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B.C. EDITION (LOWER MAINLAND) SEPTEMBER 2000 VOLUME 13 NO. 9

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David Tanaka
FROM THE EDITOR

Always-on wireless Internet access in Canada took a big step towards the mainstream in late July, when Rogers AT&T Wireless teamed up with pager maker Research In Motion (RIM) and about 20 content providers to announce a wireless Internet service.

Using this system is a no-brainer. If you know how to use a pager or palmtop device, moving onto the Net is a matter of pushing a couple of buttons. Whether being able to send and receive email or surf the Web from a restaurant or sitting on your couch is a good thing, I'll leave for the social analysts to decide. But if you want to do this, you now can—conveniently and for not much dough.

There are three components that are making this happen: the hardware platform, the service, and the content. The devices are Waterloo, Ont.-based RIM's latest BlackBerry 957 and BlackBerry 950 wireless handhelds. The larger 957, which Rogers AT&T is offering for \$549 if you sign up for a year's service, will give Palm Computing a run for its money. It's about the same size as a Palm V, and its design is equally stylish. The base functions (address book, to-do list, calendar, note taker, and calculator) are comparable to other handheld computers, and it uses a synchronization cradle like the Palm and some Pocket PCs to communicate with a personal computer. But the 386-powered BlackBerry also comes standard with a wireless modem; a necessary component in a pager that's been extended to offer general data communications, not just pager messaging.

And this is where Rogers AT&T Wireless comes in, providing the wireless data service that the BlackBerries can access with their wireless modems. The wireless data network is not new. If you've followed developments in cellular data communications, you'll recognize the name Mobitex, which Rogers AT&T introduced to Canada a decade ago when it was still known as Cantel. Mobitex's value to this party is its reach—the wireless datacommunications infrastructure is already in place in the major urban centres across Canada. Thus 75 percent of Canadians would be able to access this system today.

The third component is enablement of Web content on devices like the BlackBerry that have tiny, character-based monochrome displays. Rogers is using a micro-browser called

Go.Web, which was developed by GoAmerica Inc. The Go.Web browser is preloaded onto the BlackBerries that Rogers will be selling, and allows access to Web content over the Mobitex network. At the launch event, Rogers AT&T said it had signed up over 20 companies that would be preparing content for micro-browsers.

This is a breakthrough product that could well end up being the most significant technology implementation of 2000. It just works, and you don't need a degree in engineering to figure it out.

This isn't absolutely necessary, since the Go.Web browser tries its best to render Web pages into the small dimensions of the monochrome screen. However, translating highly graphical Web pages into straight text has its pitfalls (screen after screen of text describing graphical elements rather than displaying them, for example) and this is the problem the content partners are supposed to address. I sampled several including CBC, Schwab Canada, The Weather Network and a local site that posted traffic conditions around the city, and the screen presentations on these sites were definitely cleaner than the cross-section of non-optimized Web sites I visited.

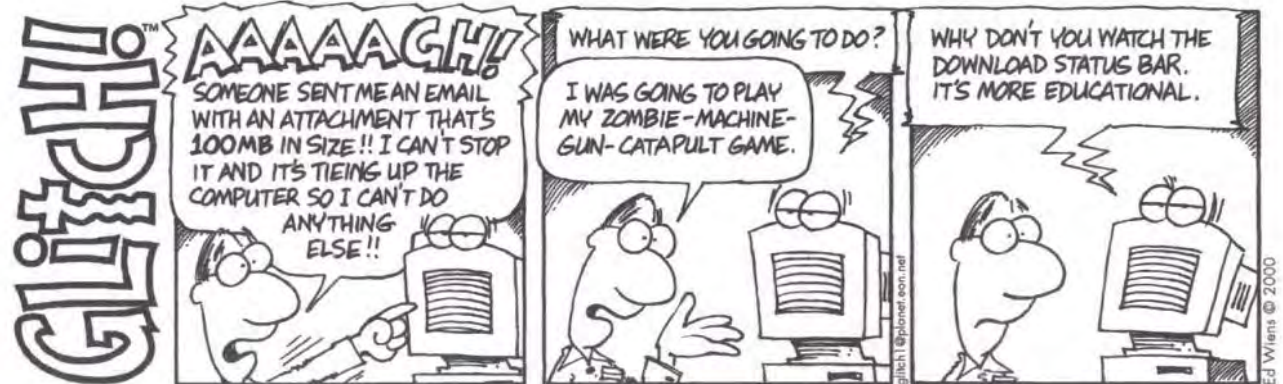
The consensus around TCP's newsroom was that this is a breakthrough product that could well end up being the most significant technology implementation of 2000. It just works, and you don't need a degree in engineering to figure it out. Local services like the address book and to-do list, and remote services like email, paging, and Web access are all simple to engage.

Of course, we're just looking at the single-celled organism stage in the evolution of this type of package. The BlackBerry's monochrome LCD screen, while as good as any on the market, is still hard to read under some conditions, especially when compared to the TFT colour screens on the latest Pocket PCs, or even the lower resolution colour Palm IIIc. Having 20 content partners on board is a start, but that's a paltry compared to what's available on the Web at large. And wireless data access, like cellular phone access, is restricted to a service provider's coverage area. Moreover, if this system becomes popular, accessibility and response time, which presently is surprisingly good, will suffer.

Rogers AT&T isn't the only national wireless datacomm provider, and RIM competitors like Palm and the Pocket PC gang are already offering ways to retrofit their devices with wireless modems and micro-browsers. Expect other kinds of partnerships to emerge among the digital wireless carriers, and handheld device makers.

But Rogers, RIM, et. al., are first out of the chute. And as one of my colleagues likes to say, it's a darn fine start.

Interesting times ahead!
David Tanaka, Editor



The Computer PAPER

Canada's Computer Information Source

VOL. 13, NO. 8, AUGUST 2000

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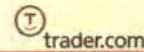
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PCC-0800

More on LiveMotion and Flash please

Following is a question and answer exchange between reader Leon Phillips, and software reviewer Jacques Surveyer:

Q: Can you set up rollovers that link to changing text blocks on the same page?

A: Yes, but you must do the output in Javascript and add your own code. LiveMotion will not do it for you. In Flash, you program this.

Q: Can rollovers have sounds attached to them?

A: Yes, in both LiveMotion and Flash.

Q: Can you set up animations or still images

that fade in and fade out slowly?

A: Yes. This is easy to do in LiveMotion, but harder to do in Flash.

Q: Can the speed of fade ins be sped up or slowed down?

A: Yes. You control frames per second in both. It is an easy setting.

Q: Can graphics or animations be set up in Flash and imported into LiveMotion? I.e., are LiveMotion and Flash compatible?

A: Not yet. LiveMotion cannot import and edit either the .FLA (design file in Flash) or the .swf runtime file. Flash cannot import and then edit .swf files either.

Once files are compressed into .swf format, there can be no more editing on the file.

It's X, not X-Windows

I enjoy reading your paper, and am always pleased when a new issue appears at my usual pick-up point. I do have a quibble with an article from the July 2000 issue, entitled "WordPerfect Office for Linux a desktop contender." The report notes: "The minimum system requirements on the software side are Linux Kernel Release 2.2 or higher, and X-Windows."

X; or X11; or X Window System; or X Window System, Version 11; or X Version 11 is never X-Windows. This may seem a small

point, but your paper is an educational tool for most users for Linux and X, and accuracy should be a prime consideration for any article.

Please continue the good work in publishing a quality paper, keeping in mind your responsibility as an educator of the masses.

Peter McPhee

TCP replies: Thanks Peter. We are doing penance by writing "I will not say X-Windows in public" 1,000 times on the chalkboard.

Vopt rocks

In the July issue, Chris Metten had an article on the Golden Bow Vopt99 defrag program. On his recommendations I downloaded and ran the software. To say that I was astounded at its speed would be an understatement. A highly recommended product indeed.

Shant Demirdjian

Opting out of spyware

You hit the nail on head with the July issue's Last Byte ("The eyes of the Web are upon you"). There are many people and businesses out there on the Internet who are collecting data on us without our consent.

This is why I and over one million others have joined in opting out of this data collection. You mentioned one site for information on opting out, <http://grc.com>, where there is a free program that removes some of the spyware from your computer. It works. Another site is <http://www.zonelabs.com/>, where you can download a free firewall, for home computers, this works great.

There are also newsgroups which help people to safely delete spyware. Try news.grc.com and select "optout" and any of the others there.

Douglas Ross

PC music report discordant

Your August 2000 issue lives up to your well-earned reputation as a good mag for PCs. The coverage of Aurenja Entertainment of Calgary was quite insightful, and "The Question of Content" feature article was good.

However, the lab report "Like Music to Your Ears" is not quite there. Yes, one needs a high-end, but not necessarily very expensive recording studio to generate professional quality music, [but] the most important aspects of music-making, i.e. great musicianship, talent, dedication, and the necessary but useful skills of a good recording engineer, and a producer are sorely missing in the article. It takes more than just a computer and a few sound cards to make professional music.

Samuel King

Web goes way of VCR

NB—Describing the way the Web works, or can work, people invariably refer to metaphors—the new television, the new radio. A company called Spot On is making the Web work like a VCR. The company has introduced a "Web Player" engine that it says allows users to "turbo charge" their ability to navigate around the Web. The engine cuts direct paths to Internet content across numerous sites, joining related pages into a single tour. In essence, what Spot On does is to take the capability of a Web browser's "back" button and reverse it, allowing surfers to cruise forward rather than backward through series of Web pages that are of interest to them. The Spot On engine's interface even looks like a VCR's, with buttons for "Add," "Organize" and "Send" among several others. The software is free for downloading from the company's site.

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WHAT'S NEW

Fujifilm blends digital video, MP3

Fuji Photo Film (<http://www.fujifilm.com>) has announced that its FinePix 40i digital camera will be available in North America by Fall. The ultra-compact portable camera combines digital imaging, MP3 audio and digital video into a single device. Fujifilm says it is the first manufacturer to pair MP3 audio technology with a high-resolution digital camera.



The FinePix 40i is 8.6x7x2.8 cm (3.4x2.8x1.1 in.). According to Fujifilm, it has an equivalent ISO sensitivity of 200, built-in flash, five programmed exposure modes, a USB port for transferring images to a PC, a 1.8-inch LCD screen, and uses SmartMedia removable storage media.

In addition to still images, it can capture up to 80 seconds of continuous AVI video with sound.

The device can also be used as an audio player. Music can be downloaded onto the device via its USB port. The MP3 controls (play/stop, forward/back, volume) are on a tethered remote into which headphones can be inserted for private listening. As an added bonus, the remote control can be used with the camera to take and then view captured pictures, along with controlling the camera's digital zoom.

The camera comes with a pair of headphones, two NiMH rechargeable batteries, a charger, Adobe ActiveShare photo editing software, and RealJukebox digital audio software. It has a suggested retail price of \$699.

—TCP Staff

Gateway Guardian firewall free online

NetMaster Networking Solutions, Inc. of Chilliwack, B.C., a leading provider of communication solutions based on the Linux Operating system, has announced plans to make its Gateway Guardian Personal Edition firewall software available at no charge for personal and non-profit use. It can be downloaded off NetMaster's site (<http://www.GatewayGuardian.com>) and from more than 100 other software download sites, including <http://www.tucows.com>, <http://www.download.com>, and <http://www.download.net>.

"We have done this to meet the increasing demand for firewall protection from families adopting high-speed cable, and DSL Internet connections across Canada and the U.S.," said Steve Hemenway, NetMaster's vice-president of sales and marketing. "Gateway Guardian will provide full firewall functionality and ease of use to those who download it."

Gateway Guardian Personal Edition works on networks with as few as two computers or more than 500 computers.

—TCP Staff



Pocket-size digital video from Canon

Canon has introduced a pocket-size hybrid digital video camcorder, the Elura 2MC, that can be used to capture a variety of still, motion and multimedia images.

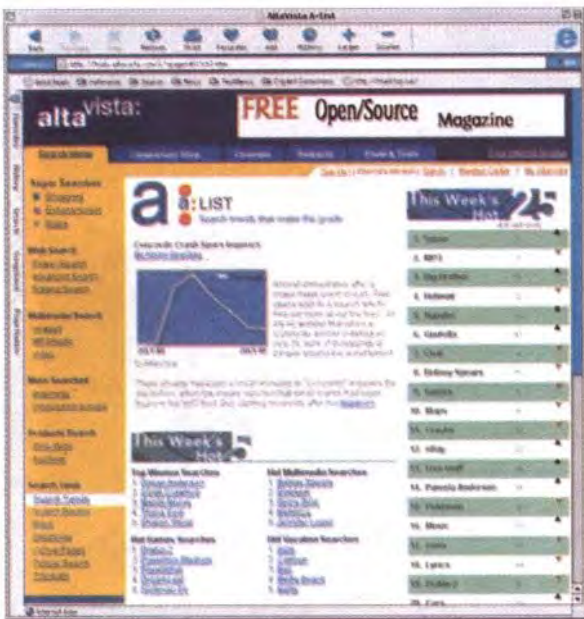
The company says the Elura 2MC offers multiple shooting modes and connectivity options, complementing DV-ready computers, televisions and VCRs for video editing, printing and sharing images.

The camera measures 4.75x10.5x8.5 cm (1.9x4.12x3.37 in.) and weighs about 450 g (1 lb.) with battery and tape installed. Video and still images are recorded to MiniDV digital videocassette.

The Elura 2MC includes three shooting modes, FireWire connectivity, 10x optical/40x digital zoom, image stabilization, a high-resolution rotating view screen and viewfinder, and digital stereo sound. Components include a progressive scan CCD image sensor, RGB primary colour filter and a three-element stereo microphone. It has a suggested retail price of US\$1,799.

—TCP Staff

AltaVista intros new search tools



PALO ALTO, Calif.—AltaVista has souped up the range of search facilities available to users of its various search engine portals.

The firm has launched a new search centre and navigation platform while simultaneously unveiling the AltaVista Entertainment Center, which it said will help consumers find audio, video and image files.

The search centre and new navigation platform is billed as providing one-click access to customized search centres, power searching and an email and tools section, in addition to a suite of new services.

According to AltaVista, the main page at <http://www.altavista.com> has been redesigned to provide a cleaner, easier-to-use interface with immediate access to a wide range of search offerings.

The Entertainment Center, meanwhile, is said to be a specific entertainment-related index to deliver the most relevant results in the fastest time. The firm said users can search within five specific entertainment categories: audio/MP3, video, images, radio and Web pages.

Ross Levinson, the company's vice-president, said AltaVista's search technology offers the hottest search categories on the Web, while weeding out duplicate pages and unrelated information that frustrate so many searchers.

According to AltaVista, the new enhancements draw on the company's patented search technology, which currently captures more than one billion Web pages.

—Newsbytes



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Computer literacy a career essential

During the past decade computers have quietly crept into every walk of life. The result has been the creation of a knowledge economy that makes computer skills important if not essential.

By Jacques Surveyer

Computing devices are pervasive. After tapering off in 1997 and 1998 because of the economic crisis in Asia, PC sales have picked up again, showing a 20 to 25 percent growth rate for the past two years. Well over 130 million new PCs will be sold this year worldwide. (Recent figures from research firm IDC peg worldwide PC sales for the second quarter of 2000 at 30.1 million units.) And this number does not include servers, game consoles, personal digital assistants (PDAs) and other handheld computers. The sales estimates for embedded computers are also staggering—more than 1.5 billion are expected to be sold in 2000.

21st Century literacy

It is easy to see how IT skills would be essential in the technology, engineering, and business sectors. However, health, law, sports, the arts and other industries outside the obvious computer-intensive areas are also being profoundly influenced by computing. There are four main factors for the spread of computers into professional and creative domains.

First, every discipline has an administrative aspect. Computers have proven their value in standalone desktop functions like bookkeeping, and are now being migrated to help manage the backroom operations and create digital infrastructures.

The Web empowers the six A's of computing:
Access Anywhere,
Anytime to Anyone
Authorized and Able.

Second, more and more products used in sectors as diverse as health and law, have computers built into them, even though they would not normally be thought of as computer equipment. Taking full advantage of these "smart" devices through interfaces and network interconnections is one of the major trends currently occurring across all organizations. This requires skills in network and communication technology, as well as computer hardware and programming.

Third, the Internet is now the most popular way for consumers and businesses to make network interconnections. However, the Web's influence goes well beyond simple point-and-click use. Collaborating workgroups, online learning, messaging and chat sessions, special interest sites with animations, multimedia presentations, and simple public postings and a multitude of other communication and collaboration services are rapidly becoming second nature on the Internet. In sum, the Web empowers the six A's of computing: Access Anywhere, Anytime to Anyone Authorized and Able.

Fourth, computers enable creative design and innovation. This is one of the more rewarding aspects of computing. Creativity



goes well beyond entertainment and games. Computers can be fun in themselves and using graphics tools can be artistically satisfying.

Increasing numbers of illustrators, graphic artists, architects and designers use computers as an integral part of their creative process. Computers can simulate most natural media, brushes and textures in painting. Musicians discover chords and melodies in their computer jam sessions that they carry over to one or more native instruments.

Computing helps the creative process by allowing artists to try out many more design impulses than they could using traditional processes. Computing also allows users to create unique effects that they cannot reproduce in the analogue world—a novel digital style.

Finally, computing enables collaboration and management of large scale creative designs that would normally be too expensive to execute using traditional methods.

So the bottom line is this: computers and computing are going to affect every aspect of your life from cradle to grave.

The recent (July 3) *21st Century Workforce Commission* report to the U.S. Congress con-

cludes: "We believe that the current health of America's economy depends directly on how broadly and deeply Americans reach a new level of literacy—'21st Century Literacy'—that includes strong academic and business skills, reasoning, teamwork skills and proficiency in using technology." Note the emphasis here goes well beyond simple proficiency in using technology. As a consultant, I would underline the importance of teamwork skills. The U.S. Bureau of Labor Statistics concludes that "employment of computing professionals is expected to increase much faster than average [defined as 36 percent or more per year]."

What computing job?

Fig. 1 shows the fastest growing category of jobs projected for the years 1998 through 2008 for all possible career categories in the U.S. We are using U.S. data because it is more recent, comprehensive, and accessible. (Note: data for all of the tables is drawn from *U.S. Bureau of Labor Statistics Bulletin, Spring 1999*) However, in analyzing the aggregates within the period 1996 to 1998, it appears the 10 percent rule of thumb is a good approximation of Canadian trends. What is interest-

ing about these job sectors is that they are not only growing quickly but that they also have some of the highest pay rates.

Fig. 1 shows the fastest growing job categories. Nine of the 20 fastest—including the top five—are computer related.

If we group the computing jobs into three categories—hardware, software and management—we can estimate the growth in positions in Canada over the 10-year period (using 10 percent of U.S. statistics as an approximation):

- Hardware: 95,000 new jobs
- Software: 82,000 new jobs
- Management: 25,000 new jobs.

Both the U.S. Bureau of Labor Statistics (in its 1998 *U.S. Statistical Handbook*) and Statistics Canada show that fewer women are participating in computer-related jobs despite the fact that computing has one of the best male-to-female pay equity ratios and one of the highest average pay rates. Recent conferences—including Microsoft Tech Ed with 12,000 attendees, and Professional Development Conference with 7,000 attendees—provided visual confirmation to this, with only about one in five participants being female. In contrast, a Project Management Institute conference had equal numbers of men and women attending, if not a slight majority of women.

Thus women continue to move slowly into senior management with Statistics Canada's national data (garnered from the 1996 *Census Report*) showing the following trends from 1991 to 1996:

Number (%) of women	1991	1996
total senior management:	17.1	20.3
mid-tier managers:	26.4	29.2
business professionals:	40.2	42.5

Continued on page 21

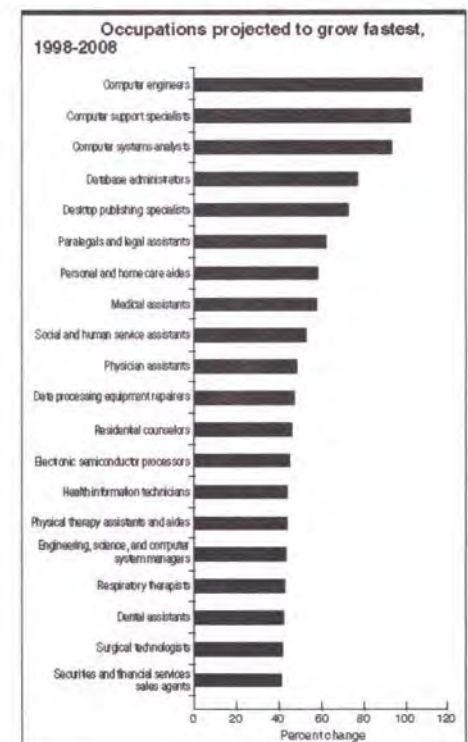


Fig. 1

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Computer literacy a career essential

Continued from page 14

The significance of this trend is that the fast track to management is widely acknowledged to be through project management experience. And computer systems development provides some of the best opportunities for a diverse range of project management experience.

What is as interesting as the growth and gender trends is how important training and education are in the computing field. The pace of change in computing might be measured by any of a number of criteria. Moore's Law continues to hold up for 30 years and counting. The result is that computers tend to double in capacity for the same cost every 12 to 18 months. Thus computers become obsolete in about three years (I wish Revenue Canada would catch on to this).

Even faster are the changes in communication capacity as the Internet is driving major leaps in bandwidth—1Mbps Web connections are replacing 56Kbps for less than double the operating cost.

Programming: computing's lifeblood

The table below shows 40 years of development of major programming languages and scripting systems. One can see some clear patterns. First, there are now more major languages to learn. Typically in a Net-based system there will be HTML, JavaScript, Java, C, C++, or Visual Basic, and increasingly some XML dialect. Only one language, Cobol, has lasted throughout the period as a major presence. Some other languages appear as shooting stars, important for part of a decade, then quickly disappearing.

Programming/scripting language evolution

1961-1970	Algol, Cobol, JCL, Fortran, RPG
1971-1980	Algol, Basic, C, C-Shell, Cobol, Fortran, JCL, Pascal, PL/1, RPG
1981-1990	123, Basic, C, C++, C-Shell, Cobol, dBase, Focus, Fortran, JCL, IFPS, Pascal, PL/1, Progress, Rexx
1991-2000	C, C++, C-Shell, Cobol, Excel, Foxpro, HTML, Java, JavaScript, Perl, PowerBuilder, Visual Basic
2001+	C++, C, Cobol, HTML, Java, JavaScript, Python, TCL/Tk, Visual Basic, VBA, XML

processing pools and computer operators—where downsizing is occurring. But by far the biggest chunk is from farming and manufacturing, where automation is relentlessly replacing manual skills. How do workers whose entire skill base is being depreciated respond to such a fundamental challenge?

Well first, note that several Canadian commissions on human resources development in the emerging economy have emphasized not just one skill category but a whole basket of skills. (See the Software and National Competitiveness Human Resources Study of the Canadian Telecommunication Industry, Canadian Consulting Engineering Industry at <http://www.hrdc-drhc.gc.ca>.)

Often the emphasis is on proficiency in a specific technology, yet as we have seen specific job skills are become obsolete very quickly. So the emphasis changes to lifelong learning and acquiring a basket of skills. Some of these skills, such as teamwork and business practices, will be applicable over a wide range of jobs and over a long period of time. Other skills such as reasoning, writing, computation, and presentations need constant polishing. Sharpness and endurance come from consistent use.

Finally, technical knowledge and proficiency require not just simple polishing but constant updates as the basic how-to knowledge changes. Fig. 2 shows how important on the

job training can be. But returning to our original conundrum: What are students, unemployed, or those in declining job categories to do about this know-how component of their skill sets?

Many are going back to school, whether night school, advance degree programs, or certificate courses—many of the latter are sponsored by computer hardware and software vendors, such as Cisco, Microsoft, Novell, and Oracle. A whole cottage industry has grown up around this certification trend.

Career training options

There are three aspects to computer training
Continued on page 23

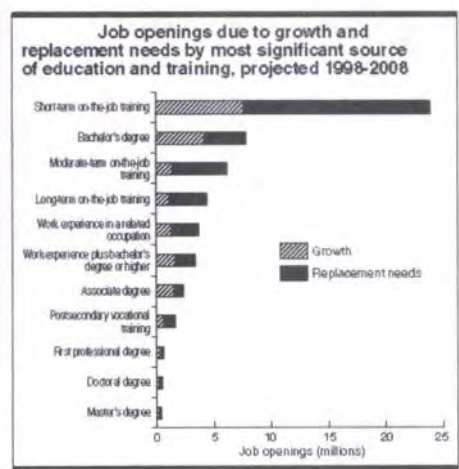


Fig. 2

Training and retraining

Fig. 2 picks up the resulting pattern in training. Short-term on-the-job training dominates a bachelor's degree by nearly three-to-one as being the most significant source of education for new job openings. In fact, on-the-job training is the most decisive factor by far for winning new job openings.

But what is an unemployed worker or a job holder in an obsolete job category to do? As Fig. 3 shows, some of the job losses are even from computing categories—such as word



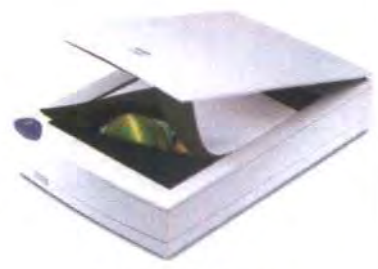
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Computer literacy a career essential

Continued from page 21

that readers will want to take into account when considering various courses. First, is the training going to expand on an existing skill set or is it going to be a substantially novel experience? Thus, a computer programmer learning a new language starts with a rich set of experience and prior knowledge to draw upon. But the same computer programmer trying to acquire project management skills may have to call upon teamwork and communication skills with which workers in other sectors may have more experience.

So before taking a training course, you have to consider if it will allow you to demonstrate your acquired skills and competencies to prospective employers in one or more effective ways.

For example, a keen programmer friend, Lyn, has kept up with the state of her art for the last two decades, largely by training herself. She is absolutely confident she can remain employable because she always conjures up a programming exercise that not only clearly demonstrates her skills, but which is also often of immediate use to her prospective employer.

However, Lyn is more the exception not the rule, with certificates being a prerequisite for many jobs. Finding out what companies require for a particular job is now easier than ever, with the rise of job sites like Monster.ca or Workopolis.com. In the computing field, most companies are posting job openings at their Web sites, so you can also do the reverse—find a job that fits your skills at a company you would like to work for.

Finally, assess the time and resources trade-off. Sure you can train yourself—after all, bootstrapping is a very honorable tradition in computing. Now more than ever, it is easy to do, with all the free programming tools and inexpensive computer hardware available.

However, before embarking on self-training consider time and resources trade-offs. It may take you six or eight weeks to teach yourself HTML and JavaScript, while a course may accomplish the task in two or three weeks. And the course may help get you over the learning hump—that first week or so when you need to ask a lot of questions that a teacher or classmate can quickly answer.

Also, be aware of your own level of self-motivation. Going to a course three nights a week sets a pace that you may not be able to match on your own. Ask yourself the crucial question: is the time gained (and perhaps the certification received) worth the resources expended?

As careers become more lifelong interests for which you can get paid, you will find lifelong learning is not work but rather part of the adventure. One of my psychology professors used to say that Bill Shakespeare got it right, we are players upon the stage, and truly now, more than ever before, we are getting to define the career roles we choose to play. □

Jacques Surveyer is a consultant and writer. See what strikes his fancy at <http://www.inforamp.net/~jbsurv>.

A place to swap stories

NB—The business-to-business phenomenon has begun to leak into the creative community. A new site called StoryXchange.com aims at becoming a place where writers of nonfiction books, unpublished novels, journalism articles, even film scripts can get noticed. Submitted stories are secured in a "story vault" and categorized by various parameters; they can be sought out by buyers registered with the portal. The site's search tool is meant to streamline the process for buyers from all media to locate and purchase material specific to their needs, the company says. StoryXchange says it plans to become the foremost marketplace for the exchanging stories aimed at use in films, TV, publishing and video, and claims that its model is superior to the others out there because of its efficiency lack of barriers to access.

<http://www.storyxchange.com/>

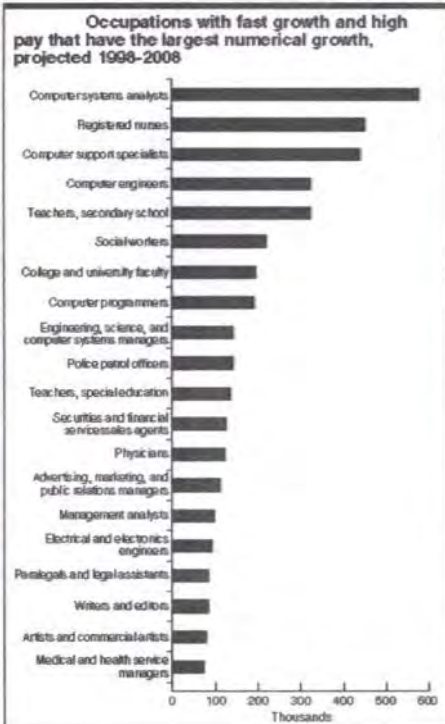


Fig. 3

For example, while teaching some introductory courses on scripting languages, I was amazed at how quickly a group of unemployed machine tool operators picked up concepts such as initialization, flow control, and other coding practices. But of course, these operators were constantly doing subtle machine preparation and planning for every new batch task they received. So they had a disposition for forecasting, planning and problem solving that translated well into the system analysis course they were taking. The lesson here is that gauging your career competencies is vital.

This is largely a self-assessment exercise, although there are professionals, especially in high schools and post-secondary institutions, who can help. But in the final analysis, only you can say how much interest, enthusiasm, satisfaction, skill, and competence you will bring to such tasks as getting people to work together well. In essence, the old Greek adage, know thyself, stands up well in an era of constant re-education.

A good rule of thumb remains: if you are taking on two or more substantially new skills, you may want to rely on formal training and courses—either by earning a certificate or diving back into school.

The second training question you'll want to answer is how are you going to demonstrate and certify your skill sets? Organizations often err badly on the side of prior work experience, putting much too much stock in it for two reasons. First, having a candidate that has made the grade in another job reduces the need to do skill assessments, which can be time consuming and error prone. Second, in addition to ability, they are trying to measure willingness—and a candidate who has done a similar job before is a known quantity in that regard.

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IBM targets digital camera, handheld markets with microdrive

The handheld market will get a memory boost in September when IBM begins shipping its newest microdrive.

The new 1 GB drive is part of IBM's growing line of microdrive solutions that the company first introduced commercially last June. Mechanically, the microdrive is a standard hard drive that has been miniaturized to CompactFlash II card dimensions (3.64x4.28x.5 cm). IBM initially offered drives with storage capacities of 170 MB and 340 MB. The drives were compatible with any

handheld or digital device that supported Type II CompactFlash slots, and could also be used with laptop computers via a PC Card adapter.

The 1 GB drive can hold up to 1,000 high-resolution photos, the text equivalent of nearly 1,000 200-page books, or up to 18 hours of digital music.

"The 1 GB microdrive is our attempt to bring the most recent advancements in storage technology to the handheld market," says John Osterhout, director of marketing for

storage technology for IBM Corp. in San Jose, Calif.

Osterhout adds that the extra storage capacity offered by the new microdrive should allow for a variety of new applications to be developed for handheld devices. It should also contribute to improvements to existing applications already out in the market for handheld devices.

Currently, companies such as Acer, Casio Computer, Eastman Kodak, Fuji Photo Film, Hewlett-Packard, and Sanyo Electric have

announced they will use the 1 GB microdrive in their existing or upcoming handheld products.

"Take Fuji Film who is a major photographic manufacturer," Osterhout says. "In February, they showed a new professional camera selling in about the US\$5,000 range that would use a microdrive. Up until then, Fuji had been supporting SmartMedia, one of the other solid-state memory form-factors. But the limitation of SmartMedia is that it holds only about 64 MB.



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IBM's microdrive (left) is the size of a CompactFlash card and stores up to 1 GB of data.

"So Fuji was looking at the 340 MB microdrive that is currently on the market and they were also aware of our product roadmap where we would have a 1 GB drive in late summer. And in looking at what their competitors were doing with their digital products and looking at the new cameras they were planning, they felt the higher capacity of the microdrives was incentive enough for designing products with microdrive compatibility."

The 1 GB microdrive will also be useful in the personal digital assistant (PDA) market. One of the criticisms made against PDAs is that they lack the necessary storage capacity to operate the kinds of applications and solutions required by business-oriented consumers. As an example, mobile professionals would be hard-pressed to use the current storage capacities of PDAs to download very large spreadsheets or product and sales databases that they would need quick access to.

Already, Toronto-based Casio Canada Ltd. sees that the new microdrive will make it easier to move its Cassiopeia Pocket PC product into larger businesses since the drive will offer the larger capacities needed to run such database applications successfully.

Steve Leach, product manager for the mobile information products division for Casio Canada, says more companies will probably use the improved drives to store multimedia presentations that can then be played back on the device.

And IBM's Osterhout expects that in the near future, wearable PCs will become much more of a reality since they will now be able to use the microdrive to store the necessary operating systems and applications easily on very lightweight devices.

—Tom Venetis

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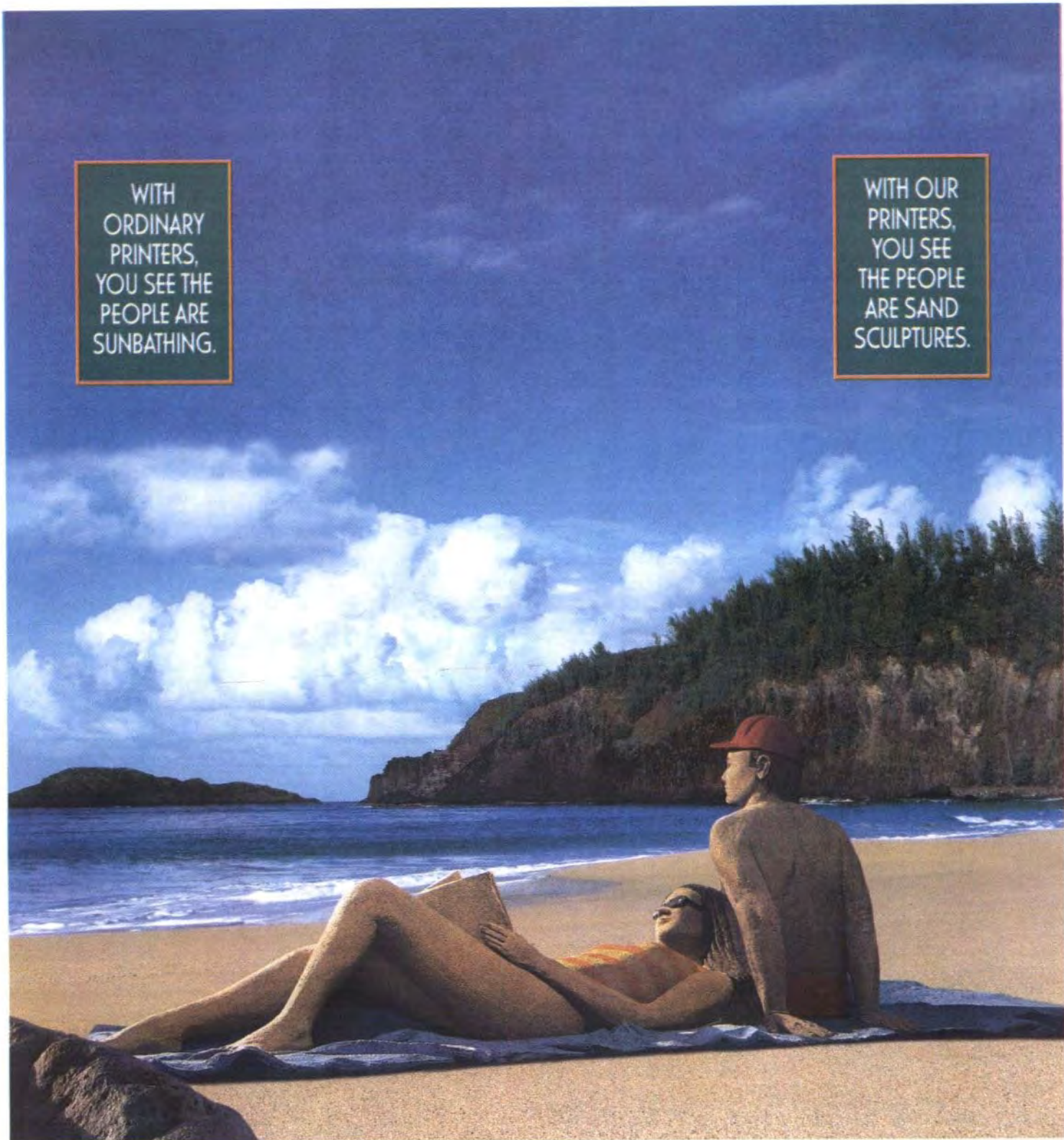
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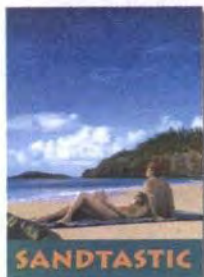
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Hands On

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Like music to your ears

Part 2: Software for notation, composition and musical fun

By Sean Carruthers

Last month, we looked at hardware and software designed to capture digital audio, then arrange and edit it. We conclude that report with a look at software aimed at the composer, and some miscellaneous software for education, utility and fun.

Notation

For a lot of people, music creation isn't done on an instrument, but with a musical staff and tons of notes. For this task, notation-based compositional software is just the ticket, allowing users to realize their symphonic ambitions on their home PC.

In addition to creating professional-quality sheet music (provided you have a high-quality printer), the packages will convert your sheet music to MIDI information, allowing you to hear what you've created, either on your sound card or external MIDI instruments.

You can also enter your data with the help of a MIDI keyboard, instead of placing all the notes with your mouse, which is a huge time-saver.

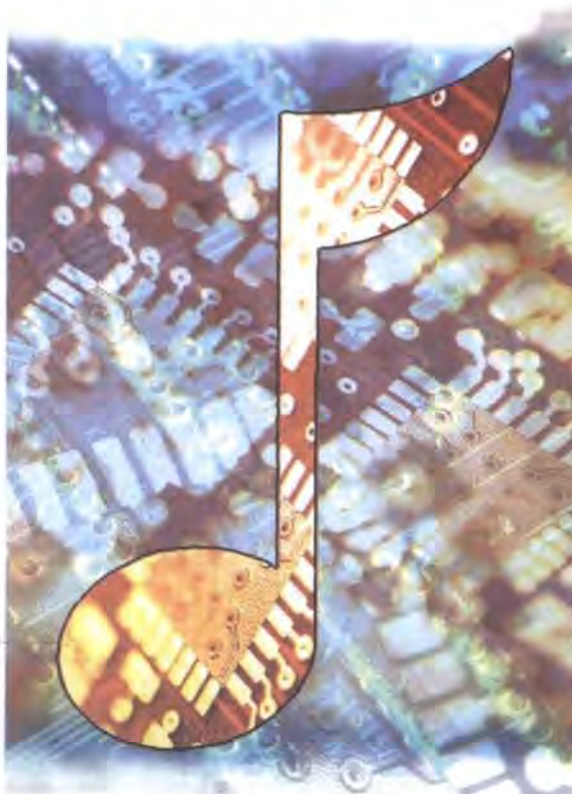
Coda Finale 2000

From: Coda Music Technology
Tel: 800-843-2066. <http://www.codamusic.com>
Price: US\$546

- Notes can be entered a number of ways, most notably through quick keyboard entry or real-time entry via connected MIDI instruments.

- Other MIDI files can be imported and turned into sheet music.
- Good for creating complicated and large scores: staves are unlimited and each staff can be easily labeled by instrument.
- Special fonts can be used, depending on what kind of output is needed, from professional to jazz and more.
- Easy transposition of sections of the score.
- Special items, like guitar tablature and lyrics, can be inserted into the score.
- Fibonacci note spacing for better music placement.
- After music is entered, you can play it back either via the soundcard using internal sound synthesis, or via MIDI instruments if you have a MIDI interface on your PC.
- Professional-quality sheet music can be printed from your own PC, provided your printer is capable of high-quality output (a higher-end consumer inkjet or a laser printer, for example).
- Between zero and 100 staff lines available for use.
- Plug-in support.
- Full pages or portions of pages can also be saved as TIFF, EPS or PICT files for export into other programs.
- Program available in separate packages for Windows and Mac OS, so make sure you grab the right version.
- Note: Finale is available for a discount (US\$275) for qualifying religious and academic institutions.

When it comes to music composition software, Finale has been the standard since it



debuted 10 years ago. It's always been a powerful solution for creating, editing and generating MIDI playback, but now it's become a lot easier to use, with updated dialogues and interfaces.

The list of Finale users is lengthy... everyone from Warner Bros through to composers for movies like *Titanic* and television shows like *X-Files*. It's been adopted as the number

Continued on page 28

HP offers one-touch colour scanning

By Dave Chappelle

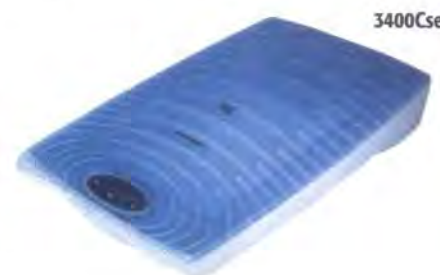
Hewlett-Packard, which makes several models of scanners, loaned the TCP Test Lab two models from the ScanJet line for review. We tested the ScanJet 3400Cse and the ScanJet 4300Cse.

ScanJet 3400Cse, ScanJet 4300Cse

From: Hewlett-Packard
Tel: 1-800-387-3867. <http://www.scanjet.hp.com>
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Colour and black-and-white scanning.
Interfaces: Parallel and USB (cables included).
Resolution: up to 600x1,200 dpi
Enhanced resolution: 9,600 dpi (with the computer interpolating what is between the dots that were actually scanned).
36-bit colour bit depth.
8.5x11.7 in. maximum document size.
Bundled software: HP PrecisionScan LTX, Trellix Web, HP ScanJet Copy Utility, Corel Photo 8.0, Adobe ActiveShare and ArcSoft PhotoFantasy.
One-touch copy, scan and email buttons.
90-day limited hardware warranty.



As with many USB devices, the software for these scanners must be installed on the computer before the connecting hardware. There are simple, step-by-step instructions for this on a poster-sized instruction sheet included in the box. The software CD-ROM has photographs of each step required when connecting the scanner to the computer. The instructions can also be printed from the disc with a single mouse-click. Clearly, HP has made the setup process as easy as possible.

The various software programs included allow users to scan, copy, manipulate, email and upload anything that can be scanned to a Web site. (I know what those of you who are bored with photocopying various parts of your anatomy are thinking right now).

Continued on page 39

Adventures in CPU Land

So, you've decided to upgrade to a faster CPU, eh? Simple, right? Not so fast!

By Sean Carruthers

There used to only be a few choices when it came to CPU upgrades, and each was pretty discrete. Socket 7 was the standard format, and your main decision was around which manufacturer's CPU to drop in; all you needed to do was select the appropriate jumpers on the motherboard. However, with the following, that soon changed:

- Pentium II moved to Intel's proprietary Slot 1, which barred other manufacturers from using the design. Some speculated that Intel was trying to shut out competitor AMD, which was steadily gaining ground
- AMD and Cyrix continued to upgrade the processors while keeping the Socket 7 format.
- AMD continued to gain ground as people

realized they could often just pop a faster AMD chip into an older Socket 7 board and not have to worry about installing a new motherboard to accommodate the new Intel chips.

- Intel retaliated by releasing the Celeron for the Slot 1, but made the mistake of not putting any cache onto the processor; resulting in most users staying away. Intel quickly redesigned the Celeron to include 128KB of cache, which vastly improved performance, but users remained wary.
- Intel's Celeron switched back to a socket-based format, this time the Socket 370, which added an extra row of pins, making the format incompatible with earlier socket-based chips.
- Intel's new Pentium III continued to make use of the Slot 1 technology.

- Intel released the 810 chipset, which was designed to work with Celeron and Pentium II chips. Incompatibilities with Pentium III caused systems with a Pentium III/810 chipset combination to lock up randomly. Intel promised to support Pentium III in the next version, the Intel 810E.
- Intel's Coppermine technology allowed the Pentium III to be run at a front-side bus (FSB) speed of 133 MHz, for extra performance. To confuse matters further, Intel began to release Pentium III in both Slot 1 and Socket 370 formats.
- AMD switched to a proprietary slot-based format (known as Slot A) and a 200 MHz FSB with its new Athlon chip.
- Intel releases the 820 chipset, which sup-

Continued on page 59





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Like music to your ears: Part 2

Continued from page 27

one professional solution because of its power and versatility and the fact that you can generate professional-quality sheet music using your own printer.

The biggest problem most of us will have is the cost: because it's a professional solution, it also comes with a professional price tag (which is not out of line with other professional software such as Adobe Photoshop, InDesign or QuarkXPress). Music students may be able to reduce the cost of entry somewhat with the available institutional discount (also available to some religious institutions). Many users may be better off with one of the less powerful solutions, reviewed below, which contain much of the same basic functionality but with fewer advanced features.

For those who want the whole shebang, though, and complete control over aspects of composition that you can't even currently foresee, it's hard to argue with Finale 2000, even at full price. It's still the standard.

Coda Allegro 2000

From: Coda Music Technology
Tel: 800-843-2066. <http://www.codamusic.com>
Price: US\$200

- More streamlined and available at more attractive price than Finale.
- Interface is easier to use than Finale because of the elimination of the more advanced features.
- Real-time entry through connected MIDI instruments and quick keyboard entry.
- Key transposition.
- Limited to 32 staves per score.
- Choice between zero, one or five staff lines.
- High-quality sheet music output possible—if your printer is up to the task.

- Pages can be saved to TIFF format (but not EPS or PICT as in Finale).
- Standard MIDI files from other sources can be imported and turned into sheet music.
- Playback is possible through either internal FM synthesis via soundcard or connected MIDI instruments.
- Jazz font can be used but program does not otherwise support multiple fonts.
- Windows/Mac OS hybrid program.

As far as functionality goes, Allegro 2000 is still quite a complete program, allowing users a lot of control over input and output. MIDI is still an integral part of the program, which means your keyboards can be used for speedy input of notes and playback when the score is done. What is sacrificed with this streamlined program are things like number of staves, ability to use plug-ins, and to custom tweak elements of the "shape" of scores, which are really more important in professional environments. If you're looking for an extremely competent program for composition that gives you professional-looking sheet music, Allegro is a really nice compromise between power and affordability.

Coda PrintMusic! 2000

From: Coda Music Technology
Tel: 800-843-2066. <http://www.codamusic.com>
Price: US\$70

- Even more streamlined than Allegro, PrintMusic! is a value alternative that gives basic functionality for the novice or those on a budget.
- Because it has a minimal feature set, PrintMusic! is the easiest of the batch to use.
- Notes can be entered either manually via software or via MIDI instruments.
- Real-time entry of notes via MIDI is possible, though a click track is necessary.

Continued on page 34



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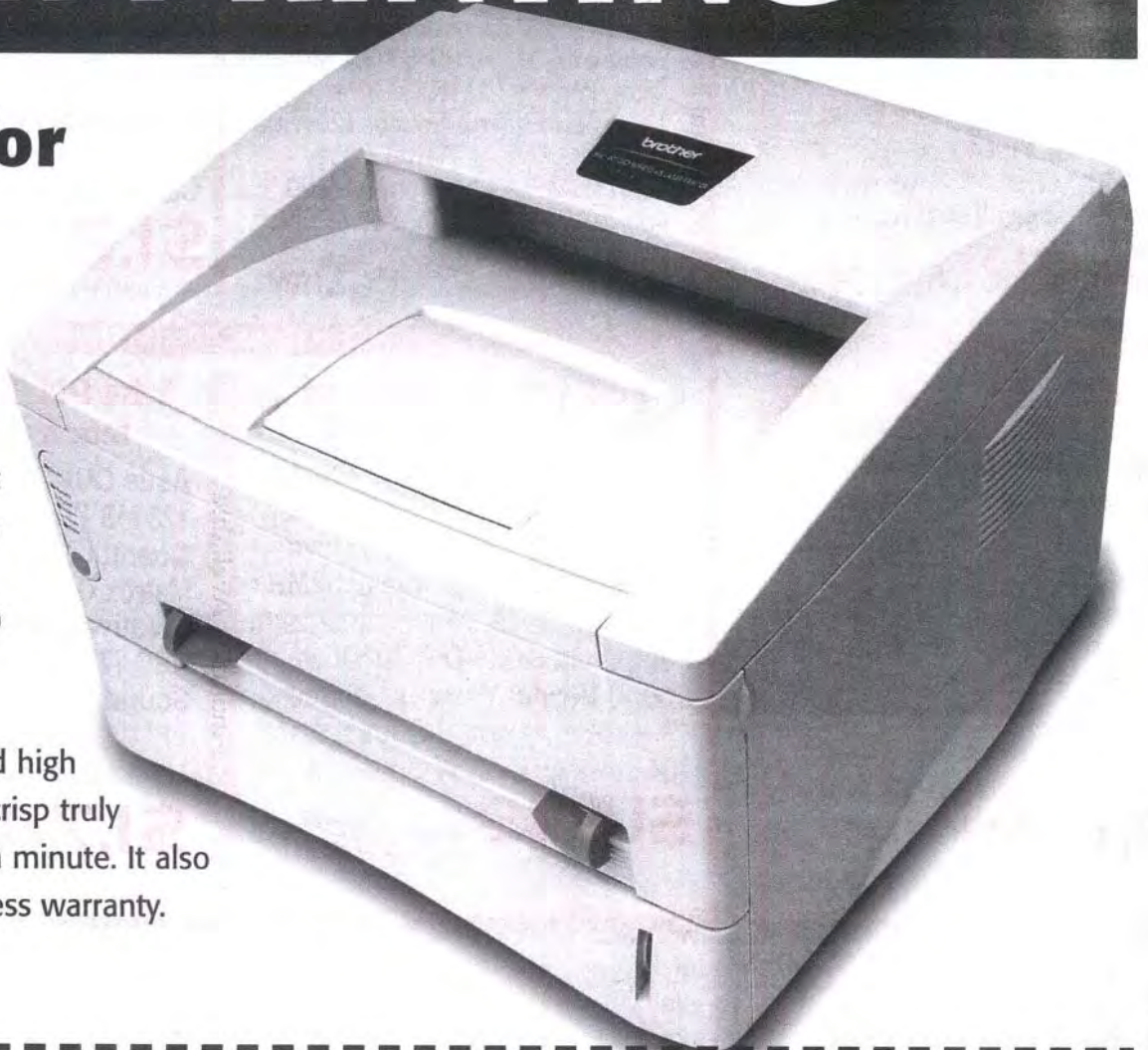
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Like music to your ears: Part 2

Continued from page 28

- Standard MIDI files can be imported and turned into sheet music.
- Limit of 24 staves per score and choice of either one or five staff lines.
- Playback of completed scores via MIDI or internal sound card.
- Program prints out professional sheet music (if your printer is capable), though PrintMusic! doesn't support output via TIFF.
- Supports key transposition.
- Jazz font can be used, but program does not otherwise support multiple fonts.
- Comes with 100 sample files for printing and familiarization.
- Windows/Mac hybrid program.

Compared to Finale, this package looks pretty minimal, but if your focus is simply on entering notes, printing sheet music and using your MIDI instruments, PrintMusic! 2000 will meet your needs. All of the fancy features have been removed, so if you want to do more complicated tasks you should double-check the complete feature list on Coda's Web site to make sure this package suitable (there is a feature comparison chart of all three Coda products to help you decide). For the beginner this program makes an excellent and powerful starting point.

Voyetra Music Write 2000 Professional Edition

From: Voyetra Turtle Beach Inc.
 Tel: 800-233-9377, <http://www.voyetra-turtle-beach.com>
 Price: US\$180

- Manual note entry with mouse and staff, or step-entry using MIDI instruments.
- Multiple composing and editing views, including score editor, piano roll style, a mixer view, event list and more.
- Playback via MIDI (if your computer has the interface).
- A 16-channel MIDI mixer included in the software, as well as sync-to-MIDI time code.
- Offers 48 tracks of music per score (96 staves).
- Lyrics and guitar tablature can be added to scores.
- Key transposition feature.
- Can import MIDI files from other sources.
- Users can print high-quality sheet music—complete or partial—provided printer is capable.
- Sheet music can be saved in TIFF and BMP formats.
- Windows-only program.
- Also available in standard edition for US\$80—which is competitive with Coda's PrintMusic! 2000.

Voyetra's Music Write 2000 offers a lot of different ways to track the music you want to

enter and edit, and offers everything you need to generate scores. In many ways, though, it's more a computer tool than a musician's tool: it's not quite as intuitive as it could be, and often displays data in a format more suitable to computer work than to musical work. This is not necessarily bad, though—those who are novices to music composition, but who have a good grounding in PC use, will have fun exploring all of the different ways to view and edit the source material.

For the professional musician, though, this program is not quite as full featured as it could be, and may often be frustrating. Novices will probably find the Standard Edition a better deal, as it offers all the basic compositional power at a more affordable price.

Miscellaneous

Music is such a big part of our lives, that there's always something that doesn't quite fit into the major categories. Some of it is fun, some of it is educational, and some of it is just plain useful. Here are a few things we looked at that didn't quite fit into the product groups reviewed above.

Dance eJay 2 Dance eJay 2 MegaKit Techno eJay

From: Voyetra Turtle Beach Inc.
 Tel: 800-233-9377, <http://www.voyetra-turtle-beach.com>
 Price: US\$50 (Dance eJay 2, Techno eJay), US\$30 (MegaKit)

The eJay packages are a really nice concept for people who are less interested in formal composition than in taking pre-fab building blocks of sound and arranging them to their liking. Each of the eJay packages comes with a ton of different samples that can be added to a timeline, edited for timing or cross-fading, sent through an internal effects processor to adjust pitch, volume, etc., or just to distort beyond recognition.

If you're not a fan of this style of music, these packages are probably not going to do much to convert you, because they have the same distinguishing feature as dance music: working best through sheer repetition and being more about giving you extended ways to move your booty. (In other words, if you're buying this for your kids, be prepared to listen to "thump, thump, thump, thump, thump, thump, etc." for extended periods.

Continued on page 39

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HP offers one-touch colour scanning

Continued from page 27

The copy button is for outputting a document or image on the scanner bed to your printer without using the software on the PC. The PC is still used for sending the file to the printer, but input is not required from either mouse or keyboard.

The one-touch copy buttons make it easy for those who don't know anything about computers

4300Cse



to make colour copies, as long as the scanner is connected to a PC that is powered on and a colour printer is connected and configured.

If the printer buffer has limited memory, the printer resolution should be lowered on some graphics images to prevent the printer memory from becoming too full to complete the print job. On small colour inkjet printers this shouldn't be a problem.

Pressing the email button optimizes photos,

text and graphics, and attaches the image directly to your email application. Of course, an email account must be configured on the PC for this feature to work.

The 3400Cse measures 49.5x30.5x9.3 cm (19.5x12x3.7 in.) and weighs 3.5 kg (7.9 lb.). HP took a paragraph from the Apple marketing handbook and made the lid of the 3400Cse translucent blue. Interestingly, there are no Mac software drivers for these scanners, so neither will work with an Apple computer.

The 4300Cse is slightly slimmer at 49.5x30.5x8.9 cm (19.5x12x3.5 in.), and slightly lighter at 3.37 kg (7.5 lb.). The top of the 4300Cse is a traditional computer beige. This system has additional copy function buttons on the front of the 4300Cse for selecting the number of copies (to a maximum of 99), and for selecting colour or black-and-white output.

The quality of images we captured with these scanners was excellent. As both provide 600x1,200 resolution at the speed of USB, they represent great value.

With its slick blue appearance and lower price the ScanJet 3400Cse may be targeted at first-time scanner purchasers. Small and home office users may be willing to spend slightly more for the extra features and more traditional appearance of the 4300Cse. □

Like music to your ears: Part 2

Continued from page 34

And beware, the sample quality is excellent, meaning you'll hear deep bass riffs coming through the walls, if your multimedia speakers are high quality.) For anyone who's a fan of dance music and wants to try to their hand, the eJay series is a bundle of fun, quite easy to use, and will help you to create grooves that will impress your friends.

My favourite of the trio we looked at was Techno eJay, though several other packages are also available, including HipHop eJay (US\$40), Rave eJay (US\$40), and various add-on packs for both.

Coda Smart Music Studio 6.0

From: Coda Music Technology
Tel: 800-843-2066. <http://www.codamusic.com>
Price: US\$120, US\$80 (vocalist or instrument standalone)

Smart Music Studio is an interesting package that aims to help those who just hate to practice. Part of learning an instrument involves spending tons of time at home, staring at sheets of music without any clue as to how it's supposed to sound or how you're supposed to play it. Smart Music Studio steps you through the process in a couple of key ways.

First, you can hear how your part should sound. More importantly though, the live accompaniment feature makes it more interesting to practice because you can hear yourself play along with all the other instruments. (So it'll be less of a surprise when you play with your band after practicing on your own and making assumptions about what the piece should sound like.)

The full package is designed for use with woodwind and brass or for vocal training. It includes two microphones (one to clip onto your instrument, and the other to use as a headset to capture your voice), as well as a control foot pedal. As you're learning a piece of music, the program plays along with you, and responds to your playing by speeding up and slowing down to keep time with you. You can also transpose, to better suit your instrument or vocal range.

Fourteen free accompaniment pieces are included with the package, and there is a 5,000 title library that users can access, for a fee. You can check for a list of available titles at Coda's Web site.

The package is also available in more specialized packages. A vocalist's version (US\$80) includes just the headset. A woodwinds and brass version (US\$80) comes with just the clip-on instrument microphone. An instructor's version of this software is also available for US\$150, with the teacher information available separately for US\$50.

DART Pro 98

From: Dartech, Inc.
Tel: 800-799-1692. <http://www.dartpro.com>
Price: US\$399

DART stands for Digital Audio Restoration Technology, which is a perfect description of what this software does. A lot of people have a closet full of old records, cassettes, reel-to-reels and more, but their sound quality is so scratchy or full of hiss that few are worth listening to anymore. The DART Pro 98 software has a number of filters to eliminate these audio artifacts, including clicks, pops, hiss, scratches, hum, and dropouts.

To do this, you being by capturing the audio to your PC via soundcard or dedicated capture device, then bring it up in DART Pro 98. If you like, the "unpack" feature will automatically separate a larger file into discrete tracks, which is really handy if you have one side of a vinyl record saved as a single sound file. Then you can apply filters as needed, either to the whole track or simply to areas that need sonic work.

The included features are the same kind as those used by professional audio restoration technicians, which means the software puts a lot of power into your hands. Of course, it's not perfect technology, and you have to occasionally do a bit of work for those really hard-to-isolate sonic problems. If you're willing, though, it gives you all the power you need to fix up most audio problems. If you have the motivation, you can restore your favourite old records and re-press them on your own custom CDs, using a CD burner.

A downloadable trial version is available at the Dartech Web site. If you like it, you pay for a key to unlock the program's full functionality, without having to download the program again. It's a bit on the pricey side, but if you've got a bunch of old recordings you want to restore, it may be worth every penny. □

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TCP Lab graphics card roundup

There's a special group of you out there—you know who you are—for whom graphic performance is everything. It's just not enough until you have the newest and fastest card out there. Frame rates have to be high and colour depth good. The card should smoke, easily handling Quake III at 1,600x1,200 resolution.

By Sean Carruthers

This month, we requested the newest and best cards from the major manufacturers of graphics cards. As is often the case in the computer industry, some manufacturers had brand new products, while others had older models (but with new products just around the corner). Because of that, we have a mixed bag of cards in this report: some for the hardcore gamers, but also some for those who looking for something less expensive or something that has a unique twist.

May the GeForce be with you

For many of us, it seemed as if Nvidia came out of nowhere to take the mantle of graphics performance champ. And take the mantle it did, making the first big splash relatively recently with the Riva TNT graphics processor. The TNT II followed shortly thereafter, but neither prepared us for the GeForce series, which not only took the performance lead but pulled out so far ahead that some of Nvidia's traditional competitors are currently running at only half the speed of its newest processor, the .18 micron GeForce2 GTS.

Since the release of the GeForce256, a few refinements have been made for the GeForce2 GTS processor—most notable are the speed improvements. Not only does the GPU (graphics processing unit) run at 200 MHz, but the speed of the memory has also been upped, to 166 MHz. Additionally, each pixel can now have two textures, double the previous, which brings the card's rating to 1.6 billion texture pixels, or texels (GTS stands for giga-textel shading).

Texture and lighting operations are now handled on the GPU, taking load off of the system CPU for faster gameplay. DVI (digital video interface) support has also been built in to accommodate the next generation of monitor interfaces, though it is currently up to the card manufacturers to decide whether or not to include the DVI connector instead of the more familiar 15-pin VGA connector. Of the

cards we looked at this month, all included the older connector.

With the increase in the clock speed of the GPU, the GeForce2 cards have all shifted over to DDR memory, which was a popular option with the older GeForce256, but by no means standard gear. The reason for this is clear: increasing the GPU speed without upping the memory speed would create a serious bottleneck. In fact, there is still a bit of a bottleneck because of the speed differential between GPU and memory, but most users won't push the cards hard enough to encounter problems.

Unlike companies like ATI, Matrox and 3dfx, who release all of their processors inside cards branded under their own name, Nvidia's technology only seems to come in other manufacturers' cards. Therefore, when it comes to GeForce2 GTS cards, you'll actually have a choice of manufacturers. From our tests that follow, the performance of one version differs only marginally from that of another, and software bundles, pricing, and warranty are the only major differences between the models, for the most part. The most rabid performance freaks will want to keep their eyes open for 64 MB versions of the cards (which command top dollar), as well as the cards that have added multimedia features, like S-VHS input/output or 3D glasses. For most of us, though, the basic 32 MB models should provide more than enough performance.

Voodoo to you too

3dfx's Voodoo technology has been big news for gamers over the last little while. Voodoo technology was originally licensed to other manufacturers and started out as add-on boards to enhance graphics cards from other manufacturers. Later, Voodoo morphed into combined 2D/3D cards branded under 3dfx's own imprint. The first 3dfx-branded cards were in the Voodoo3 line, which emphasized three things: frame rates, frame rates, and more frame rates. This came at the expense of image quality, which was forced down to a 16-bit maximum. The rationale was that for

games like Quake—which required high fill rates far more than image quality—you'd never notice the quality loss because the action would be going by so quickly.

Times change, and the Voodoo line has changed too with the introduction of the enhanced 0.25 micron VSA-100 chip on newer Voodoo boards. The new cards from 3dfx are the Voodoo4 and Voodoo5 lines, and at this point, the scarcity of the VSA-100 chips has led to an interesting phenomenon: the higher-performance Voodoo5s shipped first, and when the chips are in greater supply, the more budget-oriented Voodoo4s will become available.

The biggest change with the new Voodoo line that most users will notice right away is the shift towards image quality, with 32-bit colour capability and full-screen anti-aliasing (FSAA) built into the hardware. FSAA is designed to clean up jaggies in the picture, creating more realistic output. This is a 180-degree shift from 3dfx's original position, which was that picture quality wasn't that important. Fans of the frame rate, frame rate, frame rate school can disable the feature, however, and achieve better fills.

Another new Voodoo5 feature is multi-GPU support. The Voodoo5 5500, which we had a chance to look at this month, comes with two GPUs onboard. Dual-processor support is hardly a new thing, as ATI's Rage MAXX came with a dual-GPU design. Voodoo5, however, can support more than two—the Voodoo5 6000 will ship with four GPUs, and the technology can theoretically handle more. Still, with a theoretical rating of only 1.33 gigatexels for the four-processor design, the performance may not quite be enough to catch up to the GeForce2 in the immediate future.

Canada left in the dust?

For many years, when it came to graphics performance, the two top players were Canadian—Matrox and ATI. While both companies continue to have popular products (ATI is still the leader in overall sales),

Continued on page 44

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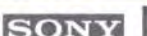
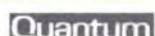
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TCP lab graphics card roundup

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their performance edge has eroded, with current models from both companies lagging behind those of Nvidia and 3dfx. What happened?

As it turns out, both ATI and Matrox have new technology on the way, but neither company had it available in time for our review.

While the Matrox GPU is still under wraps at the time of writing, ATI's Radeon technology has been announced, with specs that should bring ATI back into the raw performance game, with the Pixel Tapestry technology allowing the rendering of three textures per pixel at the card's full speed. And, as we were writing this report we learned that the Radeon started to ship, ahead of schedule, and it may well be on store shelves as you read this. We will review the Radeon as soon as we can get our hands on a sample unit (hopefully by next month).

While we're waiting for the release of the newest technology from Canada's big two, the older cards are still of note for a few reasons. Not everyone is looking for raw power, after all; some will be far more interested in Matrox's dual-head technology, and still others will find ATI's multimedia All-in-Wonder cards to be quite useful or fun.

The testing

All cards were tested on an Asus CUSL2 motherboard with 128 MB of SDRAM, and a 533 MHz Pentium III processor, with 256 KB of on-die cache. The hard drive was a 13.6 GB Quantum model, with UDMA/66 activated.

Mad Onion 3DMark scores were obtained twice: first, with card resolution set to 1,024x768, 32-bit colour depth, 100 Hz refresh and Z-buffer set to the card's maxi-

mum; the second time through, colour depth was dropped to 16-bit, as well as the Z-buffer.

Note on prices

Many of the prices listed this month were calculated from US dollars prices obtained directly from the manufacturer, so should be considered as estimates only that are subject to change based on fluctuations in the Canadian dollar. As always, suggested retail price and estimated street price are just that: suggested and estimated. Actual pricing is subject to change from location to location and from region to region.

3dfx Voodoo5 5500 AGP

Tel: 888-367-3339. http://www.3dfx.com
Suggested retail price: \$449 (converted from US\$299)

Mad Onion 3DMark score: 3024 / 3329



Highlights

- AGP 4X.
- Card is so big it requires a power connection from the PCI (A Y-adapter is included in the box.)
- Dual processors.
- 64 MB of onboard memory, up from 3dfx's previous 16 MB.
- 32-bit colour rendering, up from previous 16-bit.
- 2,048x1,536 maximum resolution (at 75 Hz).
- Drivers are available for Windows 95 and 98, but not NT or 2000.

Continued on page 46



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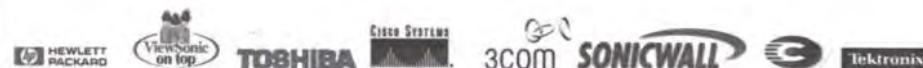
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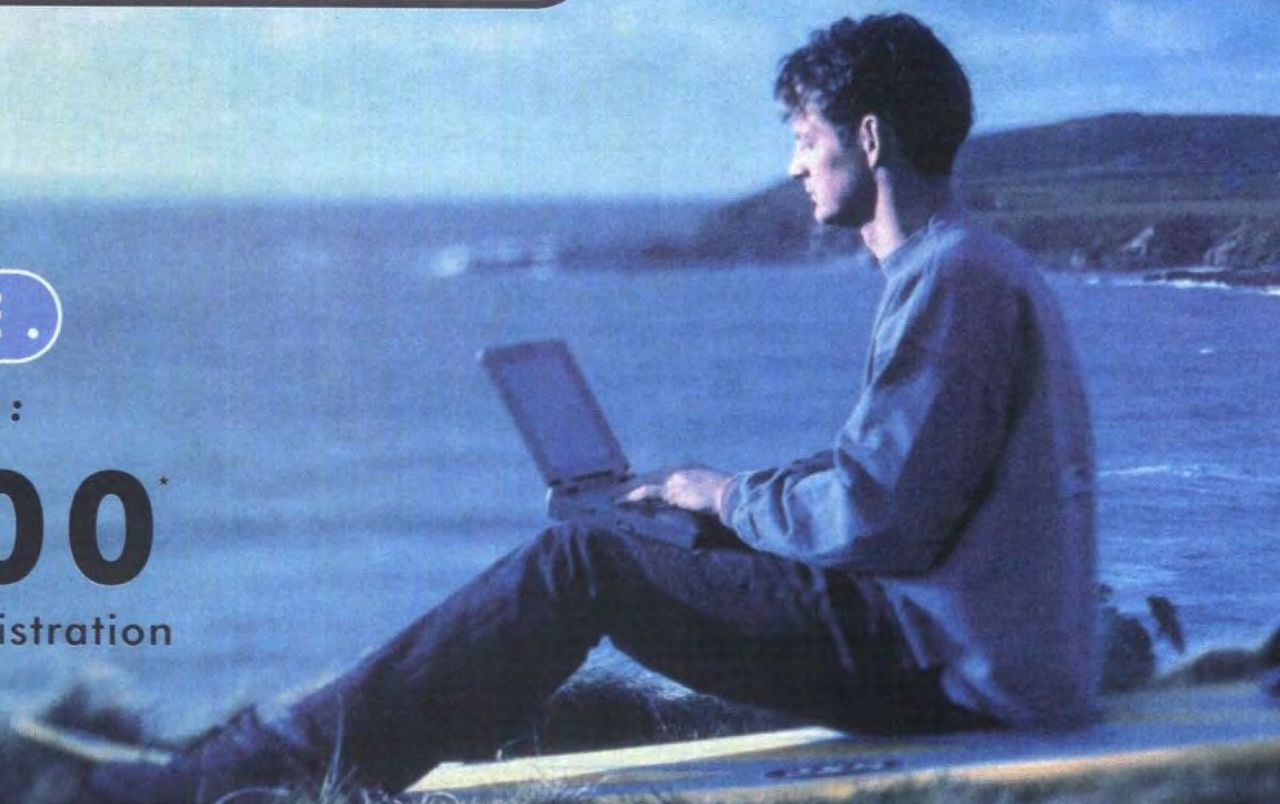
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TCP lab graphics card roundup

Continued from page 44

- Users can switch FSAA technology on or off: when on, the focus is on rendering quality and eliminating jagged edges, but when off the focus shifts to blistering frame rates (for use with games like Quake III, for example). Note: switching to FSAA makes the card take a fairly hefty performance hit.
- A PCI version is also available for those using older systems, or for those who want to upgrade the video on an integrated PC.
- DVD hardware assist is included on the card, but DVD software does not ship with the package.
- Software includes colour configuration tools.
- Comes with lifetime warranty.

Those anxiously awaiting the Voodoo4 may be puzzled by the Voodoo5, which has actually beaten the Voodoo4 to market. The difference between the two technologies is the number of processors on the card, with the Voodoo4 using a single processor design, and the Voodoo5 using two or more.

What may be more noteworthy to many gamers, however, is 3dfx's rethinking on the issue frame rates. Previous generations of the Voodoo emphasized speed over everything else, limiting rendering to a 16-bit Z-buffer and 16-bit 3D colour. Now, Voodoo users can have either just by adjusting the FSAA setting in the control panel.

When you look at the benchmarking scores

by themselves, the 3dfx lags behind the GeForce2 cards, but the image quality is actually better at the same settings, so it's not really fair to just look at the numbers—as they say, apples... meet oranges. Numbers tend to even out more at higher resolution settings, and because games built around the Unreal engine are optimized more for 3dfx cards, this card has an advantage with certain games (Unreal Tournament and Deus Ex, to name just two).

That said, the card does have a couple of characteristics that may be problematic for some users. First, the card is extremely large—nearly 25.5 cm (10 in.) long—which means the card may not actually even fit into systems where things are tightly packed

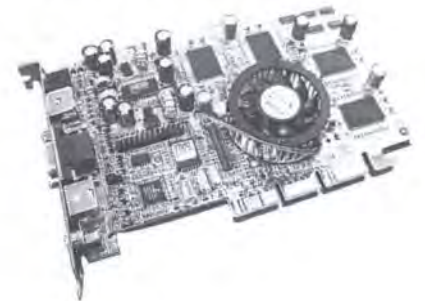
together. The card also needs to be plugged into the PC's power supply, which is another potential resource problem, but also a potentially negative trend if the idea catches on (who needs a ton of extra wires snaking throughout the PC?).

If you can afford the extra power connector though, using this card kind of feels like hot-rodding—a side-benefit for hardcore gamers ("My card is so powerful it needs extra power!"). It would be nice to see it accomplish the same job using the power delivered by the bus, however. Last big problem: if you turn FSAA on to highest quality, there can be a pretty hefty performance hit in terms of frame rates. To get both frame rate and performance, the rest of your system really needs to fly.

Bottom line: the Voodoo5 delivers excellent frame rates and beautiful rendering, which will be very appealing to the 3D gaming fanatic, and the lifetime warranty is the best in the product category. When playing games using the Unreal engine, it generates better performance at lower resolutions than the GeForce2 GTS... but it may not be enough for those of you who are looking for raw performance across the board.

Asus AGP-V7700 Pure
Tel: 510-739-3777. <http://www.asus.com>
Estimated street price: \$485

Mad Onion 3DMark score: 4141 / 5247



- Highlights
- AGP 4X.
 - Uses the new GeForce2 GTS processor.
 - 32 MB of onboard DDR memory.
 - 2,048x1,536 top resolution.
 - Works under Windows 95/98/NT/2000.
 - We tested the Pure version, which is VGA-out only. An optional upgrade allows you to use the card with Asus's 3D glasses, which have polarizing lenses to simulate 3D (when used with compatible games). The two are available in a bundle for \$545.
 - Software bundle includes software DVD player, as well as a good game bundle (including Drakan and Rollcage).
 - The bundled DVD player was very impressive, as it was not only full-featured, it was the first software-based DVD solution we've seen (not including unstable beta versions) that actually works under Windows 2000!
 - A 64 MB version of the card is also available, for a higher price.
 - Comes with a one-year warranty.

The AGP-V7700 was the first of the GeForce2 cards we looked at, which means it gave us an even better first impression than it otherwise might have. Even with the other GeForce2 cards we've had a chance to look at since, it holds up nicely, scoring the highest benchmarking result with 3DMark 2000, and boasting good compatibility across the Windows spectrum, especially with the included DVD software. Hardcore gamers may want to pick up the more expensive Deluxe version, which includes the 3D glasses, composite video out, as well as S-VHS input and output, all with similar benchmarking performance. Still, the Pure version of the card is plenty impressive as it is, as far as a basic high-performance card goes.

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TCP lab graphics card roundup

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ATI All-in-Wonder 128 Pro

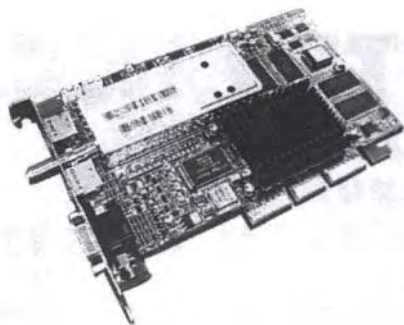
Tel: 905-882-2626. <http://www.ati.com>

Suggested retail price: \$439

Mad Onion 3DMark score: 1667 / 2093

Highlights

- AGP 4X.
- 32 MB of onboard memory.
- 1,920x1,200 top resolution.
- Uses the Rage 128 Pro processor.
- Hardware DVD acceleration takes decoding load off of the system CPU. DVD playback software is included.
- Card features coaxial input and output for use with TV and cable.



- External A/V module features S-Video input and RCA jacks for video and stereo audio inputs. Adapter cable for A/V out has S-Video out, as well as RCA video and 1/8-inch stereo audio output plug.

- Digital VCR feature records TV shows for later playback, and Hot Words feature can notify you when certain words are used.
- All of the card's multimedia components are designed for use with Windows 95/98. Basic graphic card functionality available under Windows NT/2000, but not video input/output.
- Artifacts were noticed during bump mapping portions of the tests, including discolouration and dropouts.
- Included software: Ulead Videostudio 4.0, Merlin VR, Heavy Gear II, and Need for Speed High Stakes.
- Comes with five-year warranty.

In the performance sweepstakes, the All-in-Wonder isn't going to take home the award,

Continued on page 50

Graphics card glossary

AGP (Accelerated Graphics Port)

A slot on your motherboard designed specifically for graphics cards, and designed to run at a clock speed at least twice as fast as that of PCI-based cards.

DDR (double data rate) memory

Double data rate memory means faster performance. It is becoming the preferred type for use on graphics cards now that graphics card processors are so fast. This is because it buffers the information faster and prevents data loss and video artifacting.

GPU (graphics processor unit)

A graphics processor unit is like a CPU for your graphics card.

Refresh rate

This is the number of times your monitor changes each second—measured in Hz. For example, a refresh rate of 100 Hz would mean the graphics card is updating each pixel on your monitor 100 times each second. The higher the refresh rate, the smoother the picture will be, and the less flicker it will have.

Polygons

These basic building blocks of 3D rendering are triangles slotted together in different configurations to form what resembles a wire mesh, which outlines a 3D object. Properties are then added to each of these polygons, such as colour, transparency, and texture, to create a more realistic look.

Textures

To create richer detail, a texture file is applied to a polygon surface, instead of "drawing" the texture with polygons. For example, a wood texture could be applied to a few surfaces instead of creating the wood with millions of polygons for definition. Use of polygons improves speed.

Texels

An abbreviation for "texture elements," which is a measure of the rendering speed of a graphics card. More specifically, a texel equals a pixel with a texture element added.

Bump mapping

Kind of like adding textures, but with the sole purpose of creating a 3D appearance by adding "bumps" to the otherwise flat surface of a polygon. As with texturing, this can speed up performance of the card, as it keeps polygon count down.

Lighting

To create realistic 3D scenery, lighting has to be applied like it would in the real world, with multiple sources and realistic shadows. If this can be handled by the graphics card hardware, it takes a load off the system CPU and allows more realistic 3D rendering.

Frame rate

Each 3D motion sequence is made up of a series of individual pictures, as with motion picture film. Frame rate defines how many of these individual 3D frames your computer system can generate each second. The faster the frame rate, the smoother the picture will be. If it gets too slow, the picture will appear jerky, and gameplay won't be a whole lot of fun.

—Sean Carruthers

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Graphics card specs and test results

Manufacturer	3dfx	Asus	ATI	ATI	Creative	Diamond	Elsa	Hercules	Matrox
Product name	Voodoo5 5500 AGP	AGP-V7700 Pure	Rage Fury MAXX	All-in-Wonder 128 Pro	3D Blaster Annihilator 2	Viper II Z200	Gladiac GeForce2 GTS	3D Prophet II GTS	Millennium G400 DualHead
Bus type	AGP 4X	AGP 4X	AGP 2X	AGP 4X	AGP 4X	AGP 4X	AGP 4X	AGP 4X	AGP 4X
Onboard memory	64 MB	32 MB DDR	64 MB	32 MB	32 MB DDR	32 MB	32 MB DDR	32 MB DDR	32 MB
Onboard processor	2x VSA-100	GeForce2 GTS	2x Rage Fury Pro	Rage Fury Pro	GeForce2 GTS	S3 Savage 2000	GeForce2 GTS	GeForce2 GTS	G400
Maximum resolution	2,048x1,536	2,048x1,536	1,600x1,200	1,600x1,200	2,048x1,536	2,048x1,536	2,048x1,536	2,048x1,536	2,048x1,536
Maximum refresh	160 Hz	240 Hz	160 Hz	160 Hz	240 Hz	200 Hz	200 Hz	240 Hz	200 Hz
Z-buffer	24-bit	24-bit	32-bit	32-bit	24-bit	24-bit	24-bit	24-bit	32-bit
OS compatibility	Win98	Win98/NT/2000	Win98	Win95/98	Win9x/NT/2000	Win9x/NT	Win9x/NT/2000, Linux	Win9x	Win9x/NT/2000
Included software	Colour configuration software	AsusDVD, Drakan, more	ATI DVD	ATI DVD, Heavy Gear II, more	Display utilities and demos	SoftDVD, Q3 level, Trickstyle	Display utilities, choice of games	PowerDVD and game demos	DVD player, game/gfx bundle
Mad Onion 3DMark scores									
16-bit colour	3329	5247	3302	2093	5003	2938	5390	5228	2209
32-bit colour	3024	4141	2924	1667	4077	1799	4113	4081	1554
Contact	888-367-3339	510-739-3777	905-882-2620	905-882-2620	800-998-1000	408-588-8000	800-272-3572	877-484-5536	800-361-1408
Web site	www.3dfx.com	www.asus.com	www.ati.com	www.ati.com	www.3dblaster.com	www.diamondvideocards.com	www.elsa.com	www.guillemot.com	www.matrox.com
Warranty	lifetime	1 year	5 years	5 years	3 years	5 years	6 years	3 years	3 years
Price	\$449 SRP (converted)	\$485 street	\$292 SRP	\$439 SRP	\$449 SRP (converted)	\$269 SRP (converted)	\$495 SRP (converted)	\$539 SRP (converted)	\$259 SRP

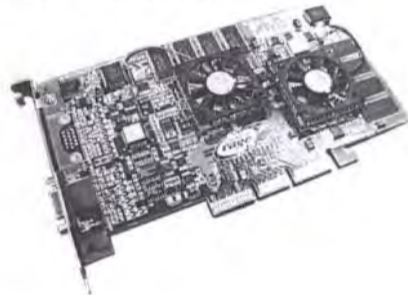
TCP lab graphics card roundup

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but that's not really the point of this card. It uses ATI's Rage 128 Pro processor, which still provides pretty impressive graphics (just a short while ago, it was top of the heap, in fact), but the real purpose of the AIW is the added multimedia functionality.

In addition to the VGA out, the AIW 128 Pro comes with a breakout box featuring S-VHS and audio input. The back of the card offers a cable TV attachment and S-VHS output, making it a full multimedia solution. (Granted, the video capture quality isn't the same level you'd get from a dedicated capture card, but for those who just want to do it for fun, it's a nice solution.) One of the nicest features of ATI's most recent batch of cards, however, is the on-card hardware DVD acceleration, which takes the load off the CPU and allows for much smoother viewing.

Mad Onion 3DMark score: 2924 / 3302



Highlights

- Uses two Rage 128 Pro processors, which limits AGP to only 2X.
- 64 MB of onboard memory.
- Designed to work with Windows 98 only. (IMPORTANT: Because of an incompatibility between the OS and the two-processor design, planned Windows 2000 driver development has been scrapped! Users who need Windows 2000 compatibility should look at the Rage Pro line instead.)
- 1,600x1,200 maximum resolution (at 90 Hz).
- Two-processor design also allows 3D rendering to be done in 32-bit colour without any speed hit, when com-

pared to 16-bit colour.

- Users may get a "black screen of death" on first install, but this can be solved by removing display adapters and monitors from the system in control panel, then rebooting.
- Some strange artifacts appeared during bump mapping portions of the test, including discolouration and dropouts.
- Comes with built-in DVD acceleration, like the other members of the Rage family, as well as ATI's excellent DVD player software.
- Five-year warranty.

MAXX is shorthand for "multiple accelerator," which refers to the two-processor design of the card. This setup uses a technology called Alternate Frame Rendering, which flips frames between the two processors, and increases performance, and colour depth during 3D rendering. Unfortunately, the setup also has a few kinks, including installation problems on some systems (the black screen noted above), but more notably the complete lack of compatibility with Windows 2000. It's probably a non-issue, though, since the MAXX is really

targeted at the hardcore gamer, and Windows 2000 isn't exactly the best choice for a gaming platform.

When used on Windows 98, however, the speed is top-notch, the picture quality is excellent, and the DVD hardware assist is always a nice touch. Even though the card's resolution maxes out at 1,600x1,200, it delivers that in both 2D and 3D modes, and at a refresh rate of 90 Hz.

Creative 3D Blaster Annihilator 2

Tel: 800-998-1000. <http://www.3dblaster.com>
Estimated street price: \$449 (converted from US\$299)

Mad Onion 3DMark score: 4077 / 5003

Highlights

- AGP 4X.
- Uses the GeForce2 GTS processor.
- 32 MB of DDR memory onboard.
- Designed for use with Windows 95/98/NT/2000.
- 2,048x1,536 maximum resolution.
- Annihilator 2 comes with FSAA for smoother picture quality.

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TCP lab graphics card roundup

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- Software bundle includes Lava, as well as colour configuration utilities and GeForce2 demos.
- Monitor output only (no S-VHS, like on some other GeForce2 cards).
- Comes with three-year warranty.

Creative's Annihilator Pro, which made use of the GeForce 256 processor, impressed us when it came through our labs earlier in the year. The Annihilator 2 is the logical successor, making use of the speedier GeForce2. As you'd expect, both performance and picture quality are outstanding.

When compared to the other GeForce2 cards currently on the market, the Annihilator 2 doesn't stand out in any noticeable way—speed and hardware features are fairly similar across the board for the most part. On the other hand, the Creative name is a good one, and those who have used Creative cards in the past won't be let down by this one, which is top-notch.

Diamond Viper II Z200

Tel: 408-588-8000. <http://www.diamondvideocards.com>
Suggested retail price: \$269 (converted from US\$179)

Mad Onion 3DMark score: 1799 / 2938



Highlights

- AGP 4X, changeable to 2X through on-card jumpers.
- Uses S3's Savage 2000 GPU.
- 32 MB of onboard memory.
- Designed to work with Windows 95/98/NT. At the time of writing, beta drivers for Windows 2000 could be downloaded, but Windows 2000 users can also use the NT drivers.
- 2,048x1,536 resolution (at 60 Hz).
- Back of the card has both S-video and composite out for use with TV or VCR.
- SoftDVD player, Quake III level, and the full version of the game TrickStyle are included.
- At present, the card does not support DirectX 7, and must use beta drivers on machines with DX7.
- Test speeds were high, but some strange colours and artifacts appeared.
- Comes with five-year warranty.

When Diamond Multimedia and S3 merged, Diamond moved away from nVidia's graphics processors, and towards S3's higher-end graphics solutions. It's slightly older technology now, and while it held up against the first GeForce cards, performance lags a bit compared to the GeForce2. While we're waiting for the next generation of Diamond cards, however, the Viper II still delivers reasonably good performance, comes with S-VHS out built into the card, and the price is getting close to half that of the newest cards on the market. For

those who don't need the fastest, this one is a cheaper alternative—and it comes with a good software bundle, too.

NOTE: When we started testing, we discovered that the Viper II became unstable after DirectX 7 (which was necessary for the benchmark testing) had been installed. We downloaded a beta driver for the card in order to complete testing.

Elsa Gladiac GeForce2

Tel: 800-272-3572. <http://www.elsa.com>
Suggested retail price: \$495 (converted from US\$329)

Mad Onion 3DMark score: 4113 / 5390



Highlights

- AGP 4X.
- Uses GeForce2 GTS processor.
- 32 MB of onboard DDR memory (64 MB version also available).
- 2,048x1,536 maximum resolution.
- Optional S-VHS video in/out module was expected to be available in July, as well as 3D Revelator glasses (polarizing lenses, which work only with compatible games).
- Works with Windows 95/98/NT/2000, as well as Linux.
- PCI version of the card is also available.
- Comes with six-year warranty.
- In addition to a software DVD player, it is bundled with two games (buyers can pick their favourite bundle).

While all of the superlatives on the package ("insane," "psychotic," "out-of-control", etc.)

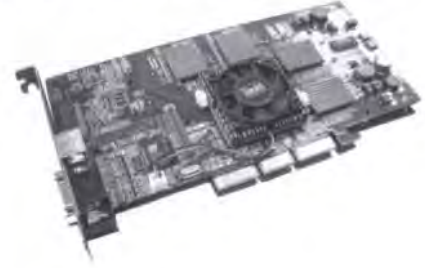
are a bit much, Elsa's GeForce2 card, the Gladiac, did manage to achieve the second-highest benchmarking score with Mad Onion's 3DMark.

The options are also nice, although they'll certainly add on to the price of the card (about US\$35 for the video module, and up to \$75 for the wireless 3D glasses). The six-year warranty is also a good selling/purchasing point for the Gladiac, as it's a longer warranty period than on any of the other GeForce2 cards. For hardcore gamers, the Gladiac is an excellent choice.

Hercules 3D Prophet II GTS 32MB

Tel: 877-484-5536. <http://www.guillemot.com>
Suggested retail price: \$539 (converted from US\$360)

Mad Onion 3DMark score: 4081 / 5228



Highlights

- AGP 4X.
- Uses GeForce2 GTS processor.
- 32 MB of onboard DDR memory.
- 2,048x1,536 maximum resolution.
- Has both monitor and S-VHS out.
- Instead of usual green or yellow circuit board, it is all blue, including the heat-sinks for the memory.
- Software bundle includes PowerDVD software and assorted game demos.
- Unlike the other cards, this card forces you to use the Add New Hardware wizard, instead of giving you an install option from the CD-ROM's auto-setup program,

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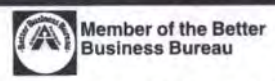
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<p>Smartbook Notebook Intel Celeron 500Mhz 14" TFT SVGA, 56K Modem 6 meg Hdisk, 64 meg ram TouchPad Mouse Lithium Ion Battery Internal Floppy & 6x DVD Windows 98, PCMCIA slot Built-in Sound & Speakers 6.8lb, champagne finish \$2699</p>	<p>Entry System Intel 810 SVGA w TV Out Intel Cache 810 AGP 64meg ram, 15G Hdisk PS/2 Mouse and Keyboard 52x CD-ROM, Floppy Drive 16bit Sound, 100w Spkrs 14" Tower Case 250w PS ACER 56k V.90 Fax/Modem Use your own monitor Celeron 566 \$749</p>	<p>Printers, CDRWs Canon BJC3000 New Separate Inks \$199 Canon BJC2100SE Color (after \$30 rebate) \$99 Lexmark Z32 Color inkjet 1200dpi \$189 Epson Stylus 670 Color inkjet printer \$139 HP 840 Color Inkjet \$229 HP 930 Color Inkjet Ret3 technology \$309 HP 1100 Laser Printer, 8ppm \$579 HP 2100 Laser Printer 10ppm \$999 Goldstar 32x/8x/4x CD-RW internal \$249</p>																																				
<p>Intel Celeron Systems: 15G Hdisk, 1.44mg Flpy 52x CD-ROM, Sound Max Intel 810 AGP Cached mem 17" LowRad SVGA Monitor Win 98 keyboard, Mouse 64meg SDRAM, 56K Fax/Modem Windows ME with Manual 14" ATX Tower 160w spkrs 566 MMx 633 MMx \$1199 \$1279</p>	<p>Intel Pentium III Starters: 15G Hdisk, 1.44mg Flpy Dr 52x CD-ROM, SB 128 Built-in Savage 4 16meg AGP 17" SVGA Monitor, .27dp PS/2 Win 98 keyboard, Mouse 64meg SDRAM, 56K Fax/Modem Windows ME with Manual 16" ATX Tower, 160w spkrs PIII 667MMX PIII 733MMX \$1429 \$1499</p>	<p>Special of the Month Athlon 750Mhz, Tekram Board 128meg PC133Mhz Ram 168pin Maxtor 20G 5400rpm Hdisk ATA-66 1.44mg Flpy drive, Built-in Sound RIVA TNT-2 32meg M64 AGP 52x CD-ROM Drive, 160watt Speakers Win 98 Keyboard, Netmouse & pad Samsung 17" 750s .24 hdp SVGA Monitor Windows ME on CD-ROM 10/100mb/s Network card \$1589</p>																																				
<p>Intel Pentium III Athlon (K7) Systems:</p>																																						
<ul style="list-style-type: none"> • Windows ME with Manual • Maxtor 20G ATA-66 Hdisk 7200rpm • 128meg SDRAM PC133mhz Ram • 16" Tower case ATX Format • Logitech Netmouse, Win 98 Keyboard • ACER Hardware 56K V.90 Modem • ACER 10/100mb/s PCI Network card 	<ul style="list-style-type: none"> • Riva TNT-2 M64 32meg AGP • ASUS CUV4X or Asus A7V K7 Board • 52X CD-ROM, 1.44mg Flpy drive • Samsung 750S 17" NI SVGA monitor .24hdp • 2xUSB, EIDE, Serial and Printer Ports • Sound Blaster 128PCI, 600watt Spkrs w Sub 	<p>Less than major brand, better components</p> <table border="1"> <thead> <tr> <th>Speed</th> <th></th> <th>Price</th> </tr> </thead> <tbody> <tr><td>Pentium III</td><td>667Mhz</td><td>\$1749</td></tr> <tr><td>Pentium III</td><td>733 Mhz</td><td>\$1799</td></tr> <tr><td>Pentium III</td><td>800Mhz</td><td>\$1949</td></tr> <tr><td>Pentium III</td><td>866Mhz</td><td>\$2199</td></tr> <tr><td>Pentium III</td><td>933Mhz</td><td>\$2599</td></tr> <tr><td>AMD Thunderbird</td><td>700Mhz</td><td>\$1769</td></tr> <tr><td>AMD Thunderbird</td><td>750Mhz</td><td>\$1809</td></tr> <tr><td>AMD Thunderbird</td><td>800Mhz</td><td>\$1899</td></tr> <tr><td>AMD Thunderbird</td><td>850Mhz</td><td>\$2039</td></tr> <tr><td>AMD Athlon</td><td>900Mhz</td><td>\$2209</td></tr> <tr><td>AMD Athlon</td><td>1000Mhz</td><td>\$2859</td></tr> </tbody> </table>	Speed		Price	Pentium III	667Mhz	\$1749	Pentium III	733 Mhz	\$1799	Pentium III	800Mhz	\$1949	Pentium III	866Mhz	\$2199	Pentium III	933Mhz	\$2599	AMD Thunderbird	700Mhz	\$1769	AMD Thunderbird	750Mhz	\$1809	AMD Thunderbird	800Mhz	\$1899	AMD Thunderbird	850Mhz	\$2039	AMD Athlon	900Mhz	\$2209	AMD Athlon	1000Mhz	\$2859
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<p>Upgrade Options:</p> <ul style="list-style-type: none"> • Maxtor 30G 7200rpm Hdisk \$79 • Windows 2000 Professional \$89 • CDRW 8x/4x/32x upgrade \$199 • Samsung 950 19" .24 \$239 • GeForce DBR 32mg AGP \$299 • Sound Blaster Live Value \$39 • 10X DVD-ROM Upgrade \$109 • SB Live w Altex Lansing ACS54 \$89 																																						

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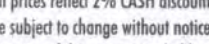
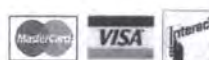
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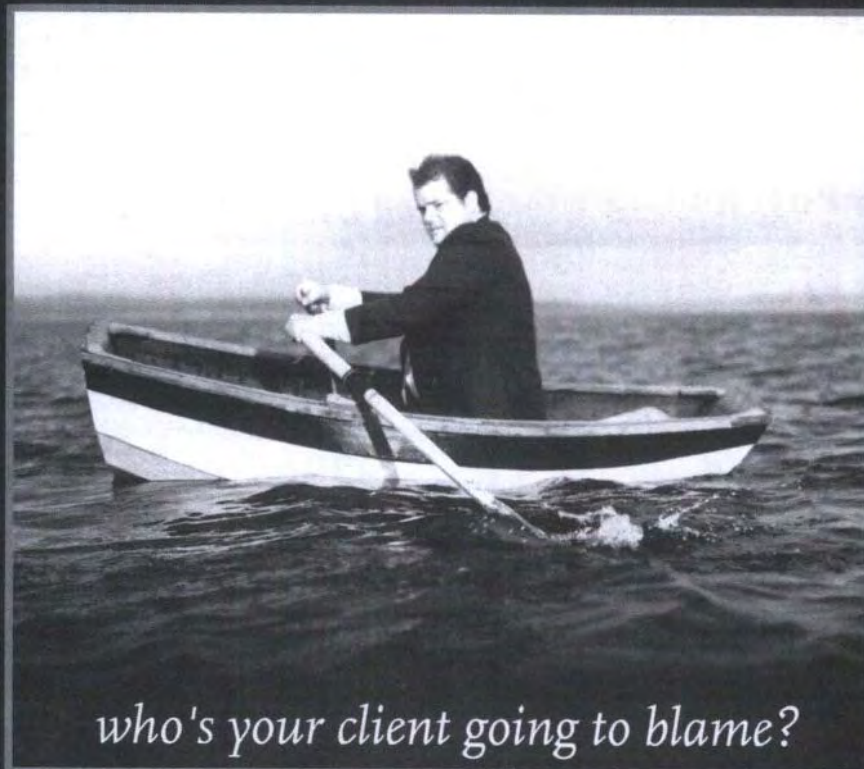
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Intel Pentium III Coppermine
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MULTIMEDIA

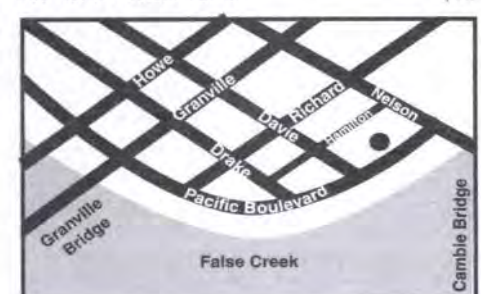
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Adventures in CPU land

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- ports Pentium III, but now doesn't support the Celeron. This is because the 820 uses a 100 MHz or 133 MHz FSB, which is too fast for the Celeron.
- AMD announced that its new Duron will also go back to a socket format (the proprietary Socket A), and will compete directly with the Celeron.
 - Intel announced compatibility problems with its 820 motherboards and recalled them. Shortly afterward, the 815 chipset shipped, which split the difference between the 810 and the 820, supporting bus speeds of 66, 100 and 133 MHz, integrating video into the chipset, but also including support for an AGP slot on the motherboard.

Lost yet? We have to admit we are, kind of. Recently we had to put a few systems together for testing, and we were surprised at how confusing it all was. We were trying to put together a system with the flexibility to test either Pentium III or Celeron chips in conjunction with certain other components, while keeping virtually everything else identical (to answer questions such as "Is there much of a difference in the performance of a system with video card X while using a Celeron, as compared to the Pentium III?").

It was at about this time that we discovered that the Pentium III was now being made in both Slot 1 and Socket 370 formats. Since the Celeron had moved over to the Socket 370, we chose a Socket 370 Pentium III, to make the test more fair. It also helped that we had an Asus CUC2000 motherboard handy for testing, which featured the Socket 370 interface and boasted compatibility with both Pentium III and Celeron right on the box.

As it turns out, that blurb on the box was

premature. While the Pentium III chip worked just fine, the Celeron was incompatible with the board, because of the restrictions of the board's FSB. Motherboards with BX chipsets or 810 chipsets handled older Celeron processors easily as a 66 MHz FSB was a standard option. Trying to get these boards to handle Pentium III chips requiring the 133 MHz FSB, however, is problematic.

What's also problematic is trying to get one of these boards to handle one of the new Celeron processors with the Coppermine core. Flash upgrades to the motherboards' BIOS should be available, but it's something that beginners shouldn't undertake lightly, as it can render the motherboard unusable if done incorrectly.

Some suggested that the best way to get compatibility with both Celeron and Pentium III was, oddly enough, to look backwards and use a motherboard with Intel's 440BX chipset and simply overclock the board to the spec necessary for the newest Pentium III processors. While the BX boards' bus can often be unofficially overclocked to 133 MHz (depending on manufacturer and model), the RAM would have to be PC133 in order to handle the higher speed. This doesn't even take into account the fact that BX boards use a Slot 1 design, which would force processors using the Socket 370 format to use an adapter interface that could impact performance somewhat. Further, the boards don't handle the new UDMA/66 hard disk interface or the faster 4X AGP spec.

On the other hand, boards using the 810E chipset would handle the 133 MHz bus easily enough, but at the expense of an AGP slot altogether. Users would have to use the less speedy PCI graphics cards, or use the potentially limited onboard video.

For a while, the only real solution that

seemed to be available, for those who wanted to switch between a Pentium III and Celeron, was a motherboard with the VIA Apollo Pro 133A chipset, potentially worrisome for those who wanted to go with Intel. On the other hand, it's one of the only chipsets that supports both 66 MHz and 133 MHz FSB while retaining an AGP slot for the video card. But it's not a perfect solution—some of the newer and faster Celeron chips may not be supported, because their speed is too high for the frequency multipliers found on the boards!

Enter Intel's 815 chipset, in late June/early July. Boards using the 815 solved a few key issues users had with previous Intel chipsets. Now, you could use processors ranging from Celeron through to the fastest available Pentium IIIs just by taking one processor out and dropping in the other (making relevant BIOS changes, if necessary), which is a step up from the 820. And if you weren't happy with the onboard video component, you could just disable it and use a more powerful AGP card, something you couldn't do with the older 810. But is it the solution that we're hoping for?

We did a few tests with a few different boards, here in TCP's Lab, to test various speeds and compatibilities.

The processors

- Intel Pentium III 600B—Slot 1 (133 MHz FSB, 512KB off-die)
- Intel Pentium III 533EB—Socket 370 (133 MHz FSB, 256KB on-die)
- Intel Celeron 600E—Socket 370 (66 MHz FSB, 128KB on-die)
- Intel Celeron 533—Socket 370 (66 MHz FSB, 128KB on-die)
- Accessory: Adapter for using Socket 370 processors in Slot 1, compatible with both Celeron and Coppermine, and all necessary bus speeds.

Motherboards

- Asus P3C2000 (Slot 1, 820 chipset, AGP, 100/133 MHz FSB)
- Asus CUC2000 (Socket 370, 820 chipset, AGP, 100/133 MHz FSB)
- Asus MEW (Socket 370, 810 chipset, no AGP, 66/100 MHz FSB)
- Asus CUSL2 (Socket 370, 815 chipset, AGP, 66/100/133 MHz FSB)
- AOpen AX6BC (Slot 1, BX chipset, AGP, 66/100 MHz FSB)
- AOpen AX34 Pro (Socket 370, VIA 694X chipset, AGP, 66/100/133 MHz FSB)

Note: We used these motherboards because we had access to them at the time of the testing. There are other similar boards from other manufacturers that would have served just as well for comparison purposes. We do, however, thank both Asus and AOpen for their assistance and sample motherboards during testing. We also thank Intel for sample units and technical information about processors and chipsets.

For our testing, we swapped motherboards and processors, but all other components remained the same (with one exception, noted below). We had a 13.6 GB Quantum hard drive (UDMA/66), a 32 MB Rage Fury card on the AGP slot (except with the Asus MEW), an 8x NEC DVD-ROM, and a single 128 MB stick of PC133 SDRAM. We tested system performance with BAPCo's Sysmark 2000 benchmarking software.

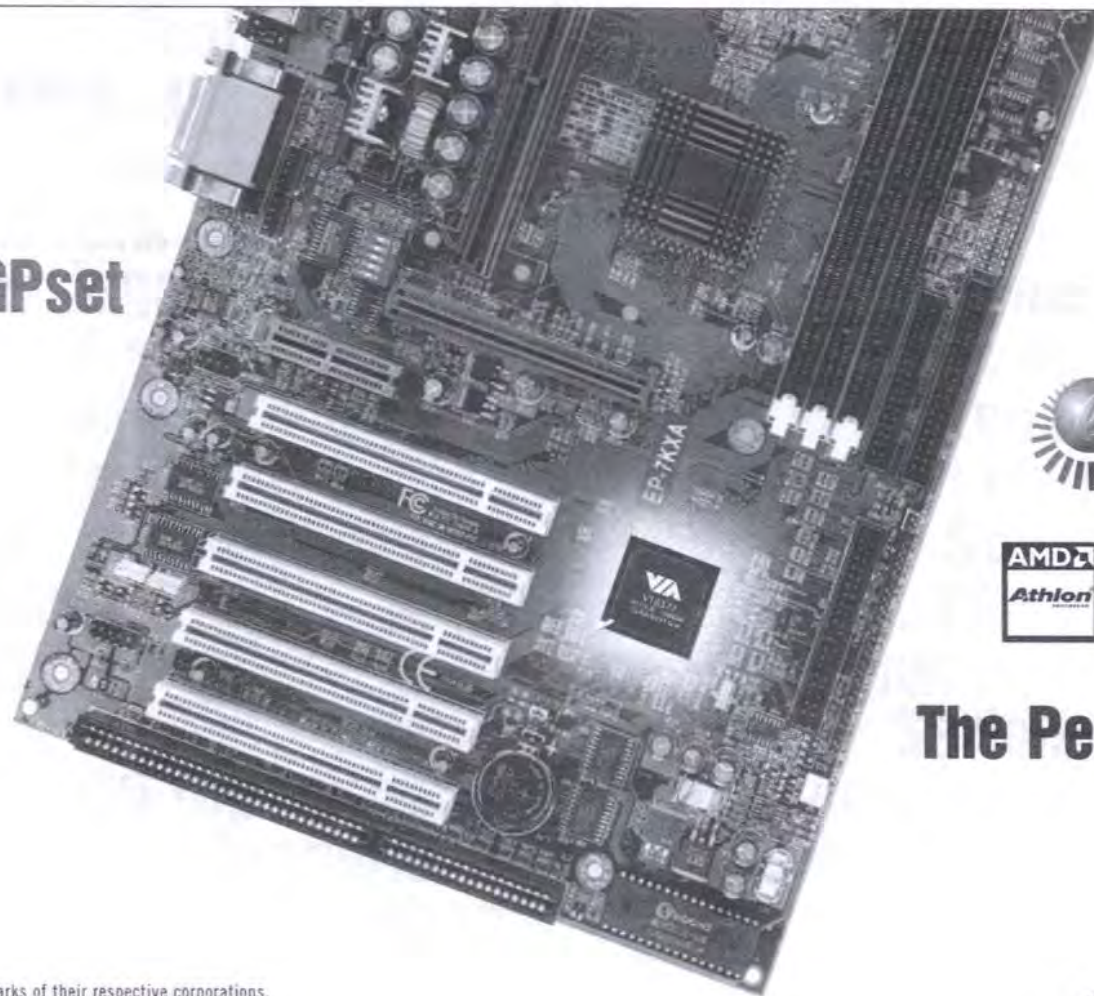
Here are our experiences with the motherboards and chipsets, in order of testing:

Asus P3C2000

The Slot 1-based P3C2000 was our first choice for our test bench because it was the newest and most feature-packed at the time. We were able to use both of the Pentium III

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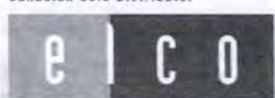
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Motherboard model	P3C2000	CUC2000	MEW	CUSL2	AX6BC	AX34 Pro
Chipset	Intel 820	Intel 820	Intel 810	Intel 815	Intel 440 BX	VIA 694X
Processor interface	Slot 1	Socket 370	Socket 370	Socket 370	Slot 1	Socket 370
UDMA 33/66/100	66	66	66	100	33	66
SDRAM speed (MHz)—Celeron	100	100	66	100	66	66
SDRAM speed (MHz)—Pentium III	100	100	incompatible	133	133, but overlocked	133
Maximum SDRAM	1,024 MB	1,024 MB	512 MB	512 MB	768 MB	1,536 MB
AGP slot	yes	yes	no	yes	yes	yes
PCI slots	5	5	6	6	5	4
ISA slots	1	1	1	0	2	1
CNR/AMR slots	0	AMR	AMR	CNR (2)	0	AMR
Onboard video*	no	no	yes	yes	no	no
Onboard audio*	no	yes	yes	no	no	yes
66 MHz FSB	no	no	yes	yes	yes	yes
100 MHz FSB	yes	yes	yes	yes	yes	yes
133 MHz FSB	yes	yes	no	yes	yes, but overlocked	yes

Sysmark 2000 scores:

- Celeron 533 (Socket 370)	FSB incompatible	FSB incompatible	87	94	86 (in adapter)	68
- Celeron 600 (Socket 370)	FSB incompatible	FSB incompatible	multiplier incompatible	109	multiplier incompatible	multiplier incompatible
- Pentium III 533EB (Socket 370)	113 (in adapter)	111	processor incompatible	121	would not run	105
- Pentium III 600 (Slot 1)	114	interface incompatible	interface incompatible	interface incompatible	118	interface incompatible

*For configurations tested—other versions may be available

Adventures in CPU land

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chips without incident but as expected, neither of the Celerons could be coaxed to work because of the lack of 66 MHz bus support. We were only able to use the SDRAM at 100 MHz because of a limitation with the board, which brought speeds down a bit. Oddly, there was little difference between the benchmark scores of the 533 MHz and 600 MHz Pentium III processors. Even with the 533 MHz in an adapter, which should theoretically hinder its performance (especially when you consider Intel's rationale for going back to a socket connector for the processor, which was that the edge-connector format provided slower performance), the inclusion of the cache right on the die of the slower processor boosted performance to virtually the same level as that of the faster processor.

Sysmark 2000 scores:

Pentium III 533 MHz (in adapter)	113
Pentium III 600 MHz	114

Asus CUC2000

This product is virtually identical to the P3C2000 except that it has Socket 370 on the board instead of Slot 1. Celeron processors still don't work in this board, and SDRAM is still limited to 100 MHz. Even more surprising, however, is that the 533 MHz chip's performance was even slower on this board than it was in the adapter on the P3C2000... but only slightly.

Sysmark 2000 score:

Pentium III 533 MHz	111
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Asus MEW

Although it was an older model, we hauled this 810 board out to test speed with the Celeron chips and the Socket 370 Pentium III. We used the internal video on this board, since there was no AGP slot to allow us to use the ATI card. The Celeron 533 MHz provided reasonable results, but we were unable to get the board to recognize the Coppermine-based Celeron and Pentium III processors, even after flashing the BIOS with the newest update.

We're sure that it's theoretically possible to make them work together, but this illustrates a peril of the just-flash-your-BIOS school of thought: it's not always a simple matter, even for those who have a lot of experience with

computer hardware, and a BIOS update may not always provide the results you hoped for. Because of the lack of AGP slot, 810 boards aren't really a good alternative for those who are looking for speed, because at some point you'll want to upgrade from the on-board video, and PCI probably won't cut it, performance-wise.

Sysmark 2000 score:

Celeron 533 MHz	87
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AOpen AX6BC

To test a hypothesis, we hauled this even older board out of storage. Tom's hardware Web site (<http://www.tomshardware.com/>) notes that BX actually outperforms the newer chipsets out there, and we have to say that we agree to an extent, but with a few serious caveats.

To use a 133 MHz bus for top performance with the processor and RAM, you have to overclock the board beyond recommended specifications. This doesn't have an impact on the processor or PC133 RAM, since they were both designed to handle that spec. Where it becomes an issue is with the video card, because this BX board uses a 3:2 ratio of bus-to-AGP to determine speeds, which means the video card would then run at 89 MHz instead of the standard 66 MHz.

Although newer cards may be able to handle this without incident, it is by no means recommended, because it will void your video card's warranty, and it will almost certainly shorten the life of older video cards... even if they seem to handle the extra speed initially.

Because of this, we can't recommend this as a solution to the problem, and only hot-rodders who know what they're getting into should attempt it. It's not a full-spectrum solution even if you're willing to take the risks, because the board didn't recognize processors with the Coppermine core, even after flashing the BIOS. Again, we're sure it's theoretically possible to get the board working with at least the 533 MHz Pentium III processor.

The 600 MHz Pentium III yielded better results than on the 820 chipset, but the 533 MHz Celeron turned in a slightly slower score, likely because the RAM was running at the same speed as the FSB, instead of at the 100 MHz allowed by the 820 chipset. What's especially worth noting about the scores

achieved is that BX boards don't have support for UDMA/66, meaning that the slower hard drive speed during the benchmarking should have dragged the scores down. That they went up despite that is curious and impressive.

Sysmark 2000 scores:

Celeron 533 MHz	86
Pentium III 600 MHz	118

AOpen AX34 Pro

The VIA chipset with Socket 370 processor interface looked like the solution to our problems, at least on paper. It has an AGP slot, and support for 66 MHz as well as 133 MHz FSB (meaning theoretical compatibility with both the Celeron and Pentium III). For that flexibility, the board is noteworthy, but we ran into a couple of issues.

Neither the 533 MHz Pentium III nor the 533 MHz Celeron achieve the same level of speed as with the other boards. Obviously, we couldn't run our 600 MHz Pentium III on the board because of the interface incompatibility, but what was even more disappointing than the speed problem is that we couldn't run our 600 MHz Celeron on the board at all.

Initially we suspected a problem with the Coppermine core, but then it hit us: when using the 66 MHz FSB that the Celeron demands, the multiplier was too high for the motherboard, and rather than running at a slower speed, it just wouldn't work at all. At the time of testing, no BIOS flash was available to address this issue.

Sysmark 2000 scores:

Celeron 533 MHz	68
Pentium III 533 MHz	105

Asus CUSL2

For those who think modern, the CUSL2 may be just the ticket. Armed with the 815E chipset, the board automatically detects the CPU and bus speed, and has a multiplier high enough to handle the newest Celeron chips. Further, the Celeron runs with the SDRAM at 100 MHz, and Pentium III runs it at 133 MHz, which is a nice improvement over the CUC2000 and P3C2000 boards (which limited SDRAM to 100 MHz no matter what).

What's modern about the board is that it takes another step towards the goal of the legacy-free PC by eliminating ISA slots completely. Instead, it features the AGP slot

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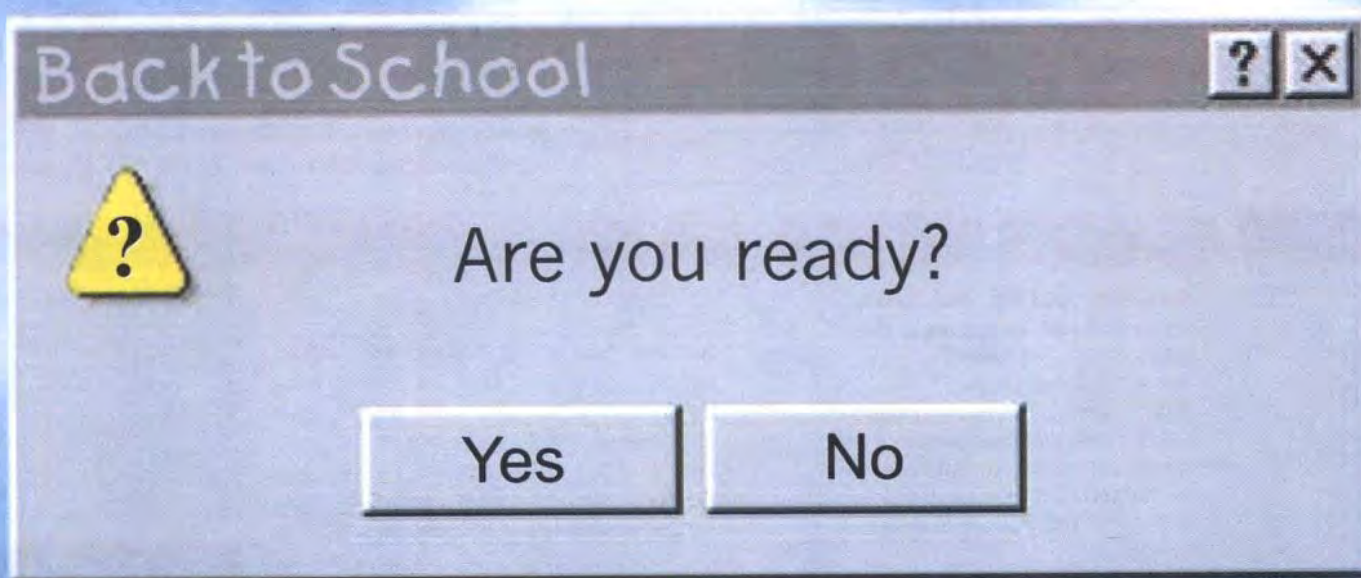
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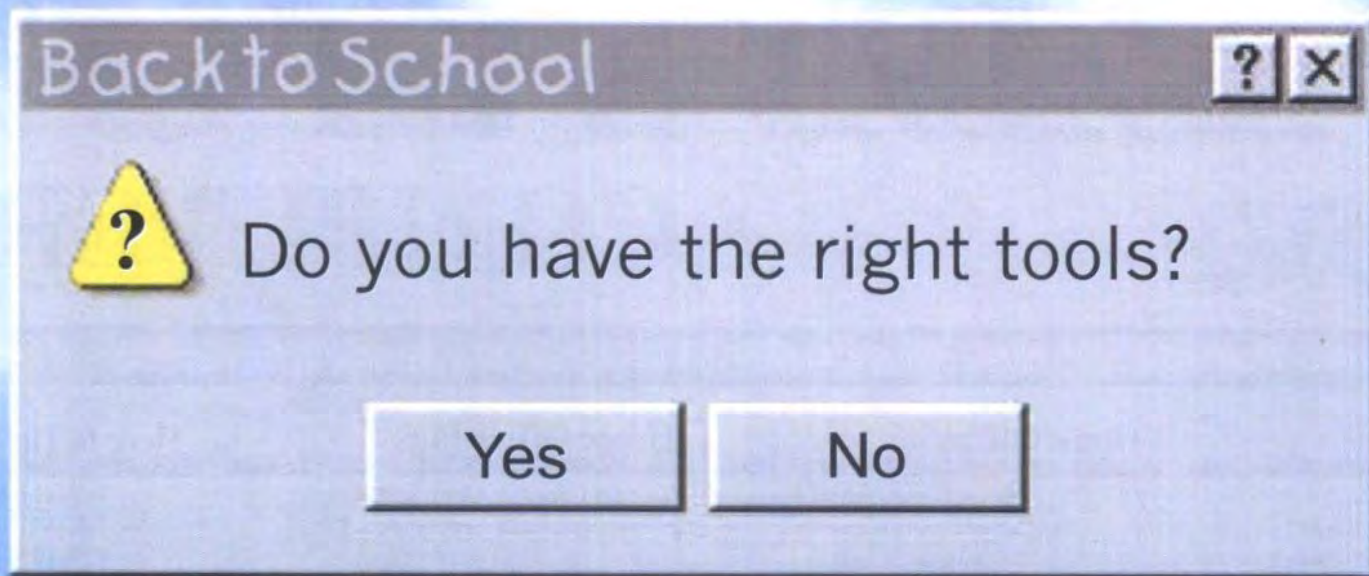
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Reseller Inquires Welcome!!!

BlackBerry targets new type of wireless users

Rogers AT&T Wireless and Research in Motion (RIM) are looking to bring on board a whole new set of customers to the wireless world with the recently launched BlackBerry handheld wireless device.

At the official launch of the new handhelds in late July, Mike Lazaridis, president of the Waterloo, Ont.-based RIM, said both companies are looking to go beyond simply offering email access to mobile customers. Instead, they want to build on the success of wireless email by adding Internet access as well as customizable content. That content can now be accessed through GoAmerica's Go.Web micro-browser, which comes with the new BlackBerry devices. The browser connects to a Rogers AT&T portal site that offers a direct connection to the Internet and links to content partners.

Currently, some 20 content providers have signed on to provide news, entertainment, weather and even e-commerce to BlackBerry customers. These include 680 News, Bank of Montreal, Canada.com, CBC, HMV.com, Schwab Canada, and The Shopping Channel. Rogers AT&T Wireless hopes to bring on board even more content providers, offering a wider variety of e-commerce and customizable news and information.

"What you will find is a whole new group of users who will access time-sensitive content as bank accounts, news groups and email," added Lazaridis.

The BlackBerry comes in two versions, the 957 and the 950. The 950 looks like a traditional pager, but with a QWERTY keyboard and display. The 957 is essentially the same as the 950, but has a larger screen, which makes surfing the Web easier. Both BlackBerries come with the BlackBerry Desktop software—which includes a schedule, contact list, task and memo pad, and an email client—and a cradle for syncing data with a PC.

RIM's Lazaridis added that the key to the success of the BlackBerry will be that it can be left on all the time, allowing the user to connect to the Internet and email instantly.

"By leaving it on all the time, it makes this device one that keeps you in touch with what you need almost passively," he said. "So when some urgent information needs to get to you, it finds you and alerts you."

David Neile, vice-president of new product development for Rogers AT&T Wireless in Toronto said the BlackBerry can keep in constant touch with the Net because the bulk of the conversion work—to make Web data readable on the BlackBerry—is done off-line, rather than by the device itself.

The Go.Web client connects to a GoAmerica proxy server that pulls the Web page, then converts it to a format that can be read by the Go.Web microbrowser. This means Web sites are loaded quickly, conserving bandwidth and even battery life.

—Tom Venetis

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Blackberry IE does handheld wireless right

Hands-on verdict: this new wireless computer is the most insanely great gadget of the year 2000

By Jeff Evans

Rogers AT&T Wireless introduced a new mobile Internet service built around the Research In Motion (RIM) BlackBerry 957 handheld computer in late July, with about 20 Canadian companies announcing online services tailored to the new wireless platform.

BlackBerry 957 Internet Edition

From: Research In Motion/Rogers AT&T
<http://www.rim.com> or <http://www.rogers.ca>
 Price: \$549 (with 12-month connectivity agreement), or \$449 (with 24-month agreement)
 Airtime fee: \$25 to \$50 per month

The new BlackBerry Internet Edition is a model 957 handheld with preloaded Internet software, including a Go.Web microbrowser, which permits some degree of wireless access to most HTML Web pages, not just wireless-optimized Web services.

Hands on

The BlackBerry 957 weighs about 141 g (5 oz.), including battery, and looks somewhat like a Palm handheld computer, with a monochrome screen taking up much of the front of the device. Unlike the Palm devices, however, the BlackBerry does not have a touch-sensitive film over the screen. As a result, the BlackBerry 957 screen display is clearer and easier to read.

For input, the BlackBerry relies on a tiny keyboard, which is cleverly designed to be quite usable in spite of its small size. The principal navigation device is a trackwheel on the right of the BlackBerry's case. By turning the trackwheel, one can quickly scroll through options. Clicking the trackwheel makes a selection. It is very easy to use, after even a few moments of experimentation.

Once powered on, selecting the radio antenna icon on the screen and clicking the trackwheel can activate the BlackBerry's wireless connection. Selecting a button that says, "proceed to my mobile.rogers.com Web Mail account" activates the wireless email account that comes with the BlackBerry. On our review unit, the email service was already activated. Once powered up, the BlackBerry remains active and ready to receive wireless data at any time. This always-on, two-way wireless capability was RIM's original claim to fame, allowing all BlackBerries to function



RIM's BlackBerry 957 (right) is slightly smaller than Palm's colour handheld device.

as two-way pagers and messaging units, 24 hours a day.

Becoming familiar with the Internet capabilities of the BlackBerry 957 was fun: I just checked out the slew of preloaded wireless services, from weather to stocks to entertainment. The BlackBerry Internet Edition functions remarkably like a real Internet connected PC, because that, in spite of the small size,

is what it is. The unit has the power of a 386 PC built in, and when checking out Web site addresses, I was surprised by how fast it connected to different Web sites, and how many ordinary Web pages were readable. About 30 percent of general Web sites I went to were not really compatible with this device: it is limited in its ability to access dynamically served pages, and heavily formatted pages

with lots of graphics are beyond the small monochrome screen's ability to display.

Nevertheless, a host of Canadian Internet publishers, such as the CBC, Buybuddy.com, Canada.Com, the Weather Network, CTV Sportsnet, and Excite.ca have made BlackBerry-optimized content available.

Reflecting the anticipation that many early

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PentiumIII					
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800(FC-PGA)	\$449 \$439	633A(FC-PGA)	\$229 \$219	900(Thunderbird)	\$659
					600(socketA) \$129
					650(socketA) \$163
					700(socketA) \$229

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 DigiCom 56K/Acer 56k \$49/39

Adventures in CPU land

Continued from page 61

teamed up with six PCI slots. Two of these PCI slots share brackets with communication and network riser slots, which can be used to add inexpensive modem or network cards to the system.

The motherboard handled UDMA/66 with little problem, and is even rated for the newer UDMA/100 spec. Further, Asus has recognized the growing use of USB and has included a bracket with additional ports, for those with more than two devices.

A couple of drawbacks, though: if you have any ISA cards, they'll have to be replaced. Secondly (and more importantly), even

though there are three slots for SDRAM, the board limits you to 512 MB total.

That said, we were able to run all three of our Socket 370 processors on this board without too much fiddling in the BIOS (it asked us to confirm the speed on bootup, but that was it). Even better is that all three of the processors turned in their fastest scores here. In fact, if you look at the number, the Celeron 600 turned in a score nearly as fast as the 600 MHz Pentium III chip on the 820 boards. Impressed? We thought so.

Sysmark 2000 scores:

Celeron 533 MHz94
Celeron 600 MHz109
Pentium III 533 MHz121

Conclusions

It only takes a quick look at the chart we've compiled to realize that processor/motherboard compatibility has become a minefield, and Intel has to take a lot of the responsibility for this by introducing so many different types of processors and chipsets in so short a time, each with its own quirks.

For those who want power but the flexibility to switch between processors, the 815 chipset looks like the best bet at present, as long as the motherboard comes with the AGP slot. The Asus CUSL2 board we looked at had everything we were looking for, and we would certainly recommend it.

All you have to do is look at the price dif-

ference between the Celeron and the Pentium III to know where your better value is, processor-wise. When teamed up with a Celeron chip, the 815 looks like a reasonably good bet for a lot of users.

Those who need a ton of raw processing power may still want to stick with a Pentium III system (you still can't use the Celeron in multi-processor systems, after all), though if pure power isn't so much of an issue, the performance gap between the processors seems to be narrowing. □

BlackBerry IE does handheld wireless

Continued from page 69

adopters of the BlackBerry Internet Edition will be skewed towards mobile business users, many of the pre-loaded BlackBerry services have a finance and business orientation, including services from Bank of Montreal, Scotiabank, Schwab Canada and TD Bank Financial Group.

The BlackBerry 957 slips into a clip-on holster that can be attached to a belt, adding to the road warrior/gunslinger ethos of the mobile computerist.

The BlackBerry 957 Internet Edition costs \$549, if purchased with a 12-month connectivity agreement, or \$449, with a 24-month agreement. The monthly airtime fee options range from \$25 (calculated for 75,000 characters of data) to \$35 (for 250,000 characters), or \$50 per month for unlimited use. U.S. roaming capability is an additional \$25 per month.

The existing Mobitex wireless network allows the BlackBerry Internet Edition service to cover the major urban centres in Canada, offering the potential to reach about 75 percent of the Canadian population, according to Rogers AT&T representatives.

With this service, the RIM BlackBerry becomes real competitor to the Palm platform, although the Palm's huge lead in numbers of users and third-party hardware and software options mean the BlackBerry has a lot of catching up to do. Nevertheless, Palm Canada head Michael Moskowitz has vowed to make all Palm handhelds "wireless enabled" in the near future, a strategy that will be essential to success for any player in the mobile computing market.

As for this reviewer, the best word to describe using the BlackBerry is "refreshing." So simple, enjoyable and productive to use that it constitutes the best out-of-the-box experience I've had with a computer product in over a decade. □

Microsoft takes PC Games to the Mac

NEW YORK—Software giant Microsoft Corp. announced at the MacWorld Conference & Expo held in New York in July that it would be developing Microsoft-brand computer games for the Macintosh platform.

Development of the Mac computer games—including popular Windows games like Age of Empires II, Links and Flight Simulator—will be undertaken through an alliance with a new start-up company. The company is headed by Peter Tamte, founder of MacSoft and former senior director of worldwide consumer marketing for Apple Computer Inc. Games will be developed for Mac OS 8, 9 and X users.

Apple's relationship with Microsoft is getting better and better, Apple chief Steve Jobs has been reported as saying at MacWorld, as a Microsoft representative took the stage to show off Office 2001 for the Macintosh. That product, due in the fall, will include many Mac-only features.

—Newsbytes

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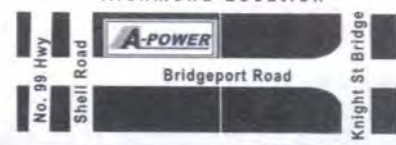
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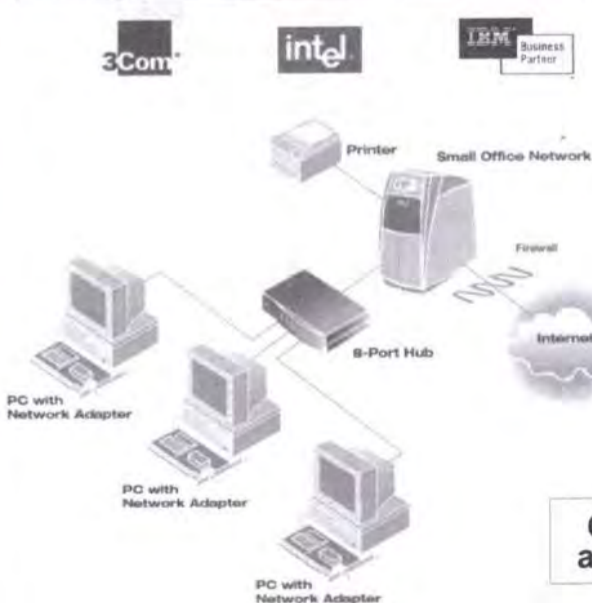
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G3 / G4 Processor upgrades table with items like Newer MAXPower G3 240-266MHz 750 w/512 Cache, etc.

Mac Software table with items like Mac OS/9, Adobe InDesign, Adobe GoLive, etc.

USB from A to Z table with items like Macally iMouse 1 button USB, Macally iVoice USB Microphone Adapter, etc.



Portable solutions Web solutions for small business

IBM ThinkPad

Table listing IBM ThinkPad models and prices, including i1210, i1230, i1250, i1422, i1482, i1492, i1542, 240, 600X, A20m, A20m P3-500, A20m P3-700, A20m P3-700/128, A20p, T20, T20 P3-650, T20 P3-700.

Compaq

Table listing Compaq models and prices, including V300, M300, M700, E500, E700.

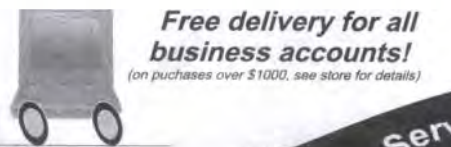
Toshiba

Table listing Toshiba models and prices, including 7200CT, 2230CDS, 2250CDT, 2750DVD, 3110CT, 3440CT, 4270XDVD, 4270ZDVD, 4260DVD, 4340, 8100, 8100 P3-650, 8100 P3-750.

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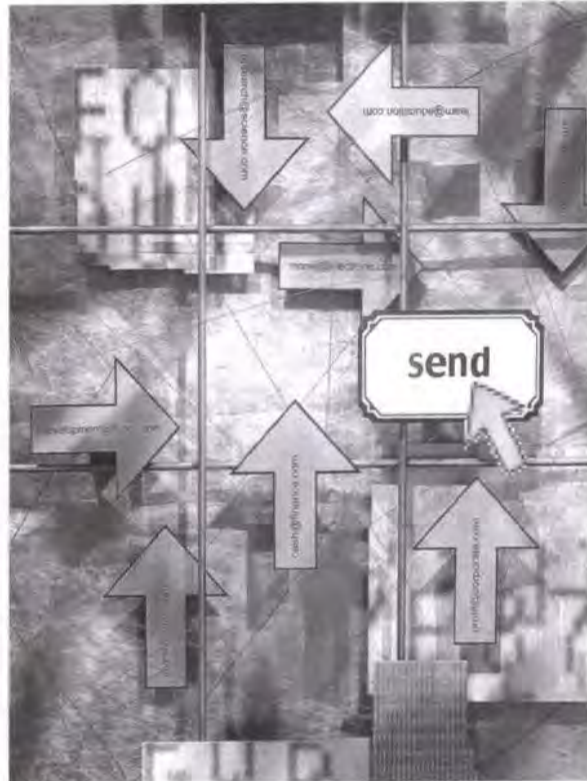
Avaya seeks to integrate messages

Lucent Technologies spinoff views messaging management as key to customer management in the e-business era

By Ross MacDonald

A few years ago, U.S.-based research firm, Gallup, did a study of 1,000 multinational workers and found that the average worker was dealing with 190 messages per day—including inbound and outbound phone calls, email, faxes, couriers, regular mail, and voice mail. The key issue for many businesses has become how to put tools in place to deal with all that communication flow. This is where Lucent Technologies enters the picture.

Allan Mendelsohn, director of marketing for enterprise messaging for Lucent Technologies in Canada, describes three stages or "waves" of business Internet use. The first wave saw businesses use the Internet primarily as a billboard or brochure mechanism. "It tended to be very static and conveyed nothing more than 'see what we're about,'" says Mendelsohn. "What was posted at this stage wasn't even



designed for the Internet, it was just existing materials put on a Web site."

Following this were early e-commerce implementations: "Basically, the Internet was used to execute a transaction instead of using the more traditional fax machine or a call centre, for example."

The third wave Mendelsohn refers to as e-business, in which Internet technology is used to connect so-called front office activities within a business to its back office activities, such as sales, marketing, support, human resources, finance, and administration.

"It's taking a very holistic view of the business when we start using the Web as a channel into the business," says Mendelsohn. "But it's very, very important that the technology as well as the business systems—and by that I mean the organization and the strategy and flows within the organization—are all highly integrated and tied together."

Mendelsohn suggests that once this is accomplished, e-business will facilitate

Continued on page 76

Microsoft describes .Net strategy

Software giant looks beyond PC-centered universe

By Tom Venetis

Microsoft recently unveiled its vision of the computing future, one in which the PC has moved from the centre of the universe to simply becoming another device among many.

In a worldwide videoconference in June, Microsoft executives outlined the company's ".Net" strategy aimed at making its applications available over the Internet as services. The .Net idea is that people do not have to be tied to a PC in order to have access to everything from an Excel spreadsheet or Word document, to entertainment and personal Internet-based services.

The move to this Internet-centered platform is in part a reaction to the growing trend towards more mobile computing among consumers, where a variety of Internet-ready devices are now connecting to the Web and networks.

"This idea that we need a new platform, a platform that takes as its centre the Internet and the user, and then takes the devices and

services those rather than having the devices at the centre," said Bill Gates, chief software architect for Microsoft Corp. in Redmond Wash. "That idea has been emerging for a long time"

The key to the .Net platform is having device manufacturers and application and service developers adopt XML (extensible markup language). XML is an open standard supported by the World Wide Web Consortium (W3C) and is used to define data elements on a Web page.

For Microsoft, XML will be used to create content and services that can be accessed and shared across any device that can connect to the Internet and can support XML-based content and applications.

"XML will transform productivity tools," Gates added. "For example, the spreadsheet will be changed by XML. The database will be changed by XML. The programming languages themselves will be changed. In fact, there will be language innovation in every popular programming language around XML."

As well as promoting XML, Microsoft announced that it will begin making servers available that will be used to deliver the various services over the .Net platform. Microsoft also hopes to have the servers adopted by a variety of Internet and network infrastructure providers so they can become the conduits, delivering those applications and services.

Rimes Mortimer, director of interactive TV and wireless for Toronto-based Microsoft Canada, said Microsoft is looking to partner with Rogers, Bell Canada, Shaw and Telus to help them develop into one-stop-shops for communications and services.

"In Canada, we only have a few players who have a national scope, who could deliver converged service to all Canadians," Mortimer added. "I think we are ahead of the game of delivering on the promise of information, communications and entertainment services from one supplier."

As an example, the type of service one might see delivered across the .Net platform would be customizable news and content.

Continued on page 79

Low-cost Internet sharing arrives

The best way to share an Internet connection is via specialized networking hardware, but until recently that has also been by far the most expensive solution. The Umax UGate-3000 Cable/ADSL



Gateway is a good example of the new breed of low-cost routers for small business. In addition to being inexpensive, it is easy to use and has many useful features.

The unit is small, sleek, and silvery. It is actually smaller than my external 56K modem. On the front panel there are LEDs indicating various kinds of activity and conditions. On the back, there are several ports.

For starters, there's a WAN port, which is just a 10BaseT Ethernet port for connecting an ADSL/Cable modem. I connected the Terayon modem Rogers supplies its customers. There are four LAN ports, too. These are 10/100 Mbps autosensing RJ-45 ports for connecting computers to the UGate-3000. If the network consists of more than four computers, the uplink port is used to connect a hub to the UGate. When the uplink port is used, the fourth LAN port cannot be used.

Making the connections is rather easy. You have to supply all of the cables, though—the unit comes with only a cable to connect the external power supply. Nor is there any software. Configuration is mostly a matter of tweaking TCP/IP parameters.

The documentation consists of a small but adequate manual. It suggests a particular sequence of steps, which I followed. First plug in the cable modem. Then run an Ethernet cable from the modem to the WAN port on the Ugate. Next, power up the router.

At this point, connect the computers via Ethernet cable to the router. If there is already an existing LAN, connect a hub via Ethernet cable to the Ugate's uplink port. The router can serve up to 253 users, but is justified in situations with as few as two users.

Select a computer to configure the Ugate-3000. Any computer on your LAN will do, as long as it has the TCP/IP protocol installed and configured to obtain an IP address automatically. It should also have version 4 or later of Internet Explorer or Netscape Navigator.

Launch the browser, and type 192.168.0.1 in the address field. That's the default address of the router. The Basic Setup screen is displayed.

In the Device Name field, Rogers users will

Continued on page 77



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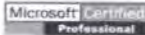


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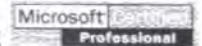
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Avaya seeks to integrate messages

Continued from page 74

getting down to a "market of one"—a unique brand worked down to very small market segments that could eventually be made up of a single customer. Market share becomes customer share.

Part of this evolutionary process is the development of what has come to be called "virtual enterprise," in which organizations focus on their core competencies and outsource everything else. "Nobody can deliver a total solution to satisfy the particular needs of every individual customer," says Mendelsohn, "so there's now a need to hook up suppliers and partners and, in some cases, buy products and integrate them with your own."

The ways in which an individual or an enterprise may interact with a business today are getting more and more varied.

—Allan Mendelsohn, Lucent Technologies

and giving them the tools to manage all of their communications needs—telephone, voice mail, faxes, email, etc.—more efficiently.

"The ways in which an individual or an enterprise may interact with a business today are getting more and more varied," says Mendelsohn, "We've got voice mail and call centre and email, for example. But look at email. Where it started out as a method of simply exchanging messages, it has now become an interaction point between customers and business. And all of these different communication channels have to be coordinated so that there's a consistent context for the customer. Today I might be interacting with a business via email, tomorrow maybe by chat and the next day with somebody in a live call centre."

What Lucent/Avaya's new products claim to do is allow you to tie all of these applications together in a highly customizable manner. While there are several products on the market focussed on accomplishing this, Lucent purports to have the solution for the next stage—tying those coordinated channels to the back office functions.

As a case study, Mendelsohn cites the Toronto Catholic District School Board, which has a large messaging system for all the teachers in its 200 schools. One of the things that typically happens is that at recess, which happens at all the schools at the same time, teachers call in to check their voice mail at the same time.

"To economize on the size of the system required, we teamed up with one of our design partners to prepare a special monitoring application that allowed staff to take a quick glance and see if they had any messages without actually calling in to the system. But as an example of third wave inte-

gration, the design partner then linked that up with the payroll system so that for supply teachers who are assigned to different schools on a day-to-day basis—and that's tracked within the payroll system—the message monitors within the various staff rooms would already know which supply teachers were at which schools and provide them with the same messaging service by name and that would move with them from school to school."

Another example that Mendelsohn provides involves another design partner creating software that links fax technology with Lucent's messaging system so that fax documents can be converted into editable files—text, tables, or images.

Adding to the complex nature of messaging is the increasing variety of devices that people use to stay in touch. On top of all the technologies cited above, people now call upon computers, Palm-type devices, cell phones, and pagers to stay in touch and access their messages. Lucent's approach has been to organize what it calls its e-communication model, which is essentially a specific Web page that launches you into customized access to information and applications: "This doesn't replace what you would be doing at your desktop computer," Mendelsohn explains, "but instead provides voice alternative access to the same information and applications you would be using if you were at your desk."

Speaking more generically, your voice mailbox today is primarily a collection point for telephone messages. But transforming the mailbox into a portal means you will soon go to the Internet or to an intranet to collect information that can be pushed through a text-to-speech application, then put into the voice mailbox. Alternatively, you may go into

your voice mailbox, then launch out from there to listen to your email as it's read from a text-to-speech application, and even reply to that message by the reverse process. Such technology is finally available in workable form.

Though you might not recognize it, the first stages of this technology are already common—even at the consumer level—as many of us interface with IVR (interactive voice response) applications linked to DTMF interfaced (dual tone multi frequency) databases when we call our banks and use voice responses and/or touch-tone commands to access our account information. Future possibilities are work flow applications in which a customer file might move all the way through an enterprise step-by-step, while emitting status messages to all relevant personnel.

Lucent/Avaya already offers Message Transcriber, which forwards a voice message to the application, translates it into text, then sends it back in written format. So, for example, if you're checking your voice mail on your cell phone from your car and there's a highly detailed message that you simply can't write down while driving, you can command that the entire thing be sent to Message Transcriber and you'll have it all written out as an email when you get back to the office. Conversely, you might dial into the application and dictate a message which will be transcribed into text.

Better for consumers and business customers alike is that the people you need to speak to can't hide behind their voice mail anymore, due to "find me-follow me" capabilities now operative in messaging software.

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you're trying to reach. As the owner of that portal, I might have programmed in two or three phone numbers—cell phone or home or cottage or something—that the system can dial. I don't have to give out those numbers to anyone, you press 'one' and I'll have told the system where to find me."

Further, if the system can't find whomever it is you're trying to reach, you will get more options back at the main menu. Lucent has also partnered to incorporate other "agents" that will monitor the status of various mailboxes under specified commands so, for example, if there are more than a certain number of messages, if any have been in the mailbox for longer than a specified period of time, or if any are marked "urgent," then the system might automatically send a copy of whichever message is flagged to alternate personnel, or send a status message to a supervisor or a reader board to ensure the message gets a timely response.

As you might imagine, all this technology is a definite boost to business. According to a total-cost-of-ownership study by the Roticotti Group, there is an average increase of 30 minutes a day in productivity for those who employ this unified messaging.

We've been told for decades that customer service is crucial to business prosperity. But thanks to the Internet and the digital age, there's the possibility that individual businesses might actually start worrying about customers spending their money elsewhere. The Internet makes that more than possible and now we know the technology exists to make customer care an economical and viable construct for business. □

LAN Line: Low-cost Internet sharing

Continued from page 74

enter something like CR123456-A. Rogers calls this the client ID. In Domain Name field, enter what Rogers calls the subdomain. In my case it's shprdl.on.wave.home.com.

Next, you need to enter values for two fields under LAN IP Address. These values are for your interior network of computers, your LAN. There's no reason not to use the default values of 192.168.0.1 for device IP address, and 255.255.255.0 for the network mask. Addresses such as these cannot exist on the Internet, and cannot be seen by computers on the Internet, which is exactly what you want.

In the remaining basic setup, you enter some other values your ISP assigned to you when your cable modem was installed. Under WAN IP Address, there are two choices: Obtain an IP address automatically and Specify an IP address. Although the @HOME system of which Rogers is a part issues an IP address automatically to the system connecting to it, it is always the same address. I found it better in this installation and others to specify this address and other parameters manually.

In addition to entering this value (Rogers calls it the PC IP) and the netmask, you also need to enter the Gateway IP address in the third field. Finally, you can enter the addresses for the primary and secondary domain name servers of your ISP. All of these values are given subscribers at the time of the original installation. They are easily obtained from technical support if required, but you are advised not to talk about your network project.

At this point, you can begin to use your browser to connect to sites on the Internet. If you are successful, you know immediately

that you have performed all of the steps correctly. I wasn't able to browse immediately, because of the particular connection settings in my browser. It was very easy to take care of this minor problem, although I wasn't able to find this issue in the documentation.

In Microsoft Internet Explorer 5, choose Tools, Internet Options, Connections. Under LAN Settings, make sure nothing is selected. You don't want to choose "Automatically detect settings," although that seems to make sense, nor do you want to "Use a proxy server."

In Netscape Navigator 4.73, go to Edit, Preferences, Advanced, and make sure that "Direct connection to the Internet" is selected.

Any other Internet software you have should work if it is set up as though it had a direct connection to the Internet. This is obviously much simpler than working with a Proxy Server.

The UGate-3000 works as a DHCP Server, but if there is another DHCP server on the network, you should manually assign IP addresses and other parameters to each of your computers. Another reason for choosing to assign IP addresses manually is if you want to divide the office into different groups and then assign rights based on group membership. Since membership in a group is based on IP addresses, using groups means manually assigning IP addresses to client computers.

As with the basic configuration, everything is done through your browser and the GUI you encounter when you go to 192.168.0.1. First you would create the groups in Group Setting. Then you would assign rights in Access Control. For each group you would do one of three things: 1) Enable all Internet

service, 2) Block all Internet access, 3) Block application by port number. The key bit of information you will need is the port number used by the particular application you are trying to block. That is usually found in the documentation. Web browsing is often the application that is blocked for a group. That uses port 80.

The default installation yields a good level of security. Gibson Research has some tests at their Web site (<http://www.grc.com>) that you can run online to check your installation. Try "Test my shields" first, and then run "Probe my ports." These tests go through the kinds of procedures that a hacker would attempt. The tests were unable to get any information from my computer. All 10 standard ports were closed, and not accepting connections. According to Gibson Research, "This is very uncommon for a Windows networking-based PC. Relative to vulnerabilities from Windows networking, this computer appears to be VERY SECURE since it is NOT exposing ANY of its internal NetBIOS networking protocol over the Internet".

The UMAX has some additional capabilities that will be discussed in a future column. At that time, I will discuss some other routers on the market, including one with good support for the PPPoE protocol used by Sympatico HSE.

This is a good place to stop, since if you have gotten this far in your installation, you have a secure and easy-to-administer solution that provides Internet access to the users of your LAN. The UGate-3000 costs around \$350. You can get additional information at <http://www.umax.com>.

TCP thanks Eprom Computer Systems who loaned us the UGate to test.

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Microsoft describes .Net strategy

Continued from page 74

Using XML and the .Net server, a service provider could make content fit across a variety of XML-ready machines, adjusting itself to the capabilities of an Internet-connected cellular phone, a PDA, or a set-top box.

Mortimer believes the .Net platform, along with XML being adopted as a universal programming and content delivery standard, could make interactive television a reality in a few years. For some time, interactive television has made little headway into Canadian homes because it required people to actually be at home to interact with a set-top box or PC in order for it to work.

Instead, this new platform would allow someone to have updated television listing of favourite programs delivered to their cell phone or PDA. From these devices, they could then dial into their set-top box at home and program it to digitally record a program. It's possible that the show could even be sent back to whatever device a person has with them on the road.

"We have watched interactive TV come and go, but in the last few years, there have been many changes that will make it a viable

experience," Mortimer said. "The Internet has become a mass market medium and 50 percent of Canadians are using the Internet, and using it to get services and news. So now we have a very good reason to try and deliver content to devices other than the PC."

Along with delivering content and service over this new platform, Microsoft also intends to change the user interface, going beyond the familiar Windows environment that is heavily tied to a PC-centric computing world. Instead, the .Net platform and its XML base will help create something called a Universal Canvas. Simply, the browser will become the interface and will always be connected to the Internet in order to access whatever applications and services one needs.

During the presentation Gates had one of his Microsoft employees demonstrate a prototype tablet PC. With the Universal Canvas approach, a tablet PC could be used more as a kind of interactive paper than as a standard PC or PDA. A user could access all the applications, services and data they need, as well as updating information using handwriting on its LCD surface. Books and reports could be downloaded and notes added into the margins without the user ever having to tap a keyboard. □



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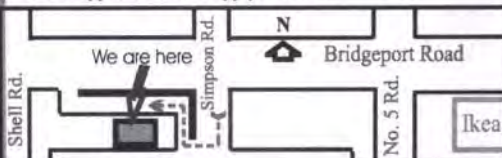
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Apple News



iMac colours:
Indigo, Ruby, Sage,
Graphite, and Snow.

Jobs unveils new G4s, iMacs

By Justin Siemens

Macworld 2000, held in New York in mid July, was one of the most exciting in recent memory, with more new product announcements than anyone expected. So, without further ado, let's take a look at what Apple has given us to drool over this quarter:

iMac line revamped

Every single model in the iMac family is new, from the base model to the SE, and with the exception of Graphite, so is every colour.

At the low end of the iMac line, the 350 has been given a new low price. It's now available for US\$799 (about \$1,199 Canadian after conversion). This model remains virtually unchanged with a 350 Mhz G3 chip, 64 MB of RAM, a 7 GB hard drive, built-in CD-ROM drive, and USB connectivity. This model comes in one colour only, a new shade Apple calls Indigo, which is much darker and more translucent than Blueberry.



G4 Cube

Next in line is the new iMac DV, which is also similar to its previous incarnation. It carries a 400 Mhz G3 chip, 64 MB of RAM, 10 GB hard drive, FireWire, USB, and a slot-loading CD-ROM drive. One thing this model doesn't have that its predecessor did is a DVD drive. But this is reflected in its price, which is now US\$999 (about \$1,499 Canadian). The DV model is available in both the aforementioned Indigo, and another new colour, a very deep red jewel tone called Ruby.

The new iMac DV+ has everything the base DV model has, but it beefs up the G3 chip to 450 MHz, doubles the size of the hard drive to 20 GB, and adds a DVD-ROM drive. It is available in Sage, which Apple describes as Graphite with a drop of emerald. The DV+ will set you back US\$1,299 (approximately \$1,999).

The top end of the iMac line is the new DV Special Edition (SE), which features everything the DV+ has, but is powered by a 500

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Sun offers up StarOffice code to open-source crowd

By Stefan Dubowski

Sun Microsystems Inc. says the open-source community will take to its software suite, StarOffice, but industry observers don't share this confidence.

On July 19, Sun announced that it will let StarOffice's source code loose on the Internet. Starting Oct. 13, developers be able to download the building blocks for StarOffice 6.0 at <http://www.OpenOffice.org>.

"We're setting up an environment where the community can really run with this," says Alan Templeton, Sun's senior product manager.

But will the community take on the

StarOffice challenge? Templeton is positive it would, but Chris Le Toq, an industry analyst with Dataquest, is skeptical.

"The question is how to keep the community effective," says Le Toq. "You have to convince the community that this is for real. And with software, that's tough."

According to Le Toq, the open-source movement has advanced beyond its programming-for-programming's-sake roots. Now that companies like Red Hat and VA Linux Systems have made money from humble open-source beginnings, others want in on the cash grab. Red Hat and VA Linux have one advantage over Sun, he says: product backup in the form of moneymaking ven-

tures. For example, Red Hat builds its own version of Linux, the open-source operating system (OS). The company makes money selling manuals and technical support.

The software is free, but the accessories will cost you.

"That's critical to success," says Le Toq.

Templeton, on the other hand, says the open-source community is still in the early stages of development, and believes developers will take to StarOffice with coding gusto, and in the long run users will "end up with a wider variety of applications, increased innovation and less hassle," thanks to Star Office's cross-platform compatibility.

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Emulator lets you adore your Commodore 64 once more

By Steve Coe

Ah, the halcyon days of computing. A time when games came on tape and you had enough time to build a new house while you waited for them to load.

With the power of computers today, it's possible to relive those heady early days of computing by using emulators—though the loading delays are now optional. An emulator imitates, through software, the system components of the original machine. There are a few Linux emulator projects dedicated to the Commodore 64 (C64), but only one of them can be classed as good.

That emulator, VICE (<http://www.cs.cmu.edu/~dsladic/vice/vice.html>), not only emulates the C64, it emulates other Commodore machines, such as the C128, the Vic20 and, the first computer I ever used, the Commodore Pet. While those are still legends of computing, the C64 is where the interests of most people lie.

Once you've downloaded and compiled the source code, you have a near-perfect emulation of a C64. Rather than have all the emulators built into one program, VICE gives you separate program files for the different emulators. To start the C64 emulator, type "x64" (minus the quotation marks), hit enter and sit back.

After a couple of seconds, you'll be greeted by the old C64 startup screen. Great. But where do you go from here? You need software!

The distribution of old software for the likes of the C64 is a bit of a grey area. While some developers have endorsed the distribution, others have said no, but don't tend to enforce that policy. For what it's worth, since there is zero market for C64 software these days, I have no trouble ethically with downloading software for it. The best software repository is Arnold (<http://arnold.c64.org>). You can find just about anything to satisfy your nostalgic yearnings here.

Once you've downloaded your software, using it is simple. When you left- or right-click on the VICE window, a menu comes up. The menu you get with a right-click is for the different settings, allowing you to decide whether you want sound, and if so, of what quality, and which disk drives you want the software to emulate. Basically, all the techie stuff can be found here.

To load the software you downloaded, left-click and chose to attach a disk image. Here you're greeted with a file requester where you can choose and attach whatever you downloaded.

You also have a quick start option—which means the software resets the emulator, restarts it, and tries to run all on its own. This option can cause a few problems. I have discovered that some disks won't load this way. You have to

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Jobs unveils new G4s, iMacs

Continued from page 81

Mhz G3 chip, increases the hard drive by half to 30 GB hard drive, and doubles the RAM to 128 MB. The DV SE is available in two colours, Graphite and Snow. Snow is best described as a slightly translucent white, and although it's a nice contrast to the graphite, ultimately it's a little boring on it's own. The price of the DV SE remains unchanged at US\$1,499 (about \$2,299 Canadian).

All of the iMacs now include Apple's new Pro Mouse and Keyboard. The three DV models are available immediately, while the iMac 350 will be available in September.

G4s get dual processors

The G4 line received only minor updates, but a couple are worth noting. First, all G4s now come with gigabit Ethernet onboard (1,000 Mbit/sec). This is notable as gigabit Ethernet cards are pricey add-ons and Apple has included it on the G4 motherboard without changing the price.

Apple has also changed the top two G4 models. The 450 MHz and 500 MHz G4s are now powered by dual processors—for the same price as their single-processor predecessors. Currently only users of Adobe Photoshop and other multiprocessor-aware applications will benefit from the dual processor-powered systems, but with the release of OS X next year, Mac OS will be able to support them at the system level.

One final change in the G4 lineup is that they now support the new Apple Display Connector, which carries power, digital video, analogue video, and USB over a single cable, greatly simplifying connections. The new G4s also all come with Apple's Pro Mouse and Keyboard. All three G4s are available now.

G4 Cube unveiled

In his keynote address, Apple chief, Steve Jobs, saved the best for last—the new G4 Cube, which is different from anything Apple has done before.

The G4 Cube is both a powerful G4 and beautiful design statement. Measuring 20.3 cm (8 in.) a side, the white cube is encased in a clear plastic shell that is taller than the cube, giving the impression that the machine is hovering just above the surface of your desk.

The Cube is available with a 450 MHz or 500 MHz G4 processor, 64 MB of RAM, a 56Kbps modem, 100Base-T Ethernet, an AirPort (wireless LAN) slot, a vertically mounted slot-loading DVD-ROM drive into which you drop discs like bread into a toaster, and the usual USB and FireWire connectors. It has no internal fan and runs almost silently.

People who like to tinker will be pleased to know that the entire contents can be lifted out using the simple handle on the bottom of the Cube. However, tinkerers will probably be disappointed once inside, as there is really nothing that can be added. This system only has room for one internal drive and has no PCI slots. True power users will still need a G4 tower with its four drive bays and three PCI slots. The cube costs US\$1,799 (about

\$2,699 Canadian) for the 450 MHz model, and US\$2,299 (about \$3,449 Canadian) for the 500 Mhz, which will only be available from the apple store. The G4 Cube includes the Pro Mouse and Keyboard, iMovie 2.0 and a pair of USB Harmon Kardon speakers.



Pro Keyboard

included with all new Macs, but can be purchased separately for US\$59 (about \$89 Canadian) from the Apple store (<http://www.apple.ca>).

Pro Mouse and Keyboard

Apple has taken criticism to heart and ditched the round iMac mouse that many referred to as a hockey puck. The new Pro Mouse is oblong and designed to fit well in both large and small hands. The new mouse dispenses with a rolling ball, using optical technology instead, much like Microsoft's Intellimouse. Apple claims that the optical sensor in its model is up to 15 percent faster than the competition. The new mouse does not have a mouse button, it is pressure sensitive. You push down on the mouse body to register a click. While it is standard with all new Macs, it can also be purchased for US\$59 (\$89 Canadian) if you already have a USB Mac and want to ditch the hockey puck.

Apple also released a new keyboard, which is similar to the old Apple extended keyboard. The new model has a 108-key layout with the full 15 function keys, larger arrow keys, page-up, page-down, home and end keys, as well as a forward delete key, which was many people missed on the old USB keyboard. It also features a built-in two-port USB hub and keys to control volume (up, down, and mute) and to eject CDs and DVDs. The keyboard is also

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Pro Mouse



The G4 Cube with the new Studio Display monitor, Harmon Kardon speakers, Pro Mouse and Keyboard.

iMovie 2.0
Macworld announcements were not limited to hardware. Apple also showed a new version of its video editing program, iMovie 2.0, which will be included with all new FireWire-enabled Apple desktops. It features a streamlined and improved interface which is heavily influenced by OS X's Aqua. It also features better audio editing, and more built-in video effects, such as sepia tone. It's available for US\$49 for owners of iMovie 1.0

OS X beta
OS X beta also made a brief appearance. However, Apple seems to have missed the proposed summer 2000 release date because it is now saying it will be out in September for the public to test. This is a bit of a disappointment, and I suspect all the new hardware may have been announced to try and draw attention away from the now long overdue OS X. Also, the final version which was previously stated to be ready in January 2001 is now set for "quarter 1 2001," which could mean as late as March of next year. □

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

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Sun's Rays hit Saskatchewan

This fall, students and teachers in two communities will use a state-of-the-art thin-client implementation, thanks to Sasktel and Sun Microsystems of Canada.

By **Issie Rabinovitch**

After years of hype and promise, the thin-client style of computing—in which the servers are powerful, the network pipes are wide, and the clients have little or no processing power—is starting to show signs of widespread acceptance.

Sun Microsystems of Canada and Sasktel are collaborating with school boards in Moosejaw and North Battleford in what is the largest deployment to date of the Sun Ray enterprise appliance—Sun's second attempt at a Java-based thin-client. The first was the JavaStation, which met with little success.

About 3,300 Sun Ray 1 enterprise appliances from Sun Microsystems will be deployed throughout 42 schools in four school board districts (North West Separate School Division, Battlefords School Division, Moose Jaw Separate School Division, and Moose Jaw Public School Division) for the 2000-2001 school year.

In the selected schools, every classroom, teacher's desk, library and



Sun Microsystems' Sun Ray 1, right, and in educational setting, above.

administrative office will be equipped with a Sun Ray 1 device instead of a personal computer. The system will provide more than 11,000 students and 800 faculty members, administrators and school officials with access to online educational materials, resources and curriculum through BrainBinder.com, an education portal *Continued on page 89*

Free digital book tests line between content and commerce

By **Stefan Dubowski**

Book publishing works like this: the author writes the book; the publisher buys it and publishes it; the book languishes on a bookstore's shelf until the store decides to return the unpurchased copies.

And somewhere between costs and sales, the publisher squeezes out a profit.

However, one publishing company isn't content with this model. That's why Say I Can Inc., a three-person operation from Berkeley, Calif., is casting off the publisher's modus operandi.

Say I Can (<http://www.sayican.com>) has put its book, *The Dragon NaturallySpeaking Guide*, online where anyone can read it for free.

For Dan Newman, president of the publishing house, it only makes sense. The publishing industry is changing, so, as he says, "Why not get a jump on things?"

Dragon NaturallySpeaking (DNS) is voice-to-text software that, according to Newman, takes the speaker's natural speech patterns and translates them into coherent sentences and paragraphs.

Newman says he uses DNS for email, and he's not alone. So far, Say I Can has sold 10,000 hard copies of its DNS how-to tome in bookstores.

"It's certainly a respectable number," Newman explains. "A bestseller means 50,000 copies. Ten thousand copies mean you have a respectable following."

But it's only a drop in the bucket compared to the number of people who use this software package.

"We think there are half a million people who use Dragon Naturally Speaking," Newman says. "But only 10,000 bought the book... By making it available for free, we increase traffic to the site. Not everyone will buy the book, and that's just fine with us. Maybe they'll click on one of the advertisers."

And there's the catch: *The DNS Guide* carries ads which, in turn, carry the publishing costs—such as they are—and helps Say I Can make a profit on the book.

Can an ad-based revenue model work in the publishing industry? According to Monique Smith, executive director of the Association of Canadian Publishers, that depends on the advertisers. She's skeptical of Say I Can's chances.

"I think people are willing to try anything at first, because it's new," she says. "But I don't know if there's enough ad revenue there to sup-



Say I Can tests ad-supported online book publishing with Dragon software guide.

Continued on page 88

NovaForum to mediate—online

Group says using Web for conflict resolution is affordable and effective.

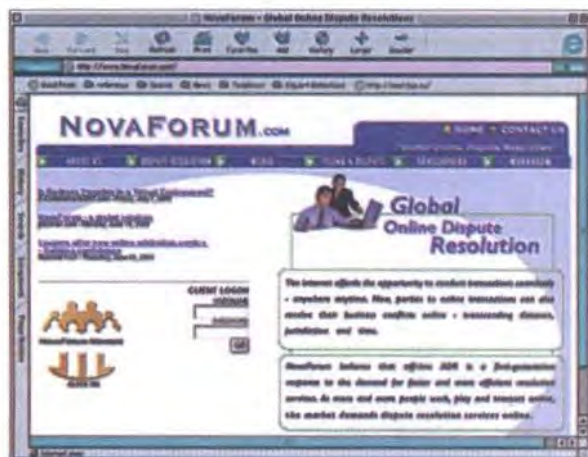
By **Tom Venetis**

A group of lawyers is looking to use the Internet to resolve business conflicts online—in the same fast and inexpensive way that one can now buy goods and services.

Toronto-based NovaForum.com Inc. has launched what it says is a unique service that allows online businesses to resolve conflicts between their customers or their business partners without having to go through a time-consuming and expensive litigation process.

NovaForum uses qualified Alternative Dispute Resolution (ADR) professionals and a variety of online mechanisms for companies and buyers to work out such things as contractual disputes, billing and order fulfillment issues, product and service quality problems, and such issues as privacy and security breaches.

Teri Kirk, chief executive officer of NovaForum, says the online dispute-resolution service came about because she and her



NovaForum's online resolution forum.

colleagues found that such a mechanism did not exist for online businesses. While there are some 16 online dispute-resolution sites around the world, the majority resolve disputes between individuals. The few that exist for business tend to be very narrow in scope and often ignore the business-to-consumer marketplace all together.

"Parties first of all have to agree to resolve their dispute through this kind of process," Kirk adds. "Once they have agreed to that, one of the parties subscribes to the NovaForum.com service and each party fills out a statement of claim and a statement of defense. These documents have been designed for the Web and are targeted at the kinds of subject matters argued about [between the parties]. We have a paralegal who works with them to make sure the forms are sensible and legible."

Once the forms have been filled out and submitted, along with any necessary documentation that each party believes is necessary to the case, it is presented to an independent mediator to be reviewed. The mediator is not affiliated with NovaForum so there can be no question of a conflict of interest. Once the mediator has reviewed the materials and spoken with the parties involved, he or she will try to negotiate an acceptable resolution between the parties. *Continued on page 98*

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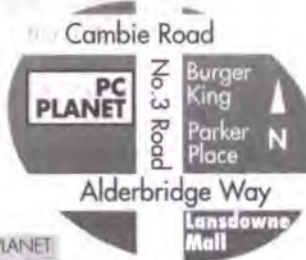
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port a whole book."

Newman, of course, disagrees. He says Say I Can has it all worked out. This publisher gets a measly (US)\$0.16 per ad for a click through. "But if we have 20 times as many people visiting the site, that works for us."

Say I Can turned to the shareware community for guidance on its business model. Among these software companies, who give their work away for a free trial run and later request payment for a access to a permanent version, "the developers found that only one in 200 people were paying for the product," Newman says. "So now there's a trend towards adding ads."

But Say I Can walks a fine line between content and commerce. In the traditional publishing model, advertisers and writers maintain a separate peace. With *The DNS Guide*, both appear on the same Web page.

Is content now nothing more than a vehicle for commerce? Newman doesn't think so. In fact, "I've been quite resistant to ads on the site because we don't want to appear biased."

To that end, Say I Can invited an ad network to take up some of its online space. Thus the ads have little to do with *The DNS Guide's* content.

Say I Can claims to be the first publisher to try such a revenue model. Off the top of her head, Smith couldn't think of any other firm following suit, unless you count Stephen King's publisher, who published the author's novella *Riding the Bullet* in electronic-only format available through online sellers like Chapters.ca.

"Some people argue that Stephen King was almost free because Chapters and Amazon.com gave away so many copies," Smith said. There was no charge for the first 10,000 copies of *Riding the Bullet* that were downloaded. "And there were promotions tied in with that."

Will Say I Can follow up with another online release? Newman said that depends on how well *The DNS Guide* does.

"If it has the success we're looking for, then we'll expand to our other titles."

-CanadaComputes.com

Emulator lets you adore your C64

Continued from page 81

load these disks the old-fashioned way, by typing in a "load" command, which I can never remember (of course, since I never had a C64, I'm less likely to remember it than long-time C64 users).

While the emulator is a fantastic piece of software, there are compatibility problems. For example, some of the Blast disks—virtual disks filled with games you can find on Arnold—work well, while others choke horribly.

Compatibility is very good for the most part, but don't expect everything to work or you will be disappointed. This is in no way a criticism of the emulator, since every piece of software pushes the system in its own way. The developer has done a great job getting compatibility up to its current level. Here's hoping it continues to get better.

So is it worth the download? If you remember the C64 with any degree of fondness and have sentimental notions for a time when games had to actually have game play to succeed, rather than just flashy eye candy, then VICE is for you. Grab VICE, grab some software and take a stroll down memory lane.

On a side note, if C64 music is your style, then look into the High Voltage SIDS Collection (<http://home.freeuk.net/wazzaw/HVSC/>), an archive of C64 music. I'm not affiliated in any way; I'm just a big fan.

-canadacomputes.com

Sun's Rays hit Saskatchewan

Continued from page 87

to be hosted by quantumlynx.com, SaskTel's application service provider (ASP) division.

The Brainbinder.com portal will be hosted on Sun Solaris servers, which will offer a variety of HTML and Java-based applications, and the new portal version of Sun's StarOffice suite. StarOffice is a suite of productivity applications that competes with Microsoft Office. It consists of a word processor, spreadsheet, database, presentation software, calendaring and graphics software, an email and newsreader client, and other more specialized software. StarOffice has an interface similar to Microsoft Office, and can read and write many Microsoft data formats.

The Sun Ray devices don't need most of the things conventional PCs need, like an operating system, hard disk, RAM, or a lot of processing power. As a result, the units are much smaller and lighter, and virtually noise-free.

In order to have complete flexibility in choosing the applications they want to run, the school boards have decided to deploy a Citrix MetaFrame server as well. This is a product that runs on top of a Windows NT Server envi-

ronment and provides access to most applications that run in that environment. Microsoft Office would be an example of applications that could be accessed in this way.

The benefits of the Sun Ray 1 enterprise appliance are many. Students and teachers will be able to access the Internet and a wide variety of applications running on the Sun servers and Citrix servers, but unlike desktop computers that require an operating system and applications running locally on the desktop, the Sun Ray systems are just an access point. All of the programs and data reside on servers. Consequently, there is no configuration work to be done on the client. It is all done by network administrators on the servers, and all of the computing is done by the servers.

The Sun Ray devices don't need most of the things conventional PCs need, like an operating system, hard disk, RAM, or a lot of processing power. As a result, the units are much smaller and lighter, and virtually noise-free. A room full of PCs, with noisy power supplies and fans, can interfere with a teacher's presentation. Though much work is being done to make PCs quieter, it'll be a long time before they compete with an intrinsically quiet appliance like the Sun Ray 1.

Another attractive aspect to the Sun Ray systems' computing model is its simplicity, reliability, and low total cost of ownership (TCO). It has fewer moving parts, and fewer components that could potentially "go bad." It has no user-serviceable parts. A small number of failure and fault diagnostics are handled through simple on-screen display graphical icons. One of the annoying aspects of a PC is the time required to boot up. In some cases, it can be in excess of two minutes. A Sun Ray 1 takes less than 10 seconds after plug-in to become fully functional. This virtual instant-on capability is valuable in any environment,

but especially in an educational institution.

In the event of a failure, a replacement unit can be plugged in within minutes, without the loss of any data. Since all of the configuration and data (in addition to all of the applications) are on the server, the user who was interrupted by the hardware failure can resume at the exact point where the interruption took place, with a unit that is functionally equivalent to the one that was replaced.

The underlying architecture, which Sun calls Hot Desk technology, enables "Hot Desking," which is the ability for users to instantly access their sessions from any Sun Ray 1 appliance on the network. The session is on the server, and looks the same on every device.

For example, a teacher could go to any device, log in, and access the very same session that was in progress on his or her desk. Similarly, a student whose device fails can go to an unoccupied one, log in, and continue to work with no loss of momentum.

Sun is not the only provider of this kind of technology, but it is probably the best known. The decision of the school boards in Moose Jaw and North Battleford to go with its thin-client solution is a significant one, since Sun will get exposure and valuable feedback. The

price charged by Sun to the school boards was not announced, but it is known to be less than the going rate.

In the short run, the focus will be on determining how well the technology works in actual day-to-day use by students and teachers. Once that bridge is crossed, the interesting question of how cost-effective this approach is to providing improved and easy-to-use access to online educational resources is sure to come up. After all, there are other thin-client solutions, and the traditional PC is becoming easier and cheaper to configure and to manage.

Sun will have to show not only that the technology works, but that it saves money over conventional approaches.

Although it may seem strange that Sun's largest installation of this kind is in two relatively small towns in Saskatchewan, the number of thin-client hosted environments is expected to soar. According to the Giga Information Group in the U.S., by 2004 10 percent of all business process-related applications used by large companies will be hosted by ASPs like quantumlynx.com, while the small and medium-sized business (SMB) market may obtain as much as 75 percent of their applications through an ASP. □

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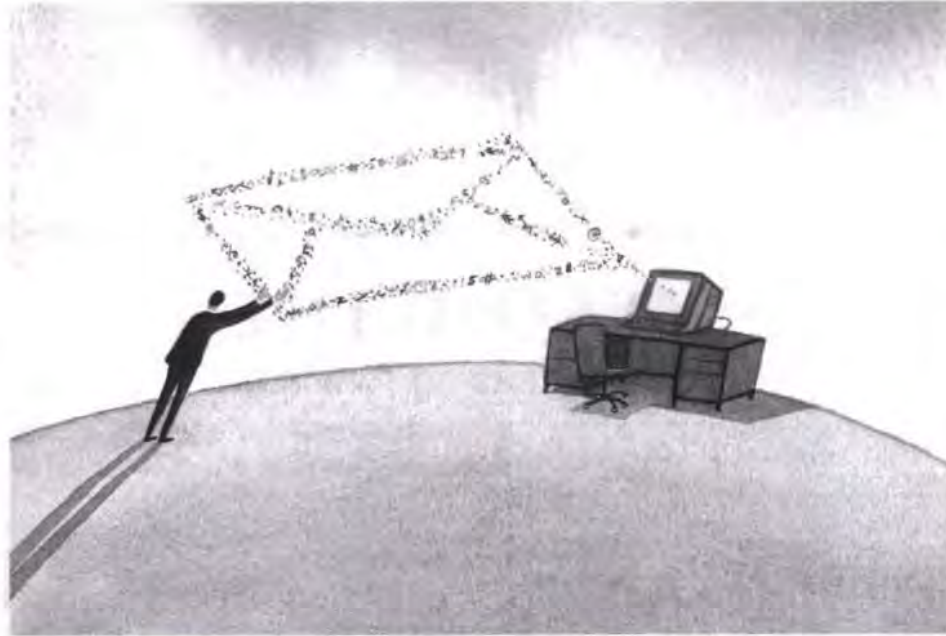
Taking education to the next level... online

By Curtis Cook

Technology has simplified our lives in so many ways, opening doors to opportunities that may have remained closed in the face of the pressures of everyday life. For many people, the thought of pursuing advanced education or returning to school to develop new skills is a dream. The challenges of career and family often consume the time and energy required to make such dreams a reality. Enter technology in the form of online distance education.

Distance education has been revolutionized by technology, eliminating the headaches and inevitable delays of mailing stacks of papers and arranging for long-distance telephone meetings with professors. The advent of videoconferencing to bring professors and remotely located students together is a vast improvement over primitive distance study options. And, while computer-based or technology-based training has existed for a number of years, its use has been primarily in corporate settings, as businesses customized in-house training needs for employees.

The adoption of the Internet by academic institutions as a means to deliver more traditional programs is a recent phenomenon. Yet, most universities and colleges are now experimenting with or thinking about online learning options. Advances in Web technolo-



gy have also been instrumental in the rapid development of distance education. The use of the Internet as a delivery tool is coming of age, and just in time. The demand for education designed for the 21st Century student is rapidly increasing.

Tom Calvert knows a thing or two about this demand. Calvert is a professor and vice-president of research and external affairs for the Technical University of British Columbia

(TechBC), one of Canada's latest entrants into innovative education delivery.

"We believe through our discussions with people in industry that continuing professional education will really benefit from courses being delivered either completely or partially online," says Calvert. "People who are working need the flexibility to be able to adjust their daily schedules, as well as their schedules over longer periods of time."

Calvert believes TechBC's programs are in very high demand, based on the shortage of IT programs available to students in British Columbia. According to Calvert, "People come for the mix of the programs. A lot of people are interested in mixing information technology with new media. The whole evolution of the Web is highly oriented to new media." The university's first undergraduate class began studies in September 1999, and the first PhD program is scheduled to begin this month.

The bulk of TechBC's course material is delivered online, which has presented a few obstacles for the school. For the institution, improvements and modifications to the delivery technology is a never-ending challenge. The university has been legally established since 1997, but one of the groups that was already hard at work was the educational technology and learning team. Its mission was to develop the models used for the online learning, as well as the software used for the delivery. "This is an ongoing activity," says Calvert. "We want to keep our delivery state of the art."

Leading edge delivery can pose interesting obstacles when the study material is diverse and complex. Calvert notes that the challenges of online delivery are apparent in some of TechBC's interactive arts course content, as well as laboratory work. He also points to any

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material that involves mathematics but quickly observes that this is a technical problem that will be solved shortly. "At the moment you can paste math equations into Web material, but it is really hard to get interaction with those equations. Now, people are developing new tools to do that."

Calvert is referring to new software tools that allow students to "meet electronically" using a virtual whiteboard to work out study problems. "We are looking for online labs, which involve software for simulating the lab situations. Particularly in electronics, there are lots of good simulations tools available."

Online learning offers numerous advantages to individuals returning to school as well as students looking for alternatives for continuing their studies. It is particularly suited to people who are employed and wish to continue working while building new skills through education. By eliminating travel costs associated with training, removing geographic barriers and allowing students to match their studies to their learning pace and schedules, online learning makes education accessible to more and more people.

Yet TechBC is attracting the younger crowd as well, including students who have not yet latched onto a career, or who know they will probably be creating their own job and company. The typical Tech BC student, according to Calvert, is "entrepreneurial and interdisciplinary." The course materials build on the some of the areas that are not necessarily learned in everyday life, and particularly not in a technology-focused environment. For example, in their first-year program, students will take management courses that get them involved in the nuts and bolts of writing a business plan. Says Calvert, "We read in the newspapers all these stories about kids in high schools who are starting dot-com companies. Well it's true. But a lot of them need a bit more background very early on in what it takes to put a viable business together in addition to very bright technical ideas."

On the other side of the Rockies, Athabasca University has responded to this winning combination of technology and management skills. A pioneer in distance education, the Alberta-based university's Centre for Innovative Management has more than 1,000 students registered in three MBA programs. Athabasca was established in 1970 and currently provides distance learning to over 17,000 students across Canada, as well as international students. In September 1999, it launched a new MBA course in information technology management, combining online studies with a week-long summer school and two weekend sessions on site.

Peter Carr, an associate professor at the centre, says the school was pleasantly surprised that registration for the information technology management course was considerably higher than anticipated. However, the school was not surprised that it would be in demand. According to Carr, "We saw information technology management as a natural market for our distance delivery mode of education, and recognized it as a strong and growing sector that needed education opportunities." Athabasca's information technology management program includes studies in project management for information technology, human factors in information technology, electronic commerce, and information technology and performance.

Distance education is not for everyone and clearly there are certain personality traits that may make online learning a nightmare for an individual. But what characteristics work best with distance education? Athabasca's Web site lists a number of criteria for potential stu-

dents, including self-motivation, computer skills, strong support from your loved ones, and the ability to integrate theory with application.

Caroline Tompkins, general manager of the Forum for International Trade Training (FITT) reinforces some of these characteristics. "An issue we face is ensuring that students have adequate computer skills before they take the course so that we don't end up having to provide Keyboard 101," says Tompkins. "We're trying to deal with this issue by stating our expectations clearly in our communication with students."

FITT was launched in 1992 to help Canadian businesses gain global expertise in

the area of trade and to establish nation-wide standards in the practice of international trade. The organization works with local partners—primarily academic institutes across Canada—to deliver eight international trade training modules covering topics as diverse as international finance and market entry strategies.

In mid-1998, FITT examined the potential for delivering these FITTskills modules electronically. One survey of 500 companies conducted by the organization revealed that 73 percent expressed interest in a technology-based distance learning application for international trade training. A second survey of owners and managers of medium-sized busi-

nesses found that 45 percent of respondents were interested in a practical approach to learning that was independent of time or place. By the beginning of 1999, FITT entered the world of electronic education delivery, offering FITTskills over the Internet.

It did not take long to notice the differences between traditional instructor-led classroom delivery and the online delivery. According to Tompkins, "The biggest challenge with online courses is encouraging interactivity among participants and between participants and the instructor. We try to stimulate involvement by basing 15 percent of the student's mark on the instructor assessment mainly gauged by the

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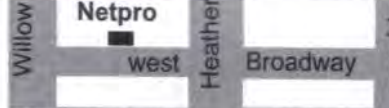
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Stylus Photo 2000P defies fading

So you have a digital camera or scanner and you want future generations to enjoy your digital images. What's the best way to do that?

Epson's latest inkjet uses pigments, not dyes, to promise centuries of life.

By Dave Chappelle

Until now, your best strategy for long-term preservation of your digital images was to leave your images in

digital format—on CD-ROM, for example—and have your heirs transfer them to whatever format they will be using in the future. But this strategy prevents you from displaying and enjoying your images today.

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Photo inkjet printers can now produce images that are comparable in appearance to prints made by traditional chemical print-making, but where inkjets still fall short is in image permanence. A photographic print will last decades without noticeable fading. Up to now, inkjet images would last for just a few years before fading.

To meet the needs of fine artists and photographers Epson has developed the Stylus Photo 2000P pigment ink printer, that the company says has been judged to last for more than 100 years. One of the key technologies used to achieve this is pigment-based inks instead of dyes. What's the difference? Basically, pigments are powders, while dyes are liquids.

Pigments last longer than dyes, but are not as glossy, don't have the colour range of dyes, and are easier to scratch. Dyes are glossier than pigments, but fade faster. The characteristics of pigments have been known to inkjet

Taking education to the next level

Continued from page 91
level of online participation." In addition, Tompkins revealed that keeping the minimum class size to 15 students ensures an increase in online exchanges.

FITT identified a number of factors critical to the success of their FITTskills program. The developers recognized that the system should have a graphical interface that mirrors most Windows- or Mac-based applications, and must support the use of both types of systems. They had to imagine a "standard" computer configuration to ensure that the system would be fully operable without the user needing the most powerful computer available. FITT also realized that access to the FITTskills material needed to be simple, either through the users own Internet service provider (ISP) or a dedicated Internet connection. Developers also had to build in capability to support multiple "start dates" as well as multiple concurrent classes. And finally, access to support, including online help and technical assistance, had to be easy and timely for the students.

FITT has more than 10,000 registrants across Canada and estimates that the introduction of the online distance training is responsible for a 20 percent increase in enrollment. Electronic delivery is also going to help the organization market its training program to a targeted 60,000 to 70,000 Canadian small- and medium-sized enterprises with exportable products and services.

Distance education offers a viable, quality learning alternative to traditional colleges, universities and specialized professional training institutes. It responds to the learning needs of a society that demands more time, energy, and expertise from its people. The winning combination of technology and education takes our modern obsession with continuous learning and turns it into a manageable reality. □

Curtis Cook is a competitive analyst with Global Trade Solutions. He can be reached at ccook@go-global.net.

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<h4>Printer Fax & Scanner *after mail-in rebate</h4> <p>Canon 1000/2000 SE Color Printer \$49*/69* Epson 670 Stylus Color Printer \$119 Epson 740 Photo Color \$155* Canon 5100 Color \$179 Lexmark Z51 Color Printer \$139 Samsung SF-5800P All-in-one 600dpi Laser. \$449* HP Deskjet 1100CXI Prof. Printer \$559 HP Deskjet 1120CXI Prof. Printer \$639 HP 1100A All-in-one Printer P/F/S/ \$/629 Silittek USB 36-bit Scanner \$79 HP 6300C SCSI/USB Scanner 1200dpi \$509 HP 4200C/5200C (USB Scanner) \$189/289 Acer 320P / 640U 48bit Scanner \$99/129</p>
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makers, but up until this point, no one has been able to figure out how to develop an ink with the long-life characteristics of pigment and the bright colours typical of dyes.

Epson's solution is a resin polymer with even particle size and distribution. The resin polymer enhances durability by sinking the pigment deeper into the crevices of the media (usually paper), instead of merely adhering to the top surface. It also provides a sealant coat on the surface that resists scratching.

Accelerated light fading tests conducted by Wilhelms Imaging Research Inc., a recognized and respected independent testing organization (<http://www.wilhelm-research.com>) indicate the life of a glass-mounted image printed by the Epson Stylus Photo 2000 and using prototype Epson Archival paper and pigment ink should be greater than 100 years, and 200 years under certain conditions.

By comparison, Wilhelm Imaging's tests of some well-known colour inkjet printers indicate that the images are safe for less than one year, although the current generation of inkjets show better fade resistance of two or three years.

The Stylus Photo 2000P exterior is a cool silver and black, with a window on top so the user can view a print job in progress.

It is capable of printing at a resolution of 1,440x720 dots per inch, with individual dots as small as 0.1 microns.

The Stylus Photo 2000P will print panoramic images up to a maximum of 13x44 in. By eliminating right and left margins, edge-to-edge printing is possible using sheet and roll paper.

Included with the unit are a roll paper holder, an "value pack" of various papers, a time-limited coupon for more free archival and watercolour paper, a Printer Basics manual, and ink cartridges.

An illustrated chart labeled Start Here makes setup easy. Users have the choice of connecting via USB or parallel interfaces. Ethernet interface is an option. Windows 95/98/NT/2000 and Mac OS drivers are included.

The software CD-ROM contains a comprehensive reference guide, and also includes video clips that demonstrate how to use sheet and roll paper.

Ink consumption is monitored so the user can install a fresh cartridge before starting a large print job. To eliminate smudging and waiting time, the printer is designed so the ink is dry before the print head makes its next pass over the paper.

Included are telephone technical support and a one-year exchange warranty. Epson says the printer will be sold primarily through camera stores that specialize in digital photography products. □

Man, do you, like, carry tube amps?

NB—The musician's online superstore MarsMusic.com and MP3.com are teaming to launch a site called the Musician's Mall. The virtual store, which is live on the MP3.com site, offers consumers access Mars' extensive collection of musical gear, which stretches from the 1904 Gibson R-1 Harp Guitar all the way to today's new five-string basses—more than 8,500 items all together. And that, of course, includes drums, amplifiers and the like, as well. Visitors to the site will have the opportunity to take advantage of special offers exclusive to MP3.com customers. Mars Music, which is reaching into the click-and-mortar plane, has a network of at least 36 brick-and-mortar stores in the U.S.

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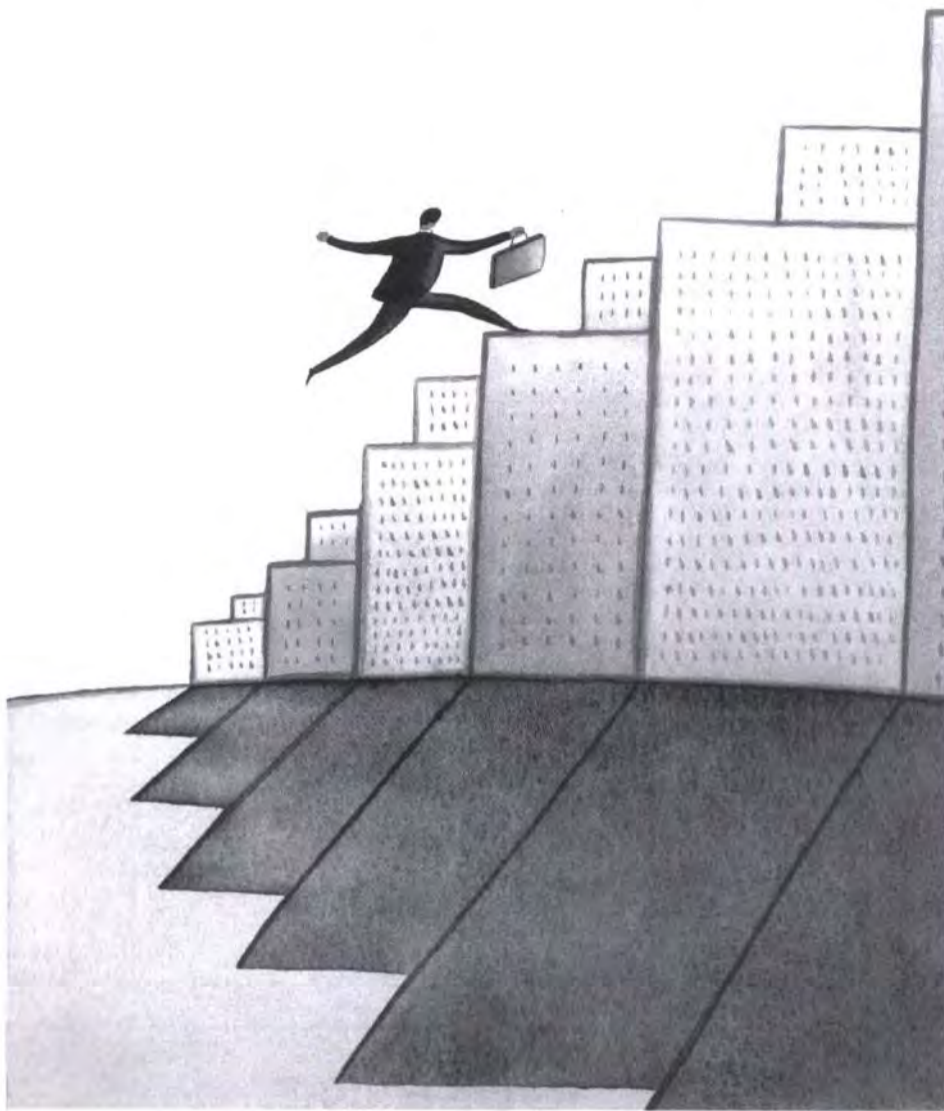
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MBA programs for the new economy



By Curtis Cook

In the new economy, those three magic letters—MBA—do not always translate into six big figures. They could just as easily stand for microchips, bytes and applications. Every day, another technology whiz kid fresh out of high school creates the next big thing and is rewarded with insane quantities of cash from investors. The entrepreneurial spirit fostered by technology, and specifically by all things Internet, has taken the shine off traditional business administration programs. Everyone wants to get out there, get some venture capital, launch an IPO, and sell out.

Obviously, it's not that simple, as evidenced by some magnificent e-business failures resulting from gross mismanagement. But neither is it simple to translate an MBA into a successful tool for many of today's technology-oriented businesses. And in the current technology-driven business world, it seems the companies making the money are those that develop and successfully market new technology, or those that have successfully implemented technology solutions within their business to create a competitive advantage.

If you want to take your love of technology and combine it with a desire to succeed in business, there is some hope. Going back to school before going into the high-tech business is a strategic move for those who want to learn the ropes about business before the trial

and error of doing it for real. Many of Canada's, and the world's, most prestigious universities are re-tooling their business programs to address the integration of technology and management that has become so prevalent in the business world. Many schools are experimenting with the technology itself, by implementing online distance learning programs for prospective MBA students. Along the way, some new players have entered the fray offering specialized technocentric management programs to churn out the corporate leaders of the future.

The extent to which technology and technology-related aspects of business are integrated into MBA studies varies from school to school. Some MBA programs, such as Queen's University, make revisions to existing curricula, which introduces concepts like e-commerce into more traditional subject matter, such as marketing strategy.

Others dedicate entire courses to the subject matter. For example, the University of British Columbia (UBC) offers Information Technology and Management as one of the five areas of specialization available to its MBA students. It is intended for individuals interested in consulting, systems analysis and design, information systems project management, and the management of information technology.

Other institutions, such as the University of New Brunswick (UNB) and McMaster University, are trying to differentiate themselves from their competitors by

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offering specialized degrees, such as e-commerce MBAs. Both schools launched programs in 1999, but have slightly different goals. McMaster's promotional material emphasizes its technical focus, such as Web-site engineering, programming, network communication, interface design and intelligent agents; while UNB students are not expected to be technical experts, but are offered the opportunity to gain technical familiarity in the development and implementation of e-commerce solutions.

One of the newest players in Canada's advanced education arena is the Technical University of British Columbia, or TechBC. The school opened last year with high-tech learning as its main objective. Many of the undergraduate courses involve both online and face-to-face activity, but the graduate-level offerings are primarily online to accommodate students who are currently employed. One might expect that such an evolutionary approach to study would be greeted with skepticism from the academic establishment. Not so, says Tom Calvert, professor and vice-president of research and external affairs for the institution.

For the most part, he says, TechBC has received positive feedback, particularly from within the province. "We have had a lot of support from the established universities. Many of them, frankly, say things like 'we wish we could be doing things like that' in terms of some of the innovation."

TechBC currently offers two graduate programs with a strong focus on the new economy. Its Master of Science degree offers interdisciplinary studies to develop knowledge and leadership capabilities for innovation in products, processes and professional practice with emerging technologies. Students are engaged

in diverse subject matter, ranging from information technology, interactive arts, management and technology and human-computer interaction.

The Master of Science in Software Technology is similar to programs offered at the University of Alberta and at the University of Victoria, as well as planned programs at the University of Saskatchewan and the University of Manitoba. These universities are working in partnership with software technology centres and private companies across Western Canada to offer advanced education and training to workers in the software technology sector. This partnership, known as the WestMOST Consortium, has resulted in the development of an industry-oriented post-graduate degree—the Master of Science in Software Technology (MOST).

Developed in collaboration with industry, the MOST program is designed to give students exposure to the study and application of leading-edge principles and concepts underlying software technology, to improve their capabilities to produce high quality software, and to foster an industry/university relationship in software research, development and teaching. From the industry point of view, involvement in the program provides assurance that MOST continues to offer a curriculum that meets the needs of the software technology sector.

Addressing the requirements of the various technology-driven sectors in business seems to be a measure of success for these MBA programs. And the number of sectors in the economy that are driven by technology seem to be increasing everyday. Athabasca University, Alberta's self-described "open university," and one of the first schools in the world to embrace online distance education at the MBA level,

started its MBA program in information technology management for this reason. The program was launched in September 1999 to meet the rapidly growing demand in industry for employees and managers with advanced management skills combined with expertise in the application and management of information technology.

The school recognizes that technical training is often widely available from a number of learning sources. However, it is targeted to employees in technical positions. Very little attention is devoted to training and educating managers, regardless of whether their management area is technology-centric. Athabasca's programs are designed to fill this void, and to give managers the skills required to advance into more senior information technology-oriented positions.

Despite the overwhelming presence of all things technological in business today, MBA purists need not be alarmed. The business programs of these schools still emphasize the traditional curriculum of your mother's MBA program: strategic thinking, decision-making, global competitiveness, change management, and business ethics are linked to marketing, accounting, finance and human resource management. Still, it is hard to deny the influence technology is having on business teaching.

Calvert expects this trend toward technology content in MBA programs to continue. He predicts that this focus may help shift the classic case studies used in these programs from the large corporations to include more high-tech startups. He acknowledges the valuable lessons that can be learned from studying industry leaders and innovators, regardless of the business they are in, yet believes the value of the enterprises driving the new economy

cannot be overlooked. According to Calvert, "a management and technology program that gives particular focus to small- and medium-sized enterprises is really important."

Technology, in its many shapes and names, has revolutionized the way business is conducted. The resulting impact on the way businesses are managed and strategic decisions made has been profound. The leaders of these businesses need the necessary tools to make the most out of the technology at their disposal. There will always be demand for people who can translate business needs into technology solutions and technology developments into business improvements. MBA programs that combine the best of traditional business teaching with the realities of today's technology-driven economy will help revitalize the value of those three magic letters. □

Curtis Cook is a competitive analyst with Global Trade Solutions. He can be reached at ccook@go-global.net.

Deja Vu: The Web as some remember it

NB—Even the fastest-moving, newest communications medium the world has ever seen has a history. Those of us who saw the Web emerge have memories that are documented and recreated here at Deja Vu. This site provides a historical timeline and an emulator where you can access Web sites using early versions of Web browsers. Remember when Web page images were new? The site currently warns that heavy traffic is making emulator-browsing quite slow, but says: "On the positive side, it makes the experience even more authentic..."

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Cirque debuts Easy Cat USB touchpad

Cirque Corp. has released what it claims is the first standalone touchpad with USB connectivity. The Easy Cat USB is compatible with both PC (Windows 98 or higher) and Mac (OS 8.5 or higher) platforms.

The device is 6.8x8.6x1.27 cm (2.7x3.4x0.5 in.) and comes with a 1.8 m (6 ft.) USB cable.



Through various combinations of tapping or gliding fingers on the Easy Cat pad, it offers the right-click, double-click and scrolling features of other trackball and mouse input devices. The Easy Cat has no moving parts to clean, so won't slow down or break down, according to Cirque.

The Salt Lake City, Utah-based input technology company says that because touchpads require very little wrist movement or touch pressure, they are a good solution for those who experience repetitive strain-related pain in their forearms.

The Easy Cat can be purchased for US\$49.99 from Cirque's Web site (<http://www.cirqueshop.com>). The company offers a lifetime warranty on all of its Cat touchpad products.

—TCP Staff

Apple sues over posting of trade secrets

CUPERTINO, Calif.—Apple Computer has swung its legal cannons into operation against an unnamed person who has apparently posted

details of the vendor's top secret new machines on the Internet.

The complaint, filed in the Superior Court for Santa Clara County, Calif., seeks an injunction against further disclosure of Apple's trade secrets as well as monetary damages.

According to the lawsuit, the unknown person—or persons—posted images of the dual-processor Power Mac G4 on to the Web back in February, way ahead of the July 19 launch.

The situation was compounded, Apple said, by details of the Apple Pro mouse being posted on the Web in late June—again, ahead of the July 19 launch.

The lawsuit—despite the fact that it has been posted against an unknown individual—is likely to send a ripple of resentment through the Apple Mac community, which has remained loyal to the Mac despite some rough rides over the years.

Many Mac fan sites and user information sites are on the Web, and virtually all have been speculating on the plans that Steve Jobs has for the computer company he helped found, now that he has returned.

—Newsbytes

Europe gets its first Net TV station

COPENHAGEN, Denmark—Quietly and almost scarcely reported outside of Denmark, Europe's first Internet TV station, ScoopStation (<http://www.scoopstation.com>), opened for business on the Web in early August.

Launched initially with five "TV channels," but with more planned, the Danish language station aims to cover the usual eclectic mix that traditional entertainment

channels all over Europe have—except, of course, that the broadcasts take place on the Internet.

The station has the backing of Ingram Micro and a number of other Danish IT companies. A spokesperson for the station said program material is being sourced from across Europe and beyond.

While modem connections won't produce the best video quality, the station says ISDN connections will produce a "near VHS" quality transmission, while ADSL and cable modem users will get a "near DVD" transmission quality.

The station is keen for viewers to video their own programs for possible transmission and says it is planning to loan out video cameras for this use in Denmark.

The station says it can broadcast copyright material without worrying about programs being recorded thanks to Microsoft's Digital Rights Management (DRM) technology, which allows one-time playback of transmissions on the user's PC.

—Newsbytes



Go2Call offers free VoIP calls

EVANSTON, Ill.—After rolling out its free Internet telephony service to selected destinations in Europe earlier this year, Go2Call is now offering free PC-to-phone Internet telephony calls to U.S. and Canadian phone numbers.

The move, announced in early August, builds on Go2Call's free services to Germany, the U.K. and Ireland in June. The company said it now offers free calls to four out of the five main destinations for international phone calls.

Since the introduction of free calling services, the carrier said the number of Go2Call members has doubled every two weeks, and members from 170 countries have placed millions of minutes of calls.

John Nix, Go2Call's co-founder, said Internet calling is revolutionizing how people communicate.

The carrier also said that Internet phone calling is a rapidly growing market and, according to recent analyst projections, is expected to account for 17 percent of global telecommunications traffic by 2003.

To place free calls, members log on to the Go2Call home page (<http://www.go2call.com>), enter the number they wish to call, then hit the "go" key.

The firm said new callers who are unsure about their computer's readiness to place PC-to-phone calls can take advantage of Go2Call's QuickCheck, a self-assessment tool that provides recommendations regarding their computer system compatibility.

For calls to destinations other than the free ones, Go2Call is offering free access to CallFinder, a search engine that allows consumers to quickly compare all major Internet calling provider rates and features for calls to any country.

CallFinder, the company said, contains more than 25,000 PC-to-phone rates from the world's leading calling service providers.

—Newsbytes

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NovaForum to mediate—online

Continued from page 87

Both parties can also use an arbitrator if they want to reach a mutually binding resolution quickly. The arbitrator is chosen for them by an agreed upon procedure. The arbitrator hears the case, then renders some kind of award that is binding on both parties.

"The process is binding and that is what people are looking for from such a mechanism," Kirk says. "The rates of compliance are very high when people agree to resolve matters [this way], much better than a litigated solution."

The greatest advantage for both parties in using such an online mechanism to resolve conflicts is that it saves both money and time. On average, taking a dispute to court can cost each party around \$25,000 and takes up to 600 days to resolve. NovaForum says that using its process, the cost to both parties is only \$2,500 and disputes can be resolved in a

matter of days. The \$2,500 cost is only paid by the business that subscribes to the NovaForum service and not by the consumer.

The \$2,500 fee is part of the annual \$12,500 subscription fee a business pays to be part of the NovaForum service.

"It gives you the NovaForum seal that is comparable to the VeriSign seal," Kirk says. "It tells a consumer that they can buy the big ticket items and do business with this company because they subscribe to this third-party dispute-resolution mechanism and [it] is available 24 hours a day around the world. It also gives the business password-encrypted key access to the site and to data, such as the kinds of disputes that arise for your type of business and what they can do about it. It also gives them one free resolution each year."

The subscription fee also allows the company to use a variety of prepared communication and dispute resolution modules that

have been designed by NovaForum's technology partner, Clarity.

Len Vanspall, vice-president of sales and marketing for Toronto-based Clarity says these modules allow the different parties a variety of ways to communicate with each other, with the mediator, and to exchange information. Some of the mechanisms provided include real-time chat, email or videoconferencing. This allow the parties to choose a means of communications that fits their technology. A consumer, using their home PC, may select the chat feature, while a large businesses may want to use videoconferencing since their internal infrastructures can support such an application.

"We offer a secure, hosted site so [the parties] do not need to load any software on their site," says Vanspall. "One of the technologies that we have worked with is ICE, one that is used in the publishing industry for

subscriptions. The underlying technology is XML, but it has a secure wrapper in it and then it gets unwrapped on the client side [for greater security]."

Clarity also offers secure servers that can be used to store important legal documents and information that is necessary for the dispute resolution process.

NovaForum's long term goal is to offer its services to international clients, and even to be able to sell the service to other law firms that are dealing with online businesses looking for alternatives to expensive and time-consuming legal processes.

"We see ourselves as working with e-businesses and we are an e-business ourselves," Kirk adds. "We recognize there is a huge disconnect between the needs of businesses to resolve their disputes in a quick, efficient manner and that is not there. That is a market we are looking to fill." □

Sun offers up StarOffice code

Continued from page 81

Amy Wohl, an analyst with Wohl Associates, wonders if Sun can carry community interest. Though Sun is leading the StarOffice open-source charge, Wohl asks "how open is open source?... They don't want to give up control."

Templeton says Sun will act as an equal developing partner, not as the head of an open-source democracy.

Asked if Sun's move with StarOffice was significant, Le Toq says "it's a competitive move... it sees it [StarOffice] as the greatest threat to Microsoft."

When it comes to productivity software, Microsoft Corp. counts as Sun's main rival with its lock on the consumer PC software market.

But for Templeton, Microsoft isn't in the

competitive picture.

"The way we do business and the type of markets we're in are completely different," he says. "We're not going after one company and this isn't a defensive move. It's just about going forward."

Meanwhile, Microsoft is ramping up its server software in the form of Windows 2000. Sun does well in the server software market, but if Microsoft continues its creep, Le Toq says the software giant could claim yet another industry segment as its own.

"[Sun] sees that Microsoft is coming on in that area."

Lately, Microsoft has been talking up its ".Net" (pronounced "dot Net") strategy, in which software services might come through your Internet connection. Le Toq says Sun's

anticipated move, making StarPortal's source code available for free, is competing directly with Microsoft's .Net services.

Still, he says it's hard to see what the edge is for Sun.

Wohl agrees, noting that, "As far as we know, they paid \$70 million [to StarOffice creator Star Division Corp. in 1999] for the thing, they're paying for the support and they're giving it away... Aside from the few they sell, they don't make any money at all."

But in light of Le Toq's observation that the StarOffice release is a "competitive move," perhaps Sun wants to stem Microsoft's growth, no matter the cost.

"We can pick our revenue points," Templeton says.

According to Wohl, StarOffice needs a lot

of work. For one thing, it can't compete, feature for feature, with either Microsoft's and Corel's office suite products. For another, it's not completely compatible with Microsoft's omnipresent software.

Will Sun's open-source decision lead to a brighter future for StarOffice? Ask the question in six months, Wohl suggests, and see "who's in charge and what kind of development community rallies around the project."

Meanwhile, Templeton is confident that this experiment will work, saying it's better than the single-minded modus operandi of its competitor, Microsoft.

"We don't make money just one way," he says. "Microsoft has to do a lot of thinking about its business models."

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 Subject to manufacturer warranty;
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Warranty:
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 (Extended warranty available)
 Parts: Common Electronic items:
 Same or next business day: 100% refund / replace; after next business day to 10th calendar day: 85% refund / replace.

Retail Store; Wholesale Price; Please check web sites for curent price and items

Special rate for labour or upgrade

WorldTech AMD K6-II 500
 ♦ ATX 17" Case
 ♦ Aopen 40X CD-ROM
 ♦ AMD K6-II 500 CPU (K6II-550) +\$55
 ♦ CPU Cooling fan (K6II-533 +\$18)
 ♦ 1.44 MB Floppy Drive
 ♦ 10.4GB IDE Hard Drive (15GB+\$18)
 ♦ 32MB SDRAM PC100 (64MB +\$48)
 ♦ 56K Int/Voice/Fax/V90/Modem
 ♦ Gigabyte/Matsonic/Houston
 ♦ with built-in Sound
 ♦ with built-in Video Card
\$488 or SCALL

WorldTech Celeron 533a
 ♦ ATX 17" Case
 ♦ Aopen 40X CD-ROM
 ♦ Intel Celeron 500 CPU (566+\$30)
 ♦ CPU fan (with PIII 550E+\$105)
 ♦ 1.44 MB Floppy Drive
 ♦ 10.4 GB IDE Hard Drive (15GB+\$18)
 ♦ 64MB SDRAM PC100
 ♦ 56K Int/Voice/fax/V90/Modem
 ♦ Elite/P6/Matsonic Motherboard
 ♦ w/built-in Sound Card
 ♦ w/built-in Video Card
\$598 (PIII 550E \$708) OR SCALL

WorldTech PIII 550E
 ♦ ATX 19" Case
 ♦ 50X CD-ROM
 ♦ Intel PIII 550E CPU (600E +\$53)
 ♦ CPU fan (with PIII 750+\$165)
 ♦ 1.44 MB Floppy Drive
 ♦ 15GB IDE Hard Drive (20GB +\$20)
 ♦ 128MB SDRAM PC100
 ♦ 56K Int/Voice/fax/V90/Modem
 ♦ Gigabyte 6VX7 (6VX7-4X +\$32)
 ♦ Creative PCI 16 Sound Card
 ♦ ATI Xpert@98 8MB AGP Video
\$908 or SCALL

WorldTech Thunder-700
 ♦ ATX 19" Case
 ♦ 50X CD-ROM
 ♦ AMD Thunderbird 700 (800 + \$100)
 ♦ CPU Cooling fan
 ♦ 1.44 MB Floppy Drive
 ♦ 20GB IDE Hard Drive (30GB+\$40)
 ♦ 128MB SDRAM PC133
 ♦ 56K Int/Voice/fax/V90/Modem
 ♦ Gigabyte 7ZX (Asus K7M +\$22)
 ♦ Built-in Sound
 ♦ RIVA TNT2 32MB AGP Video
\$1018 or SCALL

WorldTech PIII 667E
 ♦ ATX 19" Case
 ♦ 50X CD-ROM
 ♦ Intel PIII 667E CPU (733 +\$35)
 ♦ CPU fan (with PIII 800E+\$160)
 ♦ 1.44 MB Floppy Drive
 ♦ 20GB IDE Hard Drive (2000rpm+\$55)
 ♦ 128 MB SDRAM PC133
 ♦ 56K Int/Voice/fax/V90/Modem
 ♦ Gigabyte 6VX7-4X (Asus CUV4X +40)
 ♦ S.B. Live Value PCI Sound Card
 ♦ ATI Xpert@2000 32MB AGP Video
\$1118 or SCALL

**WorldTech Complete System (Special + full feature)
 [Tower or PhoneBook Case (upgradable to PIII)]**
 ♦ ATX 17"/Phonebook Case
 ♦ Aopen 40X CD-ROM
 ♦ AMD K6II-533 (for Tower)
 ♦ Cele 533 (for Phonebook)
 ♦ 1.44 MB Floppy Drive
 ♦ 10 GB IDE Hard Drive (15GB+\$18)
 ♦ 64 MB SDRAM PC100
 ♦ 56K Int/Voice/fax/V90/Modem
 ♦ Elite/Houston/Gigabyte MothBD
 ♦ with built-in sound/video
 ♦ win98 keyboard + MicroPhone
 ♦ 140W Speaker + Mouse Pad
 ♦ Generic Mouse + Printer Cable
 ♦ TVM 15" Monitor
 ♦ Canon 2000SE Printer*
 ♦ Scanner (optional, +\$85 after rebate)
 ♦ CPU, RAM, Harddrive upgradable
\$838 (tower)/\$908 (phonebook)
 *After \$20 printer rebate.

Download/view our price list
(1) Common Items +systems (2) Complete Items
 Product introduction in Chinese: www.pconline.com.cn

Bundle A: \$25
 (purchased with any system)
 140W Speaker
 Win98 Keyboard
 Generic Mouse W/Pad
 Microphone W/Stand

Bundle B: \$55
 (purchased with any system)
 320W Speaker
 Fujitsu 8725 Keyboard
 MS Tracker Mouse 2b W/Pad
 Microphone W/Stand

Bundle C: \$105
 (purchased with any system)
 Rockliffe-2000 speaker with subwoofer
 Lite-on Internet Keyboard
 Logitech 1st Mouse w/wheel W/Pad
 Microphone W/Stand

Bundle D: \$125
 (purchase with any system)
 3D-105 405W Speaker w/Subwoofer
 MS Internet Keyboard
 M.S Intelli-Mouse w/wheel W/Pad
 Microphone W/Stand w/Joystick

Bundle E: \$145
 (purchased with any system)
 GNT 7000A Speaker w/Subwoofer
 M.S Natural Keyboard
 M.S Intelli-Mouse w/wheel W/Pad
 Microphone W/Stand w/Joystick

BackDrive (web P1,P10)
 IOMEGA ZIP DR EXT Para/USB \$call
 IOMEGA ZIP DR EXT SCII \$call
 IOMEGA/PANASONIC ZIP DR INT IDE \$99/\$70
 IOMEGA ZIP DR PLUS ext/int. 250MB \$call
 Panasonic LS 120 Internal IDE \$105
 Panasonic/Samsung 1.44MB F.Drive \$19/\$18

Tower Case (web P1)
 ATX 17" 985B/ST3/787 \$44/\$41/\$41
 ATX 14" 320J/18" 320K blue/white \$43/\$49
 ATX 19" 787/deluxe/985B/ST4 \$50/\$55/\$52
 ATX 24" 250W/300W \$77/\$86

CD ROM (web P1)
 Acer/Aopen 40x/52x \$50/\$62
 Aston 52x/Afreey 50x \$58/\$58
 Creative 52x/Lite-on 48x/52x \$60/\$56/\$59
 LG 48X/52X Samsung 48X \$56/\$59/\$59
 Panasonic 40x/48x \$56/\$62

CDWriter (web P1)
 HP8250V/9110V/9310I IDE \$265/\$329/\$382
 HP8210E External \$259
 LG 8x4x32X/4x4X32 IDE \$267/\$237
 Panasonic 8432/Creative 8432 \$226/\$261
 Sony 8x4x32/Plextor 12x10x32 \$273/\$419
 Yamaha 8424 int EIDE / SCSI \$269/\$388

DVD ROM (bare) (web P1)
 Panasonic 12x/16x/Asus 8x \$185/\$199/\$155
 Pioneer 8xscscl/16x IDE tray/slot \$178/\$193/\$199
 Samsung 12X/Creative Labs 10X \$175/\$call
 Toshiba 12x/Hitachi/NEC 8x \$177/\$call/\$call

SCSI Controller Card (web P8)
 Adaptec 1505 \$web
 Adaptec 2940U/2940UW \$web
 Adaptec U2W \$web
 Adaptec 2944 w/ Differential \$web
 Asus sc 200/875 \$web
 Diamond Fire Port 40 \$web
 Diamond Homeless Card \$web

CPU Processor (web P2)
 AMD K6 II 500/533/550 \$88/\$95/\$135
 AMD Duron 600/650/700 \$129/160/\$225
 AMD K7 550/750/800 \$146/\$268/\$337
 AMD Thunderbird 700/800 \$243/\$385
 Intel P-233 MMX \$72
 Intel Celeron 500/533/566 \$143/\$157/\$170
 Intel Celeron 600/667 \$193/\$285
 Intel PIII 500/500E \$213/\$245
 Intel PIII 550/550E \$246/\$250
 Intel PIII 600E/650/700 \$290/\$call/\$320

Intel PIII 750/800/850 \$419/\$455/\$670
Intel PIII 533B/600B/667 PC133 \$call/\$call/\$311
Intel PIII 733/800EB PC133 \$330/\$463
Intel PIII 866EB/933EB PC133 \$689/\$973

Hard Drive (web P3)
 Fujitsu 10.8/15.6/20GB \$117/\$135/\$150
 Maxtor 10/15/20GB \$122/\$132/\$153
 Maxtor 30/40/60GB \$193/\$266/\$395
 Maxtor 15/20/27GB 7200rpm \$160/\$199/\$240
 Maxtor 30/40GB 7200rpm \$253/\$333
 Quantum 10/15GB 7200rpm \$155/\$165
 Quantum 20/30GB 7200rpm \$203/\$260
 Notebook HD IBM6G/ Toshiba 12G \$215/\$308
 WD 15/20 54/20G 72 \$175/\$163/\$205
 For SCSI Hard Drive Please Call \$call

Keyboard (web P1)
 Focus 8200/9200 \$52/\$58
 Fujitsu 4725/8725 \$60/\$19
 Generic WIN 98 Keyboard \$11
 Logitech Cordless iTouch (KB & Mouse) \$call
 M.S. Natural Elite/MS USB Keyboard \$33/\$56
 M.S./Lite-On Internet Keyboard \$30
 Turbo Media Enhanced Win98 Keyboard \$19

Memory (web P2)
 16MB/32MB 72Pin Regular/EDO \$62/\$117
 32MB / 64MB SD DIMM (PC 100/PC133) \$web
 64MB SD DIMM ECC (PC 100) \$web
 128MB/256MB SD DIMM (PC 100/PC133) \$web
 128MB/256MB SD DIMM ECC (PC 100/133) \$web

Modem (with fax/voice) (web P1)
 Aopen/Acer 56k V90 SM/PM \$34/\$45
 Aopen/Acer 56k V90 ISA \$66
 Cirrus Logic/Diamond SupreMax 56k V90 \$33/\$46
 Motorola 56k V90 v/f \$23
 USR win/hardware/fast Int/No/PC/V90 \$50/\$65

Monitor (web P5)
 Acana 17" / 19" \$257/\$405
 Acer 15" 58C/77E/77E \$239/\$15/\$280
 Acer 17" 78C/79G/F51/54E \$410/\$45/\$1420/\$223
 ADI 15" E55/E66/G500/G700 \$310/\$488/\$691/\$415
 AOC 17" 25" 28" 19" \$265/\$247/\$387
 Daytek 15" 17" 1726 \$web/\$web
 Hansol 17" 710A/710p \$270/\$295
 Hansol 17" 710D/900p 19" \$335/\$429
 NEC 17" AS70/AS90 \$455/\$295
 Nec 17" FE700/E750 \$375/\$web
 Preview 15" 17" 19" \$260/\$389/\$570
 Samsung 17" 750/753DF \$283/\$313
 Samsung 17" 755df/955df \$543/\$466
 Samsung 17" 700mf/700it/900mf \$398/\$365/\$608
 TVM 15" 17" \$175/\$268
 ViewSonic E771/EF70 \$323/\$385
 LCD tft flat monitor (many on web) \$web
 Mag /ViewSonic/Optique/Panasonic \$web

Mouse (web P1)
 Aopen 2B PS/2 \$8
 Generic mouse with wheel \$5/\$9
 Genius net mouse \$13
 Logitech 2B PS2/Serial/USB \$9/\$call
 Logitech 3B PS/2 \$14
 Logitech 1st Mouse w/ Wheel \$15
 Logitech USB 3B Mouse \$22
 Logitech Cordless Mouseman Plus \$web
 Mitsumi 2B w/Wheel \$11
 MS Intelli mouse PS/2 \$22
 MS Cordless Mouse \$web

Printer (some w/after rebate) (web P10)
 Brother/ Lexmark/Okidata \$check
 Canon BJC-50/85/2000se \$437/\$352/\$75
 Canon BJC-2100/3000/5100 \$86/\$150/\$162
 Canon BJC-6100/8200/4500 \$220/\$522/\$235
 Canon LBP-1760/1760n \$1355/\$call
 Canon LBP 2460/c460PS \$1550/\$3730
 Epson 440/670/740i \$99/\$119/\$199
 Epson 760/860/870 \$175/\$186/\$395
 Epson 900/1160/1270 \$375/\$445/\$594
 Epson 1520/3000 \$607/\$1516
 HP 840/930/Laser \$232/\$299
 HP 895C/1100 \$call/\$call
 HP 4500/8550DN/8100DN \$5810/\$1399/\$5199
 Muxtek 1200cu ultra/1200usb 48bit \$107/\$107
 OKI 6W laser \$225

Scanner (some w/after rebate) (web P10)
 ACER/Umax/HP/MicroTek \$call
 Canon fb330p/630p/630u \$78/\$113/\$162
 Canon 630ui/FS2710/N650U \$180/\$690/\$136
 Epson 610/636u/1200s1200u \$175/\$195/\$385
 Epson 1200u ph/2500/2500pro \$255/\$518/\$635

Sound Card (web P1,P8)
 Acer AW37 ISA/AOPEN AWE230 \$19/\$web
 Asound 32bit PCI/Creative 16 PCI \$20/\$32
 SB Live PCI/SB Live Value PCI Retail \$70/\$call
 SoundBlaster 128 PCI \$47

Video Card (PCI) (web P1,P4)
 S3 TRIO 8MB/SIS 4MB \$49/\$38

Video Card (AGP) (web P1,P4)
 Asus V3800 TNT2 M64MB AGP \$128
 Asus V6600 GeForce 32MB AGP \$259
 Asus V7700 GeForce2 GTS 32/64MB \$410/\$530
 ATI Xpert@98 8MB AGP \$53
 ATI Xpert@2000/2000PRO 32MB AGP \$111/\$web
 ATI All In Wonder@128 Pro 32MB \$235
 ATI Rage128 FuryRage 32MB tv out/4x \$139/\$156
 ATI Rage Fury MAXX 64MB \$243
 Matrox G400 4x/dual head 32MB \$120
 Creative Labs GeForce Pro 32MB \$375
 ELSA eraser III LT TNT2 (M64) 4X \$113
 ELSA eraser X GeForce 32MB SDR 32mb Ret. \$245
 ELSA Gladiac MX GeForce-2 MX 32MB 4x Ret. \$265
 ELSA Gladiac GeForce2 GTS 32MB DDR Ret \$465
 Diamond Speedstar A90/Savage4 Pro + 32MB4x \$70
 Diamond StealthIII s540/Savage4 Pro + 32MB4x \$97
 Diamond ViperII 32MB \$88
 HIS/PowerColor RIVA TNT2 16/32MB \$99/\$105
 Matrox G400 4x/dual head 32MB \$173/\$215
 S3 Trio 8MB/4MB \$49/\$35
 Voodoo III/2000 16MB AGP \$104
 Voodoo 5500 64MB/3000 AGP \$104/\$136

Camera & Conference (web P1,P10)
 Intel create and share USB \$web
 Logitech quickcam usb/kodak dvc-323 USB \$web
 Canon A50/S10/S20/Ultra/cd300(Ca.) \$web
 Epson PC650/750Z/800/850Z/3000Z(Ca.) \$web

Networking (web P1,P10)
 Acer/Aopen/Surecome Com. PCI Network Card \$19
 Acer/Surecome/Generic Com. ISA Network Card \$19
 Dlink 10/100Mbps 538 PCI Card \$28
 Generic 100 Mbps FAST PCI Network Card \$23
 GVC PCMCIA (regular\$98), special now \$75
 Dlink Network Kit \$call
 Dlink 10/100Mbps 5 ports Hub \$call
 USB Network Adaptor \$call
 4-port Hub BSFSR41/11 (linksys router) \$39/\$call
 4-port Hub BSFSR41/11 (linksys router) \$260/\$170
 INTEL B469B/3COM 3C905C/3C905B \$69/\$67/\$69

Software (web P1)
 MS Window 98/2000 \$125/\$185

Speaker ,Accessory, or Any Small Items
 (see web.P1 ,P12)

Year 2000 Daily Special
(back to school)
 The following items and price only valid on Aug. 6, 2000 (Today) and limited quantity.

Check WEB Pricelist P.10 (Daily UnUsual Price+Very Special Item).
Any system upgrade, pay parts Prices Differ
 all printer \$web P.10 all speaker \$web P.10
 AOC 17" \$247 AOC 19" \$387
 Canon 1000tse \$75 Canon 2000SE \$78
 Elite ain/fca/PiII5118 Atp BEB Mothbd \$145
 GVC PCMCIA card. \$75 GVC network card. \$17
 Maxtor 20GB \$149 Maxtor 30GB \$169
 Matsonic all-in-1 \$118 Houston all-in-1 \$116
 M.S Window 98 \$125 M.S Window 2000/3185
 Panasonic 64x/32x28x Asus 80Vd \$155
 Viewsonic EF70 \$385 NEC FE700 \$375
 USR 56K PCI/Fast/666 GigaByte 71XE \$172

As-is Items:
 Portable Scanner \$30 Portable Printer \$20
 POS-printer \$50 Barcode Reader \$50

Discount (> 1 piece or system or larger sales) + coupon
 Acer/Panasonic/Creat.Cdr \$3 OFF
 AOC/Samsung Monitor \$5 OFF
 Asus/Gigabyte motherboard \$3 OFF
 Asus/Panasonic DVD \$3 OFF
 ATI video Card \$3 OFF
 Epson/Canon Printer \$3 OFF
 Epson/Canon Scanner \$5 OFF
 Fujitsu/Maxtor Harddrive \$4 OFF
 HP/Panasonic CDWRITER \$5 OFF
 LG/Aston/Afreey cdr \$3 OFF
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 MS WIN98 SE/WIN2000 CD \$3 OFF
 Speaker/Keyboard \$1 OFF
 Tower case/Keyboard \$3 OFF
 Viewsonic/Opti. Monitor \$5 OFF

See WEBSITE For current Price Price on AD announced on 6th Aug.2000 and valid up to 15th AUG. 2000 only

*Customer may use coupon for some items. please check with our salaman.

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Back to School Special

Intel Celeron 566 System

Pentium III 133mhz ATA66 Motherboard
64M SDRAM / 10G ATA66 Hard Drive
32M TNT2 AGP4 Video
3D Sound for 4 channel Speakers
48X CDROM / Floppy Drive
56K V.90 Fax Modem
10 / 100mbps Network ready
Keyboard / Mouse / 140w Speakers
Free Anti-Virus, WordPerfect etc. & Internet ready*



\$639

It's time to Upgrade !

Celeron 566 + PIII 133 M/B + 32M Video + 3D Sound +
64M SDRAM + 56K Modem + Network ready +
ATX Case + Installation.....\$459



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Financing

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Microsoft products must be sold with new system only.
We reserve the right to correct typographical errors.

Super Buy While quantity last

BASF Blank CD w/Case 10pcs/box.....\$12
17" .25 7GLR AOC Monitor.....\$259
Panasonic 8432 CDRW IDE.....\$219
Yamaha 8432 CDRW IDE.....\$259
Golden ORB Overclock CPU Fan.....\$22
5 Port 10mbps Ethernet HUB.....\$28
Asus A7V Duron Motherboard.....\$225
Color Keyboard + Mouse Combo.....\$18

All systems are backed with 3 years labor & 1 year parts limited warranty plus one month free Internet.

Home Officer

AMD K6II-500\$529

Super7 ATX66 Motherboard
Integrated 8M Video & 3D Sound
32M PC100 SDRAM
Panasonic 1.44MB Floppy Drive
10G ATA66 Hard Drive
48X CDROM
56K V.90 Voice / Fax Modem
Keyboard / Mouse
140w Speakers

K7 Master

K7-700\$979

K7-750 / 800\$1019 / \$1089
Gigabyte K7 Motherboard
128M PC133 SDRAM
32M AGP4 Video Card
Panasonic 1.44M Floppy Drive
15G ATA66 Hard Drive
48X CDROM / 3D Sound
56K V.90 PCI Voice / Fax Modem
Keyboard / Mouse
140w Speakers

PIII Partner

Celeron 566.....\$699

Celeron 600.....\$719
633 / 667.....\$759 / 809
Pentium III 500 / 667.....\$759 / 839
Pentium III 133mhz Motherboard
64M PC133 SDRAM
16M Diamond AGP4 Video Card
Panasonic 1.44M Floppy Drive
10G ATA66 Hard Drive
48X CDROM / 3D Sound
56K V.90 PCI Voice / Fax Modem
Keyboard / Mouse / 140w Speakers

PIII Commander

PIII 667.....\$1069

PIII 733\$1099
PIII 800 / 866.....\$1219 / \$1449
Asus CUV4X 133mhz Motherboard
128M PC133 SDRAM
32M 3D AGP4 Video Card
Panasonic 1.44M Floppy Drive
15G ATA66 Hard Drive
48X CDROM / 3D Sound Card
56K V.90 PCI Voice / Fax Modem
Keyboard / Mouse / 140w Speakers

Dream Machine

Thunderbird 800.....\$2699

Asus A7V Motherboard
256M PC133 SDRAM
Asus V7700 GTS DDR 32M
Panasonic 1.44M Floppy Drive
40G 7200rpm HDD
Yamaha 8432 CDRW
10x Pioneer DVD / SB Live Value
Altec 54w Subwoofer Speakers
Logitech Cordless KB & Mouse
USR 56K V.90 PCI Modem

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CPU

OverClocker's Favorite CPU Cooler.....25&up
Asus 370/Slot1 CPU Adapter 100/133mhz.....25
Celeron 500 / 566 / 600.....155 / 169 / 179
633 / 667 / 700.....229 / 279 / 319
PIII 500 / 550 / 600.....219 / 249 / 279
667 / 700 / 733.....289 / 319 / 339
800 / 866 / 933.....449 / 689 / 999
AMD K7-700 / 750.....229 / 269
K7-800 / 850.....335 / 469
K7-900 / 950.....639 / 879
Duron / Thunderbird.....call
K6II-500 / P233mmx.....99 / 69

MEMORY

Name Brand	16M	32M	64M	128M	256M
100Mhz SDRAM	55	99	199	429	
133Mhz SDRAM		105	205	449	
72pin EDO	59	105			

MOTHERBOARD

Asus ATA66 PCI Controller Card.....39
PCP Super7 (AT) + Sound (2SDRAM 2EDO).....105
PCP Super7 + 8M Video + Sound.....119
PCP Super7 + 8M Video + Sound + Modem 129
Asus Super7 P5A(ATX) / P5AB(AT).....119 / 119
Asus A7V KT133 ATA100.....225
ABIT KA7-100 KT133 ATA100.....239
Gigabyte 7ZX KT133 Dual BIOS.....185
Gigabyte 7ZM KT133.....165
PCP PIII i810 + AGP + Sound ATA66.....129
Asus P3V133 VIA 133mhz.....129
Asus P3V4X / CUV4X133Mhz.....155 / 165
Asus CUSL2 i815e ATA100 S370.....225
Gigabyte 6VXE7+ 133Mhz ATA66.....105
Gigabyte 6VX7-4X 133Mhz ATA66 S370.....139
ABIT SE6 / SL6 / VA6.....225 / 205 / 115
M7254LMR w/Video,Audio,Modem,Lan.....129
MS7157 w/4xAGP, 3D Sound.....115

HDD / LS120 / ZIP

	5400rpm	10G	15G	20G	30G	40G	60G
Max / Fuj	115	129	145	185	255	389	
7200rpm		15G	20G	30G	40G		
Max / Fuj		155	199	245	329		
Quantum		159	199	255			

LS120 2x 120mb Super Drive / Disk.....88 / 13
Zip 100MB Int IDE Drive / Disk.....69 / 13
Zip 250MB Int IDE Drive / Disk.....139 / 25

VIDEO

Asus V3800 TNT2 / Pro 32M pure.....119 / 179
Asus V3800 TNT2 Ultra 32M pure.....189
Asus V6600 32M / 64M pure.....239 / 269
Asus V6800 32M / 64M pure.....285 / 395
Asus V7700 DDR 32M / 64M pure.....419 / 529
Creative Geforce II GTS 32M.....399
Matrox G400 32M Dual / Single VGA.....209 / 169
Diamond Savage4 Pro 32M / 16M AGP.....95 / 69
Sniper TNT2 32M AGP4 / Pro.....109 / 129
Sniper TNT2 32M AGP4 TV in&out/ out 149 / 129
ATI Xpert 98 8M / 128 16M AGP.....48 / 109
ATI Xpert@play PC2TV 8M AGP / PCI69 / 89
ATI Fury Pro 32M 64M AGP.....159
ATI Fury 32M / Fury Maxx 64M AGP.....139 / 239
ATI All-in-Wonder 128 16M AGP / PCI...199 / 205
ATI All-in-Wonder 128 32M AGP.....239
ATI All-in-Wonder 128 PRO 32M AGP.....329
ATI TV-Wonder Tuner & Capture Card PCI.....95
3dfx Voodoo3 2000 16M AGP.....99
3dfx Voodoo3 3000 16M AGP TV Out.....139
3dfx Voodoo5 5500 64M AGP.....429
PCI 8M 3D S3 Trio / SIS.....59 / 49
Logitech Quickcam Exp / Web USB.....59 / 119

AUDIO

Crystal 3D Sound Card ISA / PCI.....15 / 18
Sound Blaster PCI 16 / PCI 128.....29 / 43
Sound Blaster Live value / Platinum.....66 / 259
Sound Blaster Live MP3+ / XGamer.....149 / 149
Multimedia Speakers.....8 & up
GNT5000A Subwoofer + Speakers.....49
Cambridge FPS1000 / FPS2000.....109 / 189
Altec Lansing ACS33w / 45w.....59 / 85
Altec ACS54w Subw + 4 Speakers (Black).....89
Microphone / Headset Mic +Vol Control.....6 / 12

CD-ROM / CDRW / DVD

48X / 52X Liteon CDROM.....55 / 57
52X Creative / 50X Asus.....58 / 65
Adaptec EZ CD Creator.....10
Panasonic 8x4x32x CDRW IDE.....219
Yamaha 8x4x24x CDRW IDE.....259
Creative 8x4x32x CDRW IDE.....239
HP 10x4x32x CDRW 9310i.....379
DVD 8X Asus.....159
DVD 12X Toshiba.....call
DVD 16X Pioneer.....185
Sigma Hollywood DVD Decode Card.....109
Blank CD Recordable / Rewritable.....1.2 / 3.5
Blank CD Spindle 50pcs / 100 pcs59 / 99
80min Blank CD Recordable.....2.5 & up
Platinum 8xRecordable CD.....15 / box

MODEM / NETWORK

Motorola 56K PCI Voice WinModem.....23
AOpen 56K Voice Modem ISA / PCI.....65 / 32
Diamond Supera 56K / HW Modem.....39 / 49
USR 56K PCI WinModem.....54
USR 56K PCI HardWare Modem.....79
PCMCIA 56K V.90 Modem.....75
Surecom Ethernet 10mbps / 100mbps....13 / 17
AOpen RJ45+BNC 10mbps ISA / PCI.....19 / 19
D-Link 530TX100/10mbps PCI.....23
3Com 3C905 100/10mbps WakeOnLan.....65
Surecom PCMCIA Ethernet Card 10mbps....49
Surecom PCMCIA Ethernet 10/100mbps....79
Surecom HUB 5 / 8 Ports 10mbps.....28 / 42
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Validating Excel data



Helen Bradley

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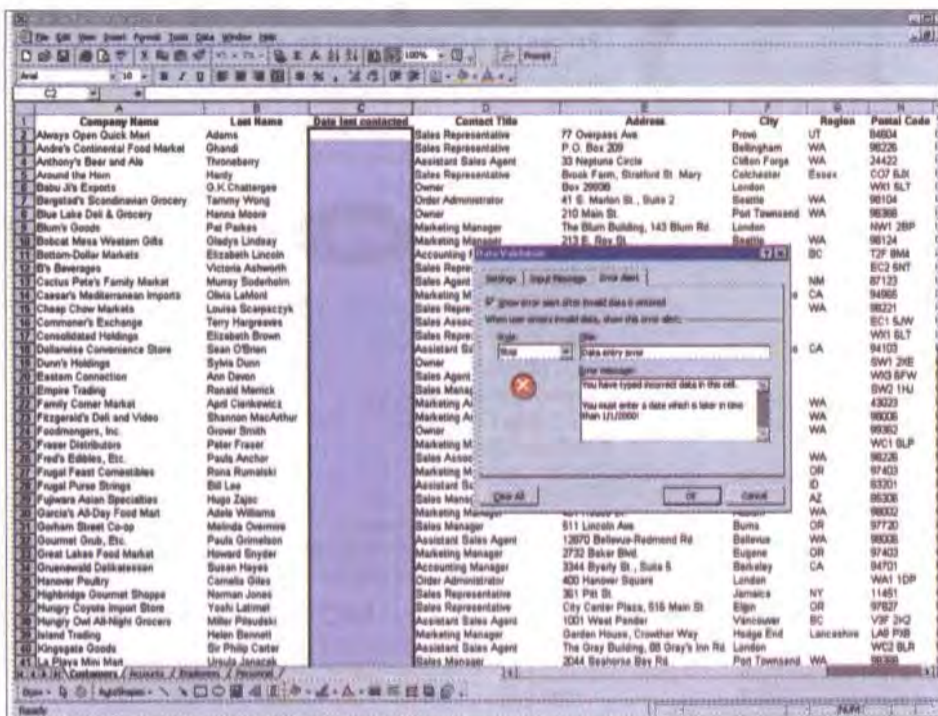
One of the most common causes of errors in worksheets is incorrect data entry. Whether you're working on your own spreadsheets or you're designing them for others, you can eliminate many errors by automating data entry. You can also add checks to your worksheet to trap errors if they do slip in. Excel has some powerful data entry and checking options that will help you avoid and trap errors.

Checking data entry

Excel allows you to determine what is valid data and to set up a worksheet that checks the validity of data as you enter it. For example, if you are entering the date of an employee's last pay raise into a range of cells, you may choose to limit the dates to those occurring after 1/1/1990.

When you set up data validation for a cell or a range of cells, you can add message box text that will display when a user selects a cell where data validation applies. This allows you to tell the user what data you're expecting. If an invalid entry is made, you can choose from a number of options to control whether or not the invalid data can be entered in the cell.

To set up a range of cells for validation, select the cells to be checked and choose Data, Validation, Settings tab. From the Allow list, choose the data type allowed (for our example we would select Date). The remaining options in this dialogue will alter depending on the type of data you choose. For Date, the options include selecting a date between two defined dates, or before a defined date, etc. If you deselect the Ignore Blank checkbox, an empty cell will be reported as an error.



Excel's data validation options allow you to specify what data you will accept in a cell and to block a user from entering anything that is not "valid."

In the same Data Validation dialogue you can choose the Input Message tab and, in the Title text box type a title for your message. In the Input Message area, type the message you want to display. This message will pop up when the mouse pointer is over one of the selected cells so make it descriptive of the data required. If you prefer not to use an input message, deselect the Show Input Message When Cell Is Selected checkbox. I'd recommend using it for the occasional cell entry where the user may not remember what is required. However, it's too intrusive for regular use.

The Error Alert tab allows you to specify what happens when a user attempts to enter invalid data. From the Style list box select the style you want to use (i.e. Stop, Warning or Information). In the Title text box type a title

for your message and in the Input message text area type the message you want to display. Alternately, if you don't want a message to appear, deselect the Show Error Alert After Invalid Data Is Entered checkbox. I'd suggest you use Error Alerts in preference to Input Messages as these only display when there is really a problem.

The three styles of Error Alert available all display different symbols and treat the incorrect data differently. Some still allow you to enter it and others prohibit it. The Stop style dialogue box has a Retry button that returns the user to the cell to make changes to their input and a Cancel button that restores the cell's previous value. The Information style dialogue's OK button allows the user to enter the invalid data into the cell and the Cancel

Continued on page 107

Java Tutorials: Part 1

Introduction to Java

Java is taking off, and in response The Computer Paper has prepared a series of Java tutorials designed to introduce our readers to Java programming at a beginning to intermediate pace.

By Jacques Surveyer

The advantage of Java is that it is very accessible. The basic Java Development Kit (JDK) is available for free from Sun Microsystems and IBM among others. Programming can be accomplished with just a text editor and the JDK. Also contributing to Java's accessibility is the fact that its .class files can be run on any system (Linux, Mac, OS/2, Unix, Windows, or whatever) with a Java Virtual Machine or JVM (and most systems using Netscape or Internet Explorer Web browsers have a JVM).

Although the Java Integrated Development Environments (IDEs) are as rich as Visual Basic's (some Javaphiles will insist they are even more so given the powerful interaction wizards found in popular Java IDEs, such as Borland JBuilder, IBM Visual Age for Java, and Symantec Visual Café—see Fig. 1), we will use the first few tutorials to get acquainted with the Java landscape before diving into the intricacies of Java IDEs. This emphasis on lecture will be well rewarded as Java's apparent simplicity masks a most powerful programming language.

Java's genesis

Java was born from Oak, a simplification of C++ designed to be an easy-to-learn yet robust language for embedded processors. From the outset, Java was designed to be reliable, networked, and secure because it would negotiate transactions between networked devices and their users.

Java was designed to be compact enough

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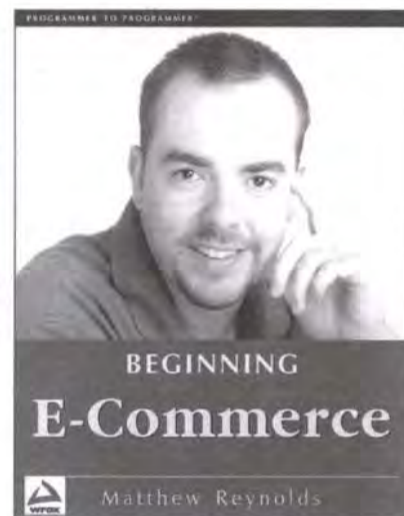
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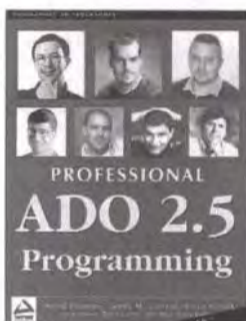
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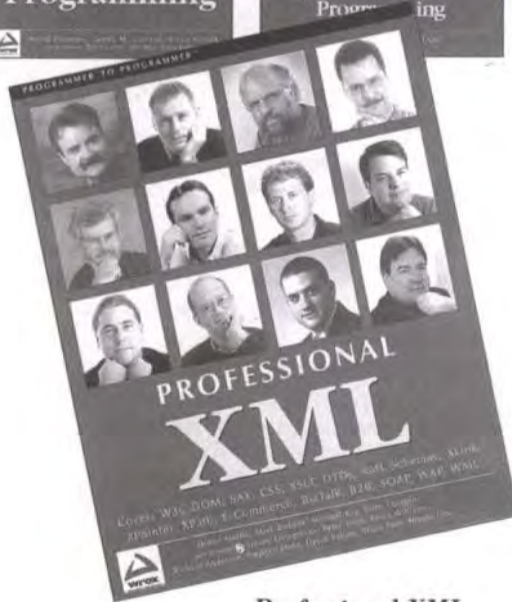
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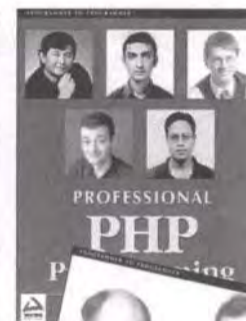
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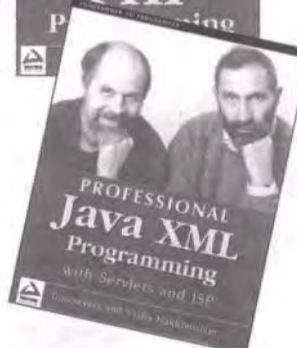
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Java Tutorials: part 1

Continued from page 101

to run on small microprocessors (8-bit and 16-bit processors with similar addressing) with a small memory size (1 MB or less). But Java was also intended to be most versatile, running in all sorts of environments from isolated machines to networks to mainframe computers. This versatility is reflected in the fact that Java can be either compiled into very fast executable code or interpreted bytecode.

Executable Java code runs within 10 to 20 percent of the best runtime benchmarks of equivalent C++ code; but for structural reasons, which are discussed below, Java will likely never surpass C++ in raw speed. Interpreted bytecode slows down the speed of Java programs but increases the number of different devices it can run on in a uniform and secure fashion. The result is that there are many Java deployment options:

- Standalone application bytecode interpreted: Very portable code runs anywhere JVM is found.
- Standalone application optimized bytecode: Fast Java but slower loading time.
- Standalone application, compiled .EXE: fastest Java but least portable.
- Browser applet bytecode interpreted: Runs on any browser that supports JVM like Internet Explorer or Netscape.
- Browser applet optimized bytecode: Optimized for size and speed for faster download and runtime.

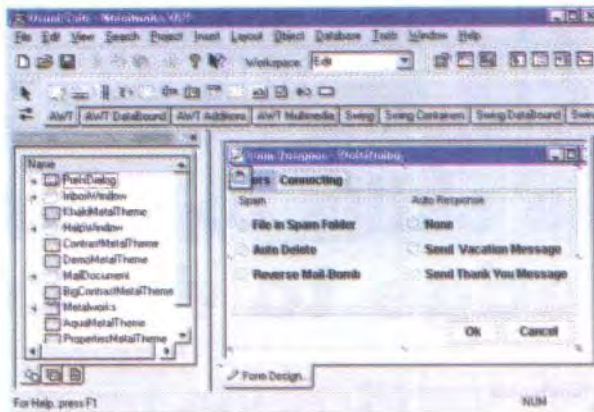


Fig. 1: Symantec Visual Cafe Integrated Development Environment.

- Browser Weblet: Interacts more openly with HTML/XML through DOM APIs.
- Web server servlet optimized bytecode: Will gradually replace CGI & Perl scripts as it is much faster.
- JavaBean optimized bytecode: Self-describing GUI components.
- Enterprise JavaBean optimized bytecode: For large-scale transaction processing tasks.

The four pillars of Java

Time and again users will find the strength of Java is fourfold. First and foremost among the strengths, is that it has been designed from the outset to be deployed on many different platforms that take advantage of its open and cross-platform portability. Its

motto is write once; run anywhere.

Second, from the ground up Java has been designed to be a safe and secure language with a limited sandbox security model for use in browser and servlet modes. Given the outbreak of Web-based viruses taking advantage of weaknesses in the Microsoft thick client architecture, this extra security is a decided attraction of Java deployments.

Third, Java's other great strength is the reuse it supports with its object-oriented design and comprehensive set of APIs.

Fourth, Java is quite approachable. Its syntax is modeled after C/C++ and it has just over 60 keywords in comparison to hundreds

for most other languages. In fact, it can be used with a simple editor like Notepad.

First program

Thus without further ado, let's write the classic "Hello World" program.

Start up your favourite editor or word processor. I am using Notepad, but Microsoft Word or Corel WordPerfect will do. Here are the lines to enter:

```
class Helloprogram {
public static void main( String args[]){

// This is a comment about Helloprogram
/* This is also a comment - which can
run over several lines - terminated by => */
/** This is a special JavaDoc comment indicated by
the two stars, **. These comments can have JavaDoc
tags, like @programmer, which JavaDoc specially formats
*/
```

Installing Java

If you don't have the Java JDK (Java Development Kit)—which contains all sorts of Java goodies including the compiler, Javac, and several Java runtimes—you can download it for free from either <http://java.sun.com> or <http://www.software.ibm.com/java>. It is 15 to 20 MB, so if you want to avoid downloading it, buy one of the many Java books that includes a CD-ROM with a copy of the JDK, because Sun and IBM distribute the JDK for free (in fact that is one of the conditions of licensing Java).

In the course of these tutorials, two books will be referenced: the Michael Daconta book for advanced users and the Horstmann and Cornell book for novice users of Java. Both books have a copy of the JDK on their enclosed CD-ROM. If you already have a copy of one of the Java IDEs, then, of course, you have a copy of the Java JDK as well. Users who have a fast cable modem or DSL connection to the Net may want to download Visual Cafe—either the free edition from Borland or Symantec's trial edition.

Finally as a note to Windows users, Java has very long ClassPath and Path setting that may produce the following error statements on booting:

Out of environment space.

If you get this message, you will have to add the following line to your config.sys file:

```
shell=c:\command.sys /p /e:32000
```

You can do this in Windows using NotePad or any other text editor. Note: the system will have to be rebooted for the new environment setting to take effect.

—Jacques Surveyer



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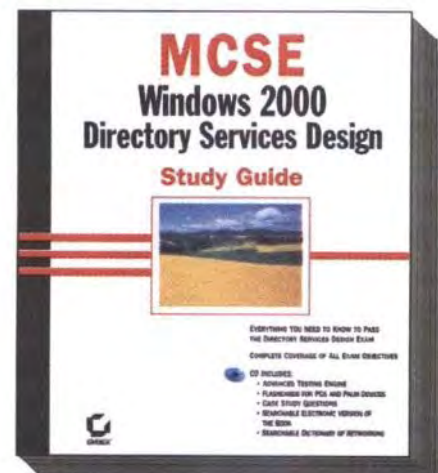


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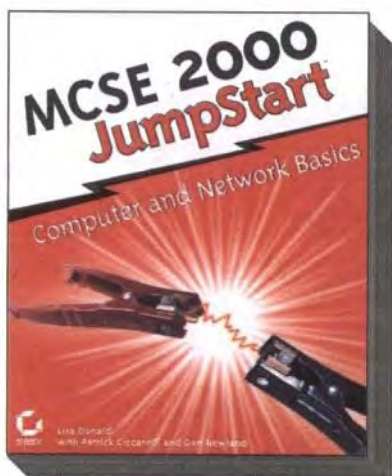
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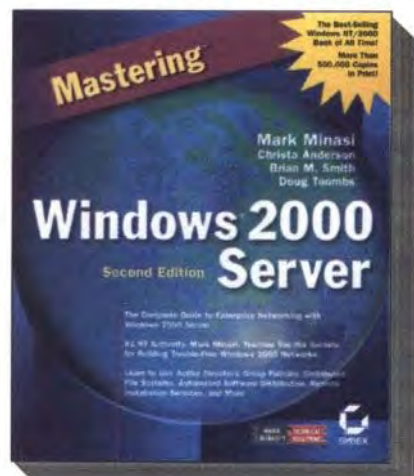


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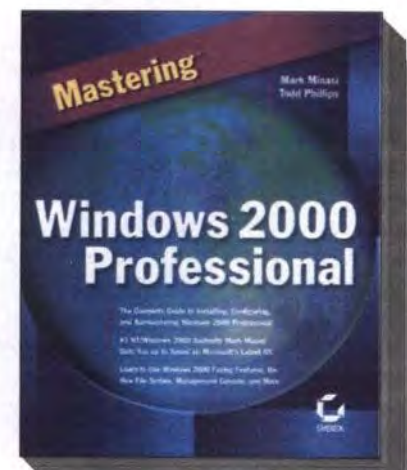


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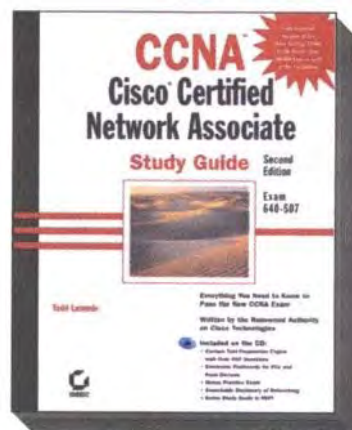
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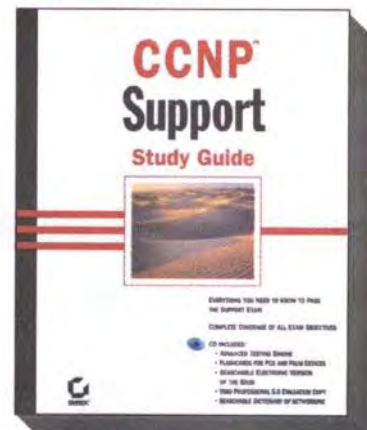
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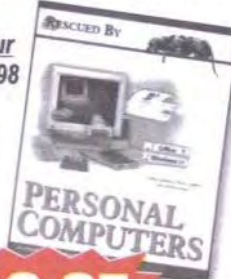
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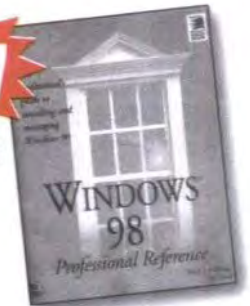


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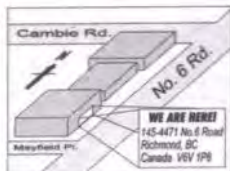
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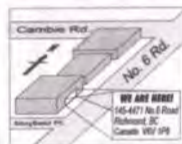
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Validating Excel data

Continued from page 101

button restores the previous cell entry. The Warning style has a similar Cancel button as well as a Yes button that enters the invalid data into the cell and a No button that returns the user to the cell to make further edits to their entry. Be careful to choose the style that meets your needs.

When you're done, select OK to exit the Data Validation dialog box.

Using these options you can apply various levels of data checking. You can be strict and alert the user to what is required and prohibit the entry of any data that doesn't match your requirements. Alternately you can use a friendly, prompting approach by using an Input Message and no Error Alert, or you can choose an approach somewhere between these extremes.

Checking entered data

Even when your worksheet already contains data, you can still easily check to see that the entries are valid. For example, if your employee data is already entered and you haven't previously set up any data validation options, you can check a set of dates for invalid entries by choosing Data, Validate, then the Settings tab. Repeat the previous instructions for setting up a definition of what constitutes valid data then click OK.

Of course, if you already have a definition of valid data for that block of worksheet cells you won't have to perform this step. You may find yourself in this situation if, for example, you have set up your worksheet so the user is prompted for correct data entry but you have allowed incorrect data to be entered.

In either case, locate the invalid data by selecting Tools, Auditing, Show Auditing Toolbar and select the Circle Invalid Data

button. Any cells that contain invalid data will be circled in red so they'll be easy to see. To remove the circles, select the Clear Validation Circles button. This process works on cells containing data as well as cells containing formulae and functions—it checks for results in the range you've specified as being acceptable.

The AutoComplete Picklist

Excel's AutoComplete function assists in data entry where you're making repetitive text entries. Excel will try to complete an entry for you when it recognizes the entry you're typing as a match for one you've previously made in the current column. When it recognizes an entry it will automatically complete the cell entry for you. You can press Enter to accept the auto completion or continue typing the same or another entry.

However, until Excel can select a single entry to match what you're typing it will not make suggestions. If you know there's an entry that you could use, press Alt + Down Arrow (or right-click and select Pick From List) and the list of entries previously made in the current column will appear.

AutoComplete won't work with numbers or dates and it only works with data that is entered down a column, not across a row, however it can save you some typing and it's handy to use when it is vital that entries are correctly typed. You can enable or disable AutoComplete by choosing Tools, Options, Edit tab and select or deselect the Enable AutoComplete For Cell Values checkbox.

Adding alarms

Another way to track a data value that is invalid or outside a range is to create a special format for this data so that it is only applied to a cell when certain criteria are met. For example you can create a special format for the exceptional circumstances of a customer exceeding their credit limit or for a date not that is not within a certain range.

This is called conditional formatting and it offers an alternative to using data validation to maintain data accuracy. In the employee dates example, select the cells that the dates

will be entered into and select Format, then Conditional Formatting. Set up one format for a cell value that is invalid (less than 1/1/1990), then select Add to create another for data that is valid (greater than or equal to 1/1/1990). When you select OK, the cells will be formatted according to their contents and every time you make changes to a cell the formatting will be automatically updated based on the cells' new contents. It will be easy to identify data that is invalid as it will be formatted differently than valid data.

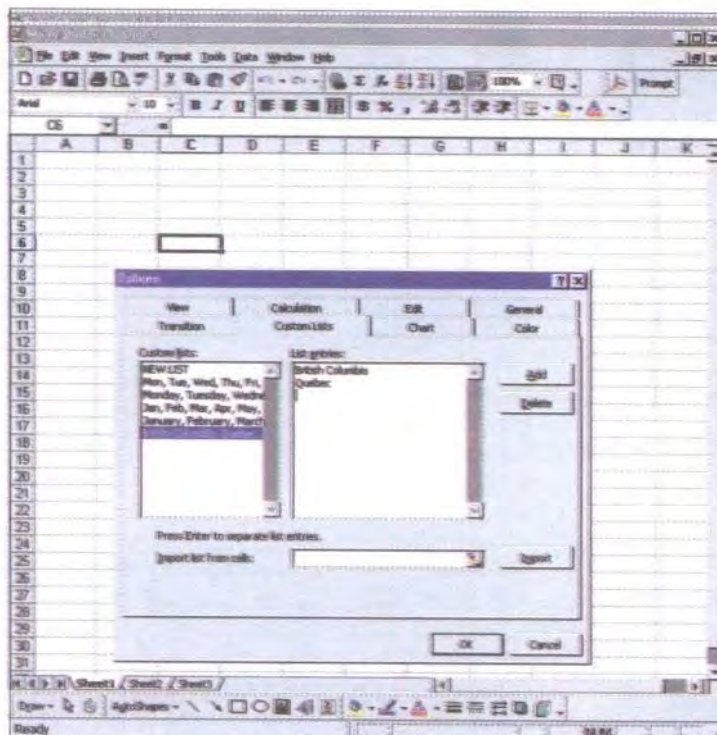
Finding data

Excel's Find command allows you to find and correct some data entry errors that might otherwise be difficult to locate. It allows you to look for a character or characters in a cell formula, comments or value.

To use this, choose Edit, Find and, in the Find What text box type the text you are looking for. From the Look In list select either Formulas, Values, or Comments, then select Find Next to search for the text. You can also use Find and Replace to alter incorrect entries. For example, in a register of commissions you can change a person's name from Jane Smith to Jane Marsden when an employee gets married and changes her name.

Quick filling cells

Sometimes the data you Continued on page 110



You can create your own custom fill list for Excel which will act just like Excel's own fill lists.

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Home networking Part 3: IP masquerading

By Gene Wilburn



In the previous installments of this home networking mini-series we connected our Linux and Windows PCs into a local area network (LAN) with network interface cards (NICs), cables and a hub, and implemented a "private" TCP/IP network

based on the IP range of 192.168.0.0-255. We then added name support in hosts files. In last month's installment we added Samba support to provide Microsoft-compatible file and print services for all the PCs on the network.

In this final home networking installment we'll look at another option for our network: providing concurrent access to the Internet to any workstation on our LAN. In order to do this, our main Linux server must already be capable of linking to the Internet, as we covered in Linux for Newbies Part 8: "Connecting to the Internet."

The main reason for connecting a home network to the Internet is convenience. Being able to share the same connection to the Internet is useful when you have two or more family members who want to visit Web pages or check email at the same time. It's easier to maintain a single modem than multiple modems, and a single Internet setup, rather than several.

Be aware, though, that the decision to connect your home network to the Internet has security implications. The Internet is bidirectional. If you can get out, others can potentially get in. As part of learning how to use Linux as an Internet gateway, we'll also touch on the basics of building a Linux firewall.

Name Address Translation (NAT)

So, how can our internal network, defined as 192.168.0.0, communicate to the world when these private numbers are not valid on the Internet? The secret lies in a networking technique called Name Address Translation or NAT. For some reason NAT picked up the name "IP Masquerading" in the Linux world and that colourful phrase has stuck.

IP Masquerading provides a mechanism for relaying a packet from your private network out to the Internet by encapsulating it in a packet with a valid public IP number. Masquerading stuffs your local workstation's real (private) IP address inside the packet, along with the rest of the packet's data, and then puts a public IP address on the outside of the packet. Hence your workstation's packet is said to "masquerade" as a packet with a valid IP address.

Where does the valid public IP address come from? From your ISP. When you connect to your ISP via PPP or a high-speed connect, you normally pick up a dynam-

cally allocated IP number from your ISP's pool of numbers, unless your ISP has provided you with a fixed IP address.

The IP address from your ISP is then bound to your PPP or NIC device, providing one half of the equation. The other half is the NIC you installed to connect to the hub of your home network.

As far as Linux is concerned, a PPP device (which uses a modem as its conduit) is a network device, just like a NIC.

What you now have is two network devices on the same Linux server: PPP and a NIC if you're using a dialup connection, or two NICs if you have cable modem or DSL. One device is "inward facing," to your home network, and the other "outward facing," to the Internet (see Fig. 1). These two devices can be gatewayed so that packets are permitted to flow, or be "forwarded", from one to the other.

However, we don't want raw packets to be forwarded between the two network devices without intervention. We want to process the packets as they pass through, using software

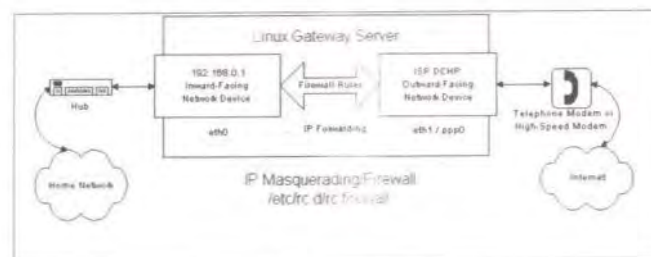


Fig. 1

that will masquerade our internal packets so they can travel to the Internet and then inspect the return packets, relaying return packets to the right PC on the internal network.

In addition we want to inspect incoming packets for packets that shouldn't be coming in. That is, we want to establish a set of rules that define which packets we want to let in, and which we don't. We want to protect our internal network by filtering packets through a set of firewall rules.

Setting up IP Masquerading

The tools you need to establish IP Masquerading and Firewalling were installed when you installed your Red Hat Linux 6.x system. Despite what some older Linux documentation suggests, there is no requirement to rebuild your Linux kernel for masquerading—the default installation kernel is already set up for this.

One key tool we'll use is called IPCHAINS. Older versions of Red Hat, such as the 5.x series, use a program called IPFWADM, but we'll concentrate on the newer IPCHAINS program that came in as the standard firewalling/masquerading program with the Linux 2.2 kernel (Red Hat 6.x series).

While setting up masquerading you should reference the Linux HOWTOs in your /usr/doc/HOWTO directory. The IP-Masquerade HOWTO provides the definitive set of instructions for setting up NAT, and the IPCHAINS-HOWTO and Net3-HOWTO provide excellent supplementary information on firewall rules and networking. If the HOWTOs are not on your system, download them or read them at <http://www.linuxdocs.org>.

The assumption being made from this point on is that you have your two network

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devices working properly. Your inward-facing NIC (e.g., eth0) is connected to your internal LAN and you can ping all the workstations on your home network. Your outward-facing NIC or PPP device (e.g., eth1 or ppp0) is connected to your ISP via cable modem, DSL, or standard modem, and you can connect to the Internet and ping servers external to your local network.

IP forwarding

In order to route, or forward, network packets from your inward-facing device to your outward-facing device, and vice versa, you must turn on IP Forwarding. This is normally turned off by default.

There are a few different ways to turn on Forwarding. Under Red Hat 6.0 and 6.1, you can edit the configuration file `/etc/sysconfig/network` to include the line:

```
FORWARD_IPV4=YES
```

On Red Hat 6.2 this method has been deprecated. Instead you adjust the line in `/etc/sysctl.conf` to read:

```
net.ipv4.ip_forward = 1
```

You can also switch on IP Forwarding by including the following line in a startup script, which works in any version of Linux:

```
echo "1" > /proc/sys/net/ipv4/ip_forward
```

rc.firewall

Because IP Masquerading and firewalling go together, we're going to create a special shell script that contains masquerading instructions and firewall rules. We'll invoke this script by adding these lines to the end of `/etc/rc.d/rc.local`:

```
# rc.firewall script - Start IPCHAINS and firewall
/etc/rc.d/rc.firewall
```

The `rc.local` file, which is executed at boot time, will in turn call a customized file called `rc.firewall` that contains IP Masquerading instructions and firewall rules.

We'll start with a basic, simple script that sets up masquerading. This script has no serious firewall rules but it's a good script for testing your setup. Here's the script in its entirety, followed by an explanation of what

the lines do:

```
#!/bin/sh
# rc.firewall - IP Masquerade and firewall script

/sbin/depmod -a
/sbin/modprobe ip_masq_ftp
/sbin/modprobe ip_masq_raudio
/sbin/modprobe ip_masq_irc
/sbin/modprobe ip_masq_quake
/sbin/modprobe ip_masq_cuseeme
/sbin/modprobe ip_masq_vdolive
echo "1" > /proc/sys/net/ipv4/ip_forward
echo "1" > /proc/sys/net/ipv4/ip_dynaddr
/sbin/ipchains -M -S 7200 10 160
/sbin/ipchains -A input -j ACCEPT -i
bootp_clients_net_if_name -s 0/0 67 -d 0/0
/sbin/ipchains -P forward DENY
/sbin/ipchains -A forward -s 192.168.0.0/24 -j MASQ
```

When you've finished writing this script, make it more secure by typing the following:

```
# chmod 700 /etc/rc.d/rc.firewall
```

The script starts out with bang-path statement `#!/bin/sh` that invokes the native Linux shell interpreter to process the rest of the script. As with all shell scripts, comments can be added by placing a pound sign at the beginning of a line, as in the second line of the script. White space is allowed—you may have as many blank lines as you wish.

The `"depmod -a"` line in the script is needed to load the kernel module lines that follow, invoked by the `"modprobe"` instructions. Each `modprobe` line enables a specialized kernel module required for services that need special handling to work with IP Masquerading. This includes FTP, RealAudio, IRC, Quake, CUSeeMe and VDOLive. If you don't need these services for the Windows, Linux or Mac workstations on your home LAN, you may exclude them or comment them out.

The `"ip_forward"` line has already been discussed—you must have forwarding enabled for masquerading to work. If you have used one of the other methods to make forwarding permanent, you can omit this line.

The line that echoes a `"1"` to `/proc/sys/net/ipv4/ip_dynaddr` is recommended if you receive an IP address from your ISP via DHCP or PPP. Comment out this line if your ISP has provided you with a fixed IP address.

The first `"ipchains"` line sets time outs: two

hours for TCP/IP sessions, 10 seconds for traffic after a TCP/IP `"FIN"` packet is received and 160 seconds for UDP traffic. This last setting is important if you have ICQ users on your home LAN.

The long `"ipchains"` line that contains `"bootp_clients..."` is for those who receive their external IP address via DHCP, especially DSL and cable modem users. If you have a fixed IP address, comment out this line.

The last two lines, the `ipchains "forward"` commands, provide a start for building a packet-filter firewall. The `"DENY"` line denies the use of your outward-facing network device for forwarding by someone on the Internet. The second line with `"MASQ"` switches on IP Masquerading for your home network's entire 192.168.0.0 range. Additional firewall rules would follow these two statements.

Testing the setup

To configure a Windows 95/98 workstation to use your Linux gateway, go to Control Panel, Network. If you've already set up your local IP address you only need to go to TCP/IP Protocol and select the Gateway tab. Click Add, and enter the internal IP address of your Linux gateway (192.168.0.1 in our example).

On the DNS tab, enter the name of your Windows 95 workstation and use the fictitious domain name you assigned to your network. In our house we name our computers after famous scientists. My Windows workstation is Wallace (the co-founder of evolutionary theory) and my Linux gateway is Darwin. Hence I would put `wallace.mynet.all` in the Windows DNS tab.

In addition, enter the primary and secondary IP addresses for the DNS servers of your ISP. (Refer to the IP-Masquerading HOWTO for instructions on how to configure Macintosh, Windows NT, OS/2 workstations.)

After your workstations are configured (and rebooted if necessary), return to your Linux server and make certain that it is connected to the Internet. Test by pinging an address on the Internet, e.g., `"ping www.yahoo.com"`.

Now, as root, type `"/etc/rc.d/rc.firewall"` and check that there are no error messages. If all is correctly configured, you should now have an active gateway.

Go to your Windows or Mac workstation and try pinging an external server, e.g. `"ping`

`www.yahoo.com"`—if you get a reply, bingo! you're on the Net. You can now browse the Web, read newsgroups, fetch email, use ICQ, or play Quake on a Internet Quake server from all the machines on your home network at the same time. Throughput speed is better, naturally, if your home LAN is sharing a high-speed connect, but even sharing a dial-up modem is handy.

Firewall rules

The firewall rules in our script are minimal and you should spend some time beefing them up. Understanding firewalls is an advanced topic, but well within the grasp of anyone who puts in some effort and study.

It is best to understand the firewall rules you put into your `rc.firewall` script, but if you're feeling a bit nervous about having your home network exposed to the Internet and want something in place prior to studying and understanding IPCHAINS, the IP Masquerading HOWTO contains an excellent template for stronger firewall rules. Just read the comments and carefully type in all the rules that seem appropriate, adjusting the entries in the template to your own IP address. Pay special attention to upper-case and lower-case distinctions.


Problems with IP Masquerading

Linux IP Masquerading is a mature, seasoned service. It has been part of Linux for many years (as far back as the 1.x kernel era) and has been continually improved and refined. It works impressively for Internet gaming, ICQ, RealAudio and other Internet services that sometimes pose a challenge to NATed gateways.

In my experience, overall throughput speed with IP Masquerading is noticeably faster than with Windows-only products, such as WinGate. And unlike Windows products, there is no licensing fee and no special software client required. IP Masquerading works with all workstations of all operating systems, as long as they can do basic TCP/IP networking.

If your Linux system is configured correctly, you normally won't have any trouble getting IP Masquerading to work. If you're experiencing difficulties, go back over your configurations and make sure the networking and Internet connect components on your Linux box are OK. Networking and Internet

Continued on page 114



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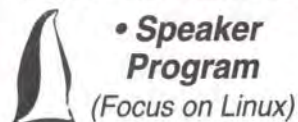
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Java Tutorials: part 1
Continued from page 103

```
// Finally our Helloprogram code
System.out.println(" Hello World !!");
}
}
```

Now save this file as Helloprogram.java (in Word or WordPerfect be sure to save the file as a text file type) in your "C:\\" root directory. To compile the program, switch to MS DOS and change to your root directory. Here you should enter the following commands:

```
javac Helloprogram.java <= compiles the program to byte-
code, Helloprogram.class
java Helloprogram <= interprets and runs the bytecode in
Helloprogram.class
Hello World !! <= this is the result you should get if you
have the Java JDK loaded
```

If the javac command returned the error message "Program not found," you'll need to install the free Java JDK.

Here are five observations that can be made about your first Java program:

First, the syntax is computer-like as opposed to the English language-like syntax of 4GLs (Fourth Generation languages) such as Focus or Progress. But Java does support variables names of any length, which must start with a letter, "\$" or "_" (no quote marks).

Second, if you mistyped or did not preserve the capitalization as shown, the program did not compile properly. Java is case sensitive and the semi-colons, parentheses "()", brackets "[]" and braces "{}" (no quote marks) are very important indicators of program structure. Take heed, omission or misplacement of these syntax elements will produce error messages of varying clarity.

Third, the bytecode produced is quite small, about 500 bytes, in comparison to the compiled version (34,000 bytes) or Visual Basic .EXE equivalent (16,000 bytes). But this is to be expected for interpreted code. All the executable smarts are contained in the runtime Java Virtual Machine, java.exe.

Fourth, the program, Helloprogram.class, will run on any machine containing a JVM. I just ported the Helloprogram.class to Linux and Mac systems and got the expected Hello World greetings.

Fifth, Java is so easy to comment and document as can be seen in the example code with its many comment types including special JavaDoc codes. The free JavaDoc facility produces HTML-based summary documentation that is tops in the industry.

In summary, Java is robust and relatively easy to use. Because of the huge API, much of your programming work has been done for you. You will find programming in Java is like

Validating Excel data

Continued from page 107

enter is actually series data, for example the days of the week, months of the year, or even the dates of each Sunday from now to the end of the year. Each of these entries could be entered individually or you could have Excel do the work for you.

To enter the days of the week, type the first day name, select the cell and position the mouse pointer over the fill handle (the small box in the lower right corner of the selected cell). Drag the fill handle horizontally or vertically and watch as the pointer tells you the entry that will go in the current cell. Let go when you have all the entries you need. You'll find that Excel 2000 now copies any format-

assembling the components of a photo montage—you still have to be creative and have good programming skills but a lot of the grunt work has been done for you and is just waiting to be tapped from the JDK. So future tutorials will be designed to give you a basic understanding of Java the programming language and some of the key entry points into the JDK. □

Jacques Surveyer is a consultant. For customized training contact him at jbsurv@inforamp.net.

Java resources

Books

Java 1.2 and JavaScript for C and C++ Programmers,
Author: Michael Daconta.
Publisher: John Wiley, 1998
Price: \$77.50 (includes CD with JDK, etc.)

- Offers good comparison to C and C++, while giving fairly advanced coverage of all Java capabilities.

Core Java Volume I Fundamentals,
Authors: Cay Horstmann and Gary Cornell
Publisher: Prentice Hall, 1998
Price: \$56 (includes CD with JDK, etc.)

- Paints Java in light of C, C++ and VB. Offers a more gradual approach to learning this programming language.

Algorithms in Java
Authors: Robert Sedgewick and Tim Lindholm.
Publisher: Addison Wesley, 1999
Price: \$59.95

- Java version of widely used reference to algorithms and data structuring.

Java Design
Author: Peter Coad
Publisher: Prentice Hall, 1999
Price: \$63

- Best intro on designing with Java. Includes lots on using patterns and templates.

Websites

- http://java.sun.com/
- The source. Start here first.
- http://www.javaworld.com
- All the news fit to print about Java.
- http://www.software.ibm.com/java
- Some amazingly good freeware.
- http://www.borland.com
- A free copy of JBuilder Java IDE Learning edition is available here.
- http://www.symantec.com
- Symantec produces the very fine Visual Cafe Java IDE, a time-limited trial edition of which is available at this site.
- http://www.metroworks.com
- Available from this site is a Java compiler, Codeworks, for a number of specialized or embedded processors like StrongARM, Motorola 68000, etc.

ting from the original cell and applies it to the data it enters.

Excel's built-in series include the days of the week and the months of the year. In addition, you can add your own series using Tools, Options, then the Custom Lists tab. In the Custom Lists box, select New List. In the List Entries text box type each list entry taking one line for each entry. Select Add to save the new list and select OK to finish. Your new list will function exactly the way that the days of the week list works.

You can also enter a series of numbers or dates where they form part of a regular series by entering the first two elements and letting Excel complete the rest. For example, to enter the first day of the month for the

12 months of 2001, type 1 Jan 2001 into a cell and then 1 Feb 2001 into the next cell. Highlight both cells and click and drag the fill handle in the direction the dates are to be entered. Let go of the mouse button when you are over the cell that causes the mouse pointer to show 1 Dec 2001.

select the cell and drag on the mouse pointer when it changes to a double set of arrows.

Quattro Pro
Limiting cell contents

Highlight the cells to limit, right-click and select Cell Properties. Select the Constraints tab and in the Data Input Constraints select General to allow all entries; Label Only to turn all entries into text entries; or Dates Only to allow only date or time entries.

Find and Replace

Using Edit, Find and Replace you can locate and replace certain entries in your worksheet.

Quick data entry

Enter the days of the week by typing the day name, select the cell, position the mouse pointer over the bottom right of the cell so it forms a fine crosshair pointer and drag the mouse in the direction you want to enter your data. Series data such as dates can be entered if you first enter the first two elements of the series before selecting them, then drag the mouse when the pointer changes to the crosshair pointer.

QuickFill list

Create a QuickFill list by selecting a blank cell and clicking the QuickFill button (or press Control + Shift + L). Select Create and type a name for the list and type the values for the list one at a time. To insert the QuickFill list select the first cell, click the QuickFill button, select the list name and click OK. □

Helen Bradley specializes in writing hands-on tutorials. Her columns appear regularly in a number of publications in Australia, Canada, the U.K. and U.S. She also reports on the computer industry for Australian Radio. Contact Helen at helen@helenbradley.com.

Other programs

Other office suites don't offer all of Excel's options. However here are some items available in Lotus 1-2-3 and Quattro Pro.

Lotus 1-2-3
Find & Replace

Using Edit, then Find & Replace, you can locate and replace certain entries in your worksheet.

Quick data entry

Enter the days of the week by typing the day name, select the cell, position the mouse pointer over the bottom right corner of the cell so it forms two sets of arrows and drag the mouse in the direction that you want to enter the data. Series data such as dates can be entered if you enter the first two elements of the series before selecting them, then drag the mouse when the pointer changes to a double set of arrows.

SmartFill list

Create a SmartFill list using File, User Setup, then SmartFill Setup. Select New List and enter a name for the list. Click Add Item and type the new item for the list and click OK. Repeat these steps for each new item and select Done when you are finished.
To use the list, enter any item from the list,



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Well, Wayne, we wish you only the best of luck, because "cutiepie126" is really a 54 year old trucker named Mort.

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VBA choices

By Jacques Surveyer

One of the benefits of Visual Basic for Applications (VBA) is that it has most of the facilities of full Visual Basic. But that benefit can also be a pain as we shall shortly see in the case of providing an open file dialogue. In effect, we have too many choices of how to implement one. And

in order to ensure you are making the right choice, you have to spend some time deciding on the best way to implement it. This tutorial is based on a real case and includes a description of some of the trade offs that had to be made in implementing some VBA programs for my client.

It all started when I was developing some VBA code using the Tidestone Formula One

spreadsheet component. This commercial ActiveX component allows users to create Excel-like spreadsheets. Now you might ask, "Why use a Tidestone Spreadsheet component when Excel's VBA exposes all the power of Excel's spreadsheets directly?"

Well, the answer is that the client was using Microsoft Visio on all its desktops, but not Microsoft Office. To further complicate

things, the versions of Office available on each desktop varied from Office 95 to Office 2000. So, to avoid the problem of not having the right libraries loaded on each machine, the client wanted to use the Tidestone spreadsheet control, which it had used in some previous development work.

The challenge

An issue arose when we discovered that Formula One had a special open file dialogue called SSOpenFileDialog. At first glance it appeared to provide all the functionality of open file dialogue. I had been using the Microsoft Common File Dialog control but that added an additional 149KB to the distributable file, so the client suggested I work with Formula One's SSOpenFileDialog.

So I set up a test routine to try out SSOpenFileDialog in comparison with open file dialogue (see Fig. 2). At first it looked like we had a winner—there was no problem getting the Formula One open file dialogue to appear or for users to either select a file or cancel the selection. And since it looked and worked like the "real thing" our suspicion was that Tidestone just called the Windows API function directly.

Snafu

However, we ran into a problem. The routine needed to identify the dialogue with a special title, Enter Definition File, and it also had to apply some file filters: *.def for Definition files and *.* for all files in the directory just in case the user wanted to check that the file had not been renamed or moved from the directory being searched. To our surprise, Tidestone did not supply any way to set these properties of the standard open file dialogue (and as it turned out four or five other properties were omitted as well).

So one of the members of the team suggested we follow Tidestone's lead and just use the Windows kernel function directly by adding a reference to it in the .bas module we were already using for other file operations. The declaration is simple:

```
' WinAPI Declarations
Private Declare Function GetOpenFileName% Lib
"COMDLG32" _
Alias "GetOpenFileNameA" ( OPENFILENAME As OPEN-
FILENAME )
```

And the resulting code (triggered by the ReadFileRAW button shown in Fig. 2) is a bit more complex. This is because, for filters, you have to separate each portion of the filter string with the null string and be sure to terminate the whole thing with two Nulls, Chr(0) & Chr(0), as shown just below:

```
OpenDialog.CustomFilter = "Def file" & Chr(0) & "*.def" &
Chr(0) & _
"Text files" & Chr(0) & "*.txt" & Chr(0) & "All files" & Chr(0)
_
```

References

Peter Wright's *Beginning VB6* (Wrox Press) discusses the open file dialogue and other common controls on pages 335-357. *VB6 Black Book* (Coriolis Press) covers the same topics from a more programmatic view point on pages 342-368.

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```
& "*" & Chr(0) & Chr(0)
Opend.DefaultExt = "*.def"
Opend.InitialDir = App.Path
Opend.Title = "Open using RAW Win API"
filename = modFileDialog.WinFileDialog(Opend, 1)
```

Although the WinAPI is free (there is no additional overhead, the functions are always available), our coders were making enough mistakes using the API functions to cause fits. Twice coders forgot to put the double Nulls at the end of a filter string. The result was some serious debug time.

We then decided to try one more option, using the FileSystemObject (FSO) of the Microsoft Scripting Runtime. We checked the size of the SCRUN.DLL, and at 137KB it turned out to be marginally smaller than the Common File Dialog control. The ReadfileFSO command button triggers the FSO routine. However, we discovered a problem. Although FSO allows for extensive file manipulation (open file, parse filename, move a file, find a file, delete a file, and many others), it does not support an open file dialogue. Back to square one.

During our testing, an ever-expanding User Interface (UI) also required us to save a file and print results. These UI needs are matched by the Common File Dialog control, which supports the standard Windows Open, Save, Print, Font and Colour dialogues. In addition, the team felt that the Common Dialogue offered and exposed the best set of control properties for the Open and Save dialogues as listed below:

CancelError: Signals that the user clicked the dialogue's Cancel button.

DefaultExt: Sets the Default file extension—*.def in our case.

DialogTitle: Sets what will appear in the dialogue's title bar.

Filename: Sets what default filename to be used, if any.

Filter: Sets the file filters to be applied.

Font: Allows a whole range of font styling to be set.

Help: Allows several Help file settings to be initialized.

InitDir: Sets the directory in which the Open or Save dialogue starts.

Position: These parameters allow you to set the exact start up position of the dialogue.

DialogTitle, Filter, and InitDir turned out to be the most often used properties.

Back to the beginning

So we came full circle back to using the Common File Dialog control. Its extra size of 149KB was offset by the additional properties and dialogue types it supported.

This is a cautionary tale. When we begin to examine database connections in VB and VBA, the number of options increases from two or three to nearly a dozen different access methods, which means there are even more complicated trade-offs to be made. Already we have covered one of the options—the popular and easy to use DAO access method.

So this is the strength and challenge of VB and VBA. There is a way to program just about any Windows task, but many times there are several ways. The problem arises in choosing the best one. □

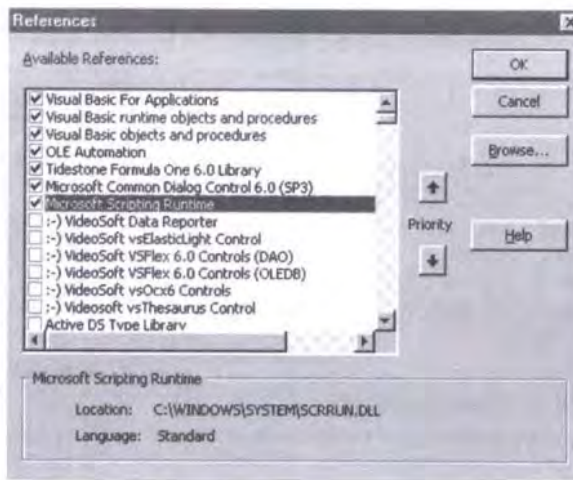


Fig. 1: References in VBA.

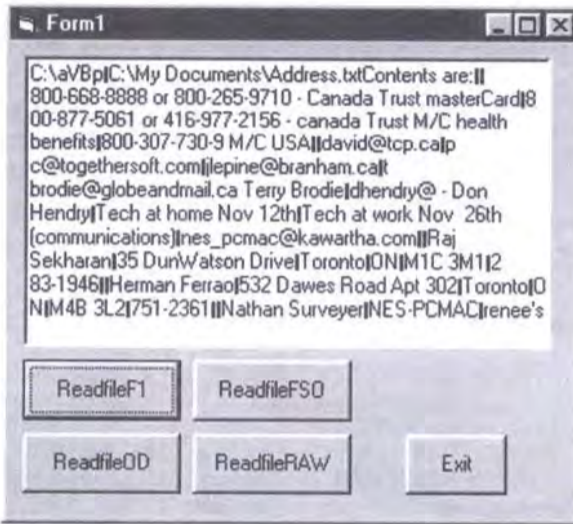


Fig. 2: Test UserForm for VBA OpenFile.Dialog

Jacques Surveyer is a writer and consultant. Contact him or access past tutorials in this series at his Web site: <http://www.inforamp.net/~jbsurv>.

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Microsoft PowerPoint

By Helen Bradley

This month, we take a look at how we can create more powerful PowerPoint notes, handouts and minutes.

Printing slides for handout or reference
PowerPoint 2000 allows you to print more slides per page than was possible with previous versions—up to nine in total. You also have the choice of printing them horizontally or vertical-

ly. To select these options, choose File, then Print. Then from the Print What dropdown list, select Handouts. From the Slides Per Page dropdown list, click the number of slides you want, and choose the Horizontal or Vertical option. Click Frame Slides to add a thin border around the page.

Master Handout sheet
Like the Slide Master, PowerPoint has a Handout Master that controls the items appearing on your

handouts. To see what options are available, choose View, Master, then Handout Master. From the Handout Master toolbar you can choose the desired arrangement of the slides on the sheet. You can also add images and text as well as header and footer information to the master.

Handout orientation
To alter the orientation of the page for printing handouts, choose File, Page Setup, and from the Notes, Handouts & Outline area, select either

Portrait or Landscape to set the required orientation. This won't affect the orientation for the slides themselves, and will allow you to easily set handouts to print in Portrait orientation—even when slides are designed in Landscape.

Exporting to Word
While PowerPoint can create some pretty good looking handouts, you may prefer to use Word for a really professional job. To export the handout details from a PowerPoint presentation to Word, choose File, Send To, Microsoft Word. Make a choice from the options displayed as to whether you export the slides and the notes, the slides only, or just the outline. If you're exporting slides and notes you can choose the positioning of the slides and notes relative to each other or the positioning of blank lines for the participants to write on. Click OK to finish.

Colour your handouts
Like slides, handouts can be formatted using colour. To select a colour scheme for your handout, choose Format, Handout Color Scheme, then choose a pre-designed format or create your own. You can also apply a background to your handouts by choosing Format, Handout Background, then, from the drop down list, choose the desired colour or fill effect.

Notes in Slide Sorter view
While there is no Notes pane visible in Slide Sorter view, you don't have to change views to add a note to a slide. Instead, click on the slide you want to add the note to and choose the Speaker Notes button on the Slide Sorter toolbar. A small dialogue will appear with the slide number in it into which you type your note. Click Close to finish.

Notes in slide show view
When you're viewing your presentation to check how it looks, you'll occasionally want to make a note of something you see that needs altering on a slide or something you think about and don't want to forget. You don't need to stop the presentation to add a Note—instead, right-click the slide and choose Speaker Notes from the shortcut menu. Type your note and

Linux for Newbies: Part 14
Continued from page 109
connectivity have to be working correctly before IP Masquerading will work.
If you need additional help with IP Masquerading, networking, or Internet connectivity, you can find it on the Internet. Type in "IP Masquerading" on a search engine, such as <http://www.google.com>, and you'll find excellent online tutorials. If you have questions, avail yourself of the peer support available in newsgroups such as comp.os.linux.misc and comp.os.linux.networking, or the Red Hat mailing list. The <http://www.deja.com> site also provides an excellent way of locating discussion threads on Linux topics.

This concludes our home networking mini-series. These short columns only scratch the surface of all the topics inherent in home networking, IP masquerading, and firewall rules. Networking is an engaging topic of study that can keep you amused for years. Bonne chance, mes amis. □

Next time: Linux shell scripting.
Gene Wilburn (gwilburn@home.com) is a Toronto-based IT specialist, musician and writer who operates a small farm of Linux servers.

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Quick Tips: Microsoft PowerPoint

Continued from page 114

click Close to continue with the presentation.

Notes in Slide View

When you're viewing a slide in Slide View, the Notes pane is only partially visible so you may think it's not there at all. To see the Notes as you view the slides, use your mouse to drag the divider at the foot of the window containing the slide up the screen. This reveals the Notes pane and allows you to see any Notes more clearly. The Notes pane will remain visible for all slides while you remain using this view, but it will be restored to its original setting if you change views and return to the Slide View.

Taking notes

When you're playing a presentation to an audience and want to take notes relevant to the presentation, you can do this using the Meeting Minder feature. In the Slide Show view, right-click and choose Meeting Minder from the menu. The Meeting Minutes tab is the place to add minutes. The Action Items tab allows you to add an item requiring follow-up to the Action list, to allocate it to a person, and to specify a due date. Clicking the Schedule button will open Outlook so you can add the item to your calendar.

Printing minutes and Action Items

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Helen Bradley specializes in writing hands-on tutorials. Her columns appear regularly in a number of publications in Australia, Canada, the U.K. and the U.S. She also reports on the computer industry for Australian Radio. Contact Helen at helen@helenbradley.com.



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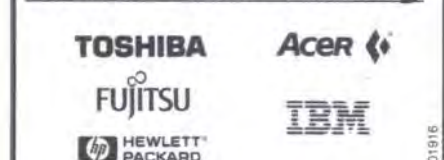
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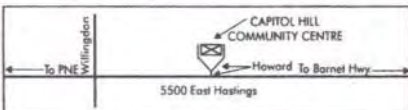


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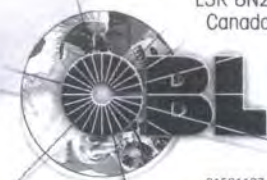
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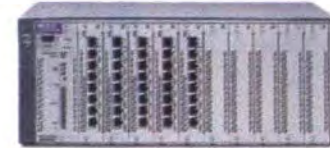
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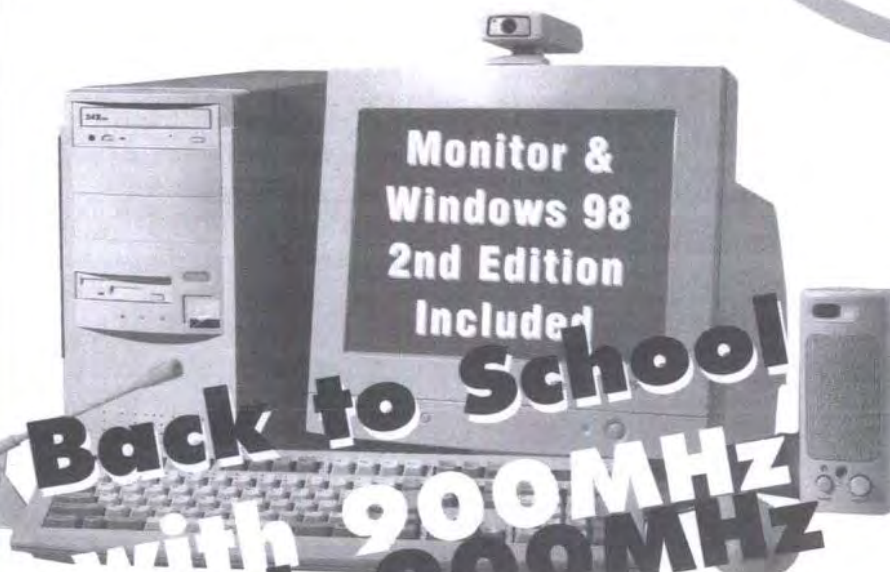
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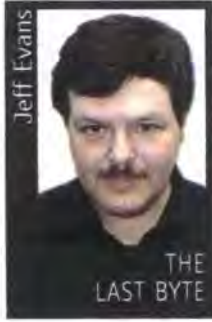


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The efficiency of inefficiency



Recently, I went to a media event in Toronto unveiling the new Blackberry 957, a wonderful little wireless handheld computer.

Created by Waterloo, Ont.-based Research In Motion (RIM), the

Blackberry 957, in its Internet Edition as offered by Rogers AT&T Wireless, packs much of the power of a 386 PC into a few ounces of handheld high-tech magic that clips onto your belt or fits in your pocket.

I was given a demo unit of the 957, and took it home to test. It lives up to the hype. The Internet Edition of the Blackberry 957 comes out of the box with a wireless email account, paging, workgroup messaging, and a Go.Web Internet micro-browser, as well as the usual electronic organizer software. Like the other RIM wireless devices, you simply turn it on once, and it stays on, automatically checking for incoming email or other scheduled wireless data updates.

It's close to perfect, except for one thing. The little note that came with it said my journalistic review account would run for two weeks only, and would then be terminated.

And, since Rogers AT&T Wireless is my only choice for a wireless service provider, once the two weeks are up, I will, of course, be out of the wireless Blackberry business.

Compared to a PC, the Blackberry 957 Internet Edition is a dream to use, because it demands almost nothing in the way of expertise or trouble from the user. However, it's also limited in the range of functions it

can perform, and totally dependent on the network provider. This, in a nutshell, is the choice that will increasingly be offered to computer users over the next five years. Either continue to use the traditional PC, with all its expensive and time-consuming demands for tinkering, training and service, or switch to an Internet appliance, which is much easier and cheaper to use, but offers less flexibility and, most critically, less user control.

The love-hate relationship

The early adopters of the PC were mainly technology loving geeks, and endless tinkering to get a personal computer to work was



part of the fun. Microsoft chief Bill Gates' mortal enemies, Scott McNealy of Sun Microsystems and Larry Ellison of Oracle, have always laughed publicly at the foolishness of PC users for wasting their time on flaky, failure-prone personal computer hardware and, especially, Microsoft operating system software.

Yet the half billion people who currently use PCs worldwide are not fools, no matter what McNealy and Ellison pretend. For all the difficulty of making PCs work, they have always offered one huge, magnificent good thing: choice.

The personal computer is affordable enough for many people—if they choose to have one. It's sufficiently standards-based for almost anyone to manufacture. This has spawned thousands of PC manufacturers, and encouraged millions of individuals to build their own PCs, or to upgrade and customize them as they choose. The PC is flexible enough to be used for an almost infinite number of tasks, from fun to finance. The

I have seen the future of computing, and it is the connected Internet appliance. But what will happen to our digital freedoms when the personal computer goes the way of the dinosaur? Think of your relationship with your cable TV provider and tremble.

World Wide Web has grown because millions of individuals could make the decision to use it without needing permission from a central authority or a single vendor.

By comparison, centrally controlled, collective computing systems based on UNIX or other mainframe operating systems typically operate from the top down.

The owners and administrators at the top dictate what the users can do, and what information they can have access to.

In practice, personal computing and collective computing have ended up feeding each other, with the PC allowing the masses to play as they pleased, and high level operating systems providing the reliability and scalability to networks that enabled the rapid expansion of the Internet through the 1990s.

As messy and inefficient as the PC is to its unsympathetic critics, it has actually been hugely efficient in its own perverse way. The PC has been a vast school that let much of humanity teach itself computing and the use of the Internet, and it has stimulated millions of self-motivated individuals to become programmers, product developers, and entrepreneurs.

Creation is always a messy and chaotic and even silly-looking affair, and to the bean counters, the personal computer has often seemed ridiculous.

As the old African saying goes, however, "Snakes catch birds." Something that seems impossible at first glance actually makes sense if you look at it with an open mind.

As computing comes full circle, back to its network-based roots, we may hope that the legacy of the personal computer will infect the next age of computing with some of its populist tradition.

As users of future networked devices we can insist on truly open, non-proprietary standards, freedom to switch network service providers, uncensored access to information, messaging, media, and maximum personalization and customization.

If the virtues of "inefficient" personal computing can survive the transition to the next level, we will all be the richer. □

Red, white and green: Web activists win battle with Coca Cola

By Jeff Evans

The Web was originally a resolutely non-corporate medium, conceived by Tim Berners-Lee and others associated with the CERN research labs to encourage a decentralized, totally free exchange of ideas and information across the globe.

In the last five years, however, multinational corporations, which have a very different, proprietary and profit driven agenda for the Internet have aggressively colonized cyberspace.

The war between the "information wants to be free" crowd and the global brand names has simmered for years. Corporations like the Walt Disney Company, Microsoft, Time-Warner and Coca Cola defend their copy-righted turf with vigour and large legal budgets.

Anti-corporate artistic, social and political activists criticize, poke fun and make satirical and humorous comment on the corporate giants at their peril.

Canada's Adbusters (<http://www.adbusters.org>) is one of the oldest practitioners of "culture jamming"—the act of combining art and politics to open up alternatives to the corporate agenda.

Adbusters has learned to use the Web as a key medium to economically and effectively get its counterculture message across to an international audience.

Adbusters and the environmental organization Greenpeace recently picked what seemed like a hopeless fight with Coca Cola, one of the world's most powerful corporate brands, over Coke's practice of using environmentally unfriendly refrigeration technology.

This might seem to be an odd choice of battleground, until one considers that, according to environmentalists, Coca Cola is a major contributor to the pollution of the earth's atmosphere and global warming in order to provide its customers with cold fizzy water.

From that point of view, making marginal savings on its refrigeration costs seems rather irresponsible, considering the damage caused to life on earth.

Adbusters and Greenpeace created a very effective art/propaganda Web site at <http://www.cokespotlight.org>, satirizing Coca Cola's feel-good imagery and linking it to the potentially catastrophic consequences of releasing Hydro fluorocarbon (HFC) gases into the atmosphere.

The big lever Adbusters and Greenpeace used in their campaign was Coke's sponsorship participation at the Athens Olympic Games in 2004. Especially considering the notoriously polluted air of Athens as a backdrop for environmentalist agitation, Coke was facing a public relations nightmare from the well-orchestrated, Web-led environmentalists' campaign.

Under normal circumstances, the corporate response to a politicized satiric comment is often to sue the pranksters. In this case, Adbusters and Greenpeace are two organizations that don't scare easily, and can make a convincing argument on freedom of speech and democratic rights grounds.

To our amazement, at the end of June, Coke seemed to cave on the issue. The com-

pany announced that it would phase out its greenhouse gas HFC use in favour of alternative refrigeration technologies, at least in Athens in 2004.

In a slightly exultant press release, Greenpeace "congratulated Coca-Cola for meeting Greenpeace demands by adopting a new refrigeration policy to reduce its impact on global climate change before the world's first Green Games."

With the production and release into the atmosphere of greenhouse gases not merely continuing but increasing at a frightening rate, the struggle to stop global climate change is far from won.

However, the Coca-Cola decision is at least a heartening symbol that the Web can make a difference. □



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- 230Kbps throughput (Requires PC with 230K UART)
- Fully supports Windows 95/ 98 operating systems
- Distinctive Ring Detection and Caller ID (US Version only)
- Free and easy online upgrade
- Video Conferencing Support**
- V.80 synchronous access mode
- H.324 support for enhanced video Conferencing
- Fax/ Voice Mail Features**
- Automatically detects and routes incoming voice, fax and data call to proper module
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- Sends and receives faxes to or from any group 3 fax machine
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- Easy voice message retrieval through telephone handset, amplified speakers via sound card or from remote locations
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- Fax speed up to 14,400bps
- Sends and receives faxes to or from any group 3 fax machine
- Printer-quality faxing, forwarding, schedule fax transmission and multiple recipients
- Convenient voice storage and playback
- Easy voice message retrieval through telephone handset, amplified speakers via sound card or from remote locations
- Password protection for up to 999 mail boxes

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THANKS FOR NOT CHOKING ON US.



Knowledge Management

Continued from page 63
ers in an organization. I need to know what to do with it, where to store it and what taxonomies to use so people can find it. The technology is a tool to enable this."

Certainly the greatest difficulty in getting a knowledge-management solution to work is the sometimes maddening problem of getting people to actually share their knowledge.

"I don't care if you are a small or large company," says Priscilla Emery, senior vice-president of information products and services for the Association of Information and Image Management (AIIM) in Silver Spring, Md. "It is a challenge to get people to share information across different departments and different types of areas in a process-driven manner so that decisions can be made effectively."

AIIM is a non-profit industry association representing some 10,000 world-wide members who are involved information and image management. AIIM has been in existence for some 50 years and keeps abreast of

"We would not be discussing knowledge management if it was not for the Web and the ubiquitous nature of that access."

—Priscilla Emery, AIIM

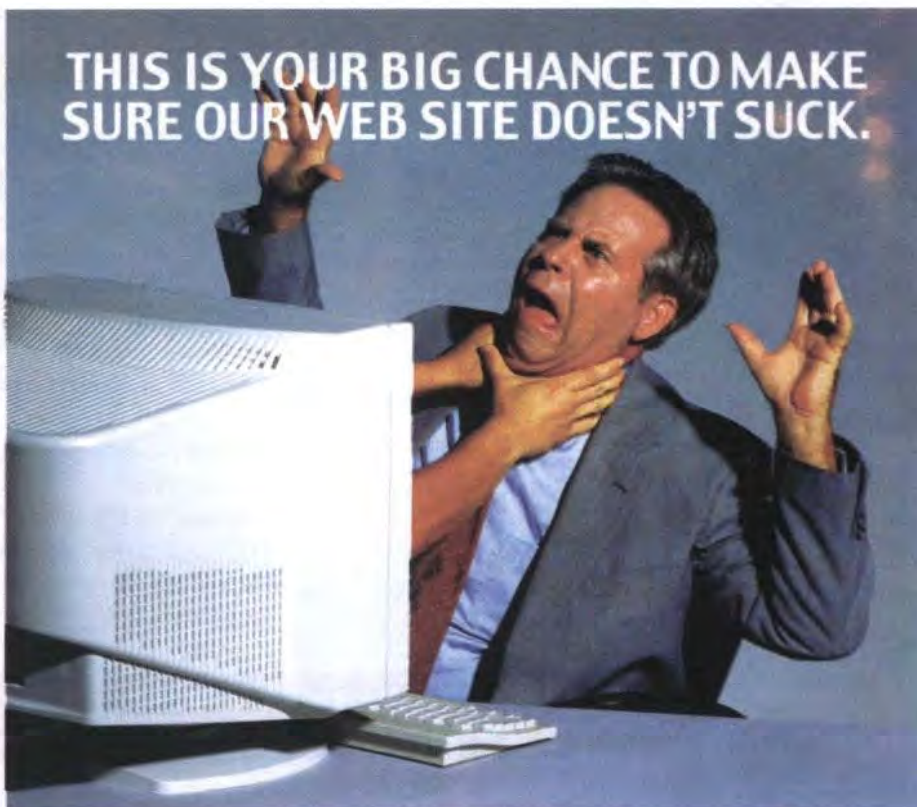
the latest technologies and solutions that can be of use to its members.

One of those solutions is knowledge management. AIIM tries not only to be aware of the various knowledge-management technologies available, but also helps overcome many of the corporate cultural challenges that can make putting knowledge-management solutions into place difficult.

The biggest challenge to overcome is the idea that knowledge is power, that having more knowledge than anyone else makes an individual more valuable and indispensable. Hoarding information is not only bad for the overall health of the business, it can have personal disadvantages as well.

"If you are the only person who knows anything, you are going to get pretty tired of getting all the calls," Emery adds. "Sharing knowledge is very important for sanity purposes."

Along with helping its members decide on knowledge-management solutions, AIIM is putting its own knowledge-management system into place. Upcoming additions to its Web site will include access to a library of more than 30,000 abstracts.



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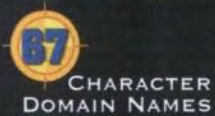
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