

VIRTUAL PC 4.0

By Chris Waldrip (chris_waldrip@atlmug.org)

I'm a dedicated Macintosh user and supporter (ask to see my tattoo one day). But I'll be the first to admit that sometimes you just have to run a PC-only program. Now, granted, there's probably a Mac program for just about any job you need, but for business reasons, or family reasons, or for many other reasons, you may need to run a specific PC program. If you're one of those people that needs to use a specific PC program, and you can't wiggle out of it, then Virtual PC 4.0 might be for you.

Virtual PC, or VPC, is an emulator; this means that the program translates code intended for another type of processor. Emulation isn't new to Mac users; there is a built-in emulator in the MacOS so that PowerPC systems can run 68k applications. In the case of Virtual PC the program not only translates code intended for an Intel compatible processor, but it also translates many of the other systems of an Intel compatible computer; the sound card, video card, hard disk controller, and much more are all emulated by Virtual PC.

With the release of Virtual PC 4 there are several improvements, some under the hood, and others users will notice and appreciate right away. One new feature that applies to both is the speed increase. Virtual PC 4 now runs up to twice as fast as Virtual PC 3 did on G3's and G4's. Running an Intel-MMX optimized multimedia program in Virtual PC 4 on a G4 with the Velocity Engine you can expect a speed increase of up to

three times.

Other features of Virtual PC 4 include the fact that you can now increase the amount of memory for the emulated PC from Virtual PC's old max-

imum of 96MB to an amazing 512MB of RAM. And to help facilitate changing the RAM there is now a slider control in the settings. But this extra RAM is needed for some users, Virtual PC now allows you to run multiple Intel-

compatible operating systems at the same time. So now you can run Windows 98, NT, 2000, ME, the BeOS, various flavors of Linux, and even the predecessor to MacOS X – Next-Step. For best performance though it's advised that you keep all but one PC session in its saved state (analogous to sleep mode).

That brings up a new interface feature of Virtual PC – the Virtual PC List. This window will show you the various



IN THE NEWS

Public Beta Discount Offered

Apple announced on February 1st that those that ordered the Public Beta will be eligible for a \$30 discount on the \$129 price of the release version of MacOS X. Educational users can also take advantage of this offer.

Apple Talks To Analyst

Steve Jobs (iCEO), Fred Anderson (CFO), Phil Schiller (VP Worldwide Product Marketing), Tim Cook (Sr VP), and Avie Tevanian (Software Engineer) spoke with market analyst On January 31st. The meeting is held to inform market analyst of Apple's position between quarterly announcements.

Some of the points made at this meeting were that there are no plans for mass layoffs. Apple is redoubling efforts to take back the education market from current leader Dell. During a product demo similar to MacWorld San Francisco Steve stated that Superdrives that read and write CD's and DVD's could be available by 2002. Mr. Cook stated that component costs are falling and memory is in good supply, implying that lower costs can be expected. Avie spoke high praise of MacOS X, not surprisingly. It was also stated that the new

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FRIENDS, MAC USERS, AND COUNTRYMEN...

By Chris Waldrip

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An important passing occurred quietly at the beginning of this year. So quietly that it has only just this past week been reported by industry news sites.

Windows 95 has been officially put to rest. Effective January 1st, 2001 there are no name-brand PC manufacturers bundling Windows 95 on their systems. Microsoft will not be releasing any further bug fixes. Tech support will only come from an independent source or a book. And good luck finding new peripherals that support Windows 95.

Windows 95 is dead! Hoorah!

But why am I, an avid MacOS lover, and despiser of Microsoft operating systems, writing about Windows 95, here in a Mac users group newsletter?

Because we wouldn't have the macOS we have today without Windows 95.

Put your weapons down... thank you.

When Windows 95 was released Apple's OS strategy was somewhat stagnant. They had just released System 7, and it did feature many grand improvements over previous system software. But where would we be today if Microsoft hadn't taken Apple's great ideas and 'applied' them to their own needs? We'd probably be patiently awaiting MacOS 8 and loving Netscape 3. Shiver.

Windows 95, as unoriginal as many of its features and user interface elements were, was very popular and combined many elements together for the first time. It also put a hot poker in Apple's nickers. Some would say too hot a poker.

Apple has spent more than five and a half years working on their next generation operating system. A strategy they've been working on since Windows 95 was first announced. Taligent, Copeland, Rhapsody, and now MacOS X.

All have been efforts in Apple's marathon run for a next generation operating system.

And now on March 24th Apple will introduce MacOS X. The culmination of several years of development, false starts and all.

MacOS X will be buzzword compliant, as they say. It'll feature multi-tasking, multi-threaded memory, BSD Unix security, and support for previous MacOS software. It is the software that Apple is depending on to carry it forward into the 21st century and it owes part of its creation to Windows 95.

And Windows 95, as we all know, owes part of its creation to the MacOS. See, good karma does come back...

CONTINUED FROM IN THE NEWS, PAGE 1

Titanium PowerBook has begun to ship.

1984 - Revisited

With the SuperBowl having come and gone a poll was conducted by USA Today to rank the Ad's seen over the past thirty-five years.

Coming in first was the Mean Joe Green Jersey-Coke Ad. In second was the infamous Apple 1984 Ad. The difference between the first and second place winners was .4%. Enough for some people to consider looking for hanging chads...

Sun Vs. Microsoft

Sun has won a major victory in their war with Microsoft over the use of Java. Microsoft had been trying to implement their own additions to the Java 'standard' without the consent of Sun. Sun retaliated by suing Microsoft. And recently they settled out of court.

The settlement entitles Microsoft to continue using Java in currently shipping products, or those under development, for the next seven years, but they can't use any "Java compliant" logos. They also have to pay Sun \$20 Million, which is \$15 Million less than the original lawsuit asked for.

available PC images you can launch. The preferences for the application are now limited to PC Behavior (Pause in background and restore PC at launch), adjust video resolution, and mute sound in background. Other familiar Virtual PC preference settings are now set for each PC image. Two of the new changes in these preferences, in addition to the memory setting, include a total of three volume letters (the main hard drive is C, second is D, and third is E) for various PC images, and new support for multi-button mice.

And to help you get started running multiple PC images, Connectix will soon

start shipping PC images with various flavors of Windows pre-installed. Prices and availability have not yet been announced.

In addition to the Virtual PC

List to help you manage the multiple PC images, they've built-in a disk assis-

tant. The disk assistant helps you with one of Virtual PC 4's other great new features. In previous versions of Virtual

PC, otherwise you can use the disk assistant to manually expand an image as needed. Dynamic images can even shrink in size, but you have to zero out unused space using a third party utility like the PC version of Norton Utilities.

Now for the details: If you've got a 68K Mac you're still out of luck. In fact there's no hope for you, except to use much older emulators that are now out of print. For PowerPC owners you'll want a fairly recent system, at least a G3 or a G4, at least 50MB of free RAM, MacOS 8.5 or later, and as much hard disk space as you think you'll need. I recommend at least 500MB for a Windows 98 installation and

space for files. Users with MacOS X Public Beta installed on your machines will be out of luck for the time being as Virtual PC is not yet compatible, even in Classic Mode. But Connectix promises to fix this shortly after MacOS X ships in March. Upgrades to Virtual PC 4.0 costs \$79 (or free if you bought Virtual PC after November 1st, 2000). Full versions of Virtual PC with Windows 98 or Windows ME will set you back \$199. And while this could buy you a super cheap PC, you'll probably have fewer headaches' with Virtual PC.

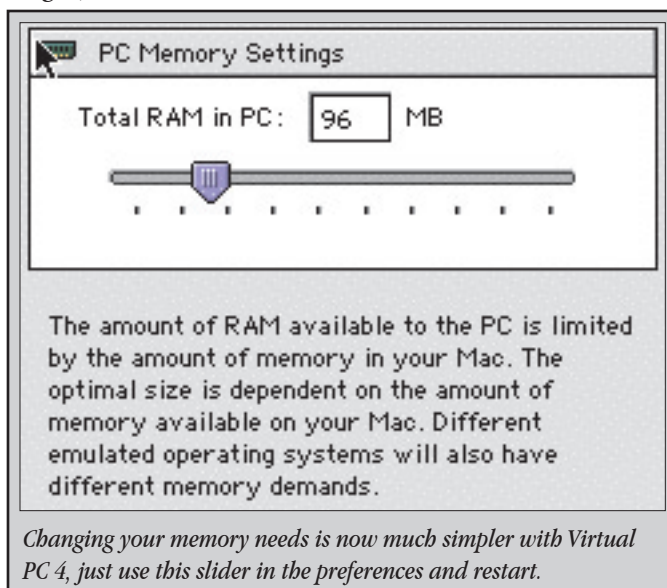
Chris is currently a support analyst at a large global multi-media organization seemingly bent on world domination. Other than AMUG. His hobbies include playing on his Mac at home, playing on his Mac at work, and thinking about playing on his Mac if he's not at home or work. He also enjoys the occasional movie and book, at least when he's not working or playing on his Mac. He's realizing that he may need some new hobbies...



PC you had to decide how much space you wanted for your partition, and once decided, there was no easy way to change that amount in any significant way. But Virtual PC offers the ability to resize PC images as needed. You've just

installed Office 2000 Professional and need an extra 200MB of space? Not a problem, Virtual PC will automatically increase the PC image's size, but

only if you've converted the image to a dynamic image with the disk assis-



AMUG JANUARY MEETING

By Chris Waldrip

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A social meet and greet was held before the meeting. This time was set aside as AMUG's official Professional Networking Reception. AMUG members and guests

were given an opportunity to talk with each other about their professional lives, and to network. A bulletin board was also provided for members to post business cards.

AMUG was lucky to have two guests speakers, Mike Kozee and Jack Quattelbaum, from Apple attend our January meeting.

Mike spoke first and introduced several in the crowd to

Apple's Solutions Experts Program. Program members become part of a network of consultants, developers, and

system integrators. Apple helps put program members in touch with consumers looking for specific skills and knowledge. Program members also gain access to technical and product information from Apple, as well as being able to schedule events at Apple's regional market centers.



Jack Quattelbaum, fresh from MacWorld San Francisco, gave an in-depth review of Steve Job's keynote speech. Apple's new focus on the computer as a "digital hub" was key, as were product announcements like the new Titanium

PowerBook, the Super-



drive which is capable of reading and writing CD's and DVD's, iDVD software for creating your own DVD's, iTunes software for ripping, managing, playing, and recording MP3's, and the

ubiquitous speed bumps in the G4 line, now boasting speeds of up to 733Mhz.

MACLANTA IN PDF

By Chris Waldrip

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With this issue we're publishing the MacLanta newsletter every other month in PDF format only. Yep, you'll only be able to download it from the AMUG web page. You'll still get an old fashioned copy in the mail, at least for the time being. Eventually we'd like to see most of our readers move their subscriptions over to PDF only. You'll get an E-mail once a month letting you know that the latest edition is out, and where you can download it from. Of course we'll still mail it to those of you that request it when the time comes.

But why you may be asking? Well, two reasons. First postage is expensive, we all know that. Now imagine mailing out several hundred copies of a newsletter. Yes, there are non-profit rates, but it's still not cheap. Then there's the handling, that's the placing of stamps and address labels. That's a pain in the butt to do for several hundred newsletters.

The second reason is that we can do color cheaply in PDF's, we can add interactive elements (like clickable links), and because we can. The PDF format is a popular distribution method, it's cross platform and usable by almost everybody with a computer.

What do you think? Let me know!

JANUARY DOOR PRIZE WINNERS

Joe Webb	MacOS 9 For Dummies
Charles Henderson	MacOS 9
Cliff Wessling	MacOS 9
Henry Milson	MacOS 9
Scott Anderson	MacOS 9

Other Prizes Awarded:
iBook for Dummies, AppleWorks 6.0.4

Editor's Note: We're honored to be able to reprint select articles from the long running E-mail-only TidBITS mailing list. Look for more great articles and reviews from TidBITS in upcoming issues of MacLanta.

UNIX COMING TO A MAC NEAR YOU, PART 1

By Chris Pepper (pepper@reppep.com)

(TidBITS 558, 04-Dec-2000) – With Mac OS X, Apple is building Unix into the Mac OS, and this has technical, social, and political ramifications for

Mac users and the rest of the industry. To understand the implications of this change, let's take a look this week at the Unix family of operating systems and how they constitute a part of Mac OS X. In the next part of this article, I'll address how the fusion of these two operating systems will impact not only Mac and Unix users, but the computer industry as a whole.

Unix 101: The History of the Machine

In the beginning (or as far back as

we want to go), there was Unix, which was originally developed at AT&T's Bell Labs. In many ways, Unix grew up in symbiosis with the C programming language, which became an important facet of its underlying philosophy - that programming is good for you. (For more information, see some of the resources provided by Dennis Ritchie, one of the creators of C, as well as an interesting time line of the history of Unix). In sharp contrast, the Macintosh was rev-

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AMUG NEWS & EVENTS

February Meeting

Announcing the next AMUG monthly meeting on Tuesday, February 20th at Macquarium.

In honor of Valentine's Day, it's "bring a friend" night. Bring a guest to the meeting and receive an extra door prize ticket. If your guest becomes a member at the meeting, then you'll receive



"CANON N650U"

ANOTHER door prize ticket and a bonus month's membership to AMUG!

You'll definitely want to accumulate as many tickets as possible, because February's meeting is going to have one of the biggest door prize giveaways ever!

Scott Norman

from Canon is excited about the new Mac printing and



"CANON S450"

scanning products and

will be demonstrating the Canon S400, S450 and BJC-8200SE bubble jet printers and the N650U, N656U, N1220 flatbed scanners.

Scott is SO excited, he'll be giving away at least one product as a door prize at the meeting! AND if there are at least 100 people in attendance, he'll be giving away TWO products. That's right - if there are 100+ people at the meeting, then Scott will give away an S450 bubble jet printer and an N656U flatbed scanner (if there are less than 100 people, then he will still give away one of the 2 products)

So "bring a friend" and let's pack the house!

The meeting starts at 7 p.m. and ends around 9 p.m. at Macquarium in downtown Atlanta.

New Users SIG

This meeting is intended for all new Macintosh owners. The format is typi-

cally on a subject of common interest (i.e., fonts). There is also a one-hour question/answer session. You do not need to bring (or even own) a computer to participate in this meeting. Non members welcome.

New User's meetings are usually held from 10 a.m. to noon on the 1st Saturday of each month at Creative Circus, 812 Lambert Dr. NE Atlanta

Maclanta Expo, Spring 2001 (Swapfest, Auction, MacCollege)

Imagine MacWorld in Atlanta. Keep dreaming! But here's the next best thing! AMUG's swapfest featuring AMUG members, Mac owners, and dealers all selling at the best negotiable prices. Buy and sell to your hearts content. Find that cable you need, that part you're dying for, finally sell that box of stuff your significant other has been nagging you about. Don't forget the AMUG auction, bid on great software, hardware, and other Mac stuff.

And at the same time sit in on seminars and instructional classes covering Mac software and hardware.

All in one day...

Tentatively scheduled for March 17th at Northside High School. Look for more information in the next Maclanta!

DIRECTIONS TO MACQUARIUM:

From I-85 South:

Take Peachtree Street exit 28. This exit becomes GA-13 S. Take Peachtree Street exit ramp towards Buckhead. Merge onto Peachtree Rd NE. Travel approximately one-half mile, MacQuarium building is on your left. Parking entrance is on far side of MacQuarium sign next to R. Thomas.

From Ga 400 South:

Take the Sidney Marcus Blvd. exit, towards Piedmont Rd. Turn Left onto Sidney Marcus Blvd. Take the US-19 North/ Peachtree St. ramp North, towards Buckhead. Merge onto Peachtree Rd NE. Travel approximately one-half mile, MacQuarium building is on your left. Parking entrance is on far side of MacQuarium sign next to R. Thomas.

From I-75 South:

Take the 14th/10th Street exit. Turn left onto 14th Street go 1/2 mile. Turn left onto Peachtree St. Go 2 miles and the road will fork; bear to your right. Pass behind the Equifax building, approximately one mile. MacQuarium building is on your left. Parking entrance is on far side of the MacQuarium sign next to R. Thomas.

From I-20:

Head towards 75/85 connector. Go north on 75/85. Take the 14th/10th Street exit. Pass over 10th street. Turn right onto 14th Street. Turn left onto Peachtree. MacQuarium building is on your left, approximately one mile. Parking entrance is on far side of MacQuarium sign next to R. THOMAS

Thanks For For Joining AMUG And Renewing Your Membership

Stan Allen, Sharon Berenson, Joseph Chisolm, Lois Davidson, Jay Davis, Salah El Guindi, William Elliott, Mary Frey, Edward Hotchkiss, Norma Huff, William Jarrett, Jim Johnson, Joseph Johnson, Kelvin Johnson, John Kanaly, Chip Lawson, Roy Leonard, Melvin Martin, Sheryl McDonald, Robert Osattin, Kevin Powell, Jeffrey Prince, Janet Robison, Al Schroedel, Mark Shefrin, Lloyd Snyder Jr., J Richard Steele, John Trent, Cecelia Turbyville, Austin Wattles, William Williams, David Zeeman, Jack Honderd, Elizabeth Walsh, Wesley Argo, Kerry Wooten, Charles Haynes, Eckhart Richter, Rosemary Richter, Joseph Barclay, Dana Barclay, Chris Waldrip, Donna Becker, Job Muhumuza, Charles Newton II

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olutionary because of Apple's concept that computer users could be insulated from the underlying workings of their computers, and not have to be programmers. Apple's vision of the Mac OS was as a system for managing a computing appliance, whereas Unix was published as a research project with an open invitation to tinkerers.

<<http://www.cs.bell-labs.com/cm/cs/who/dmr/>>
<<http://perso.wanadoo.fr/levenez/unix/>>
<<http://db.tidbits.com/getbits.acgi?tlkthrd=1194>>

Over time, various companies and individuals contributed to Unix, each under their own licenses, some of which required payment for use. Several companies, most notably Sun Microsystems, licensed Unix to use as the basis of their own operating systems to run on their own computer hardware. There are now hundreds of derivatives of the original Bell Labs Unix. A crucial point in the development of Unix came when AT&T sued the University of California at Berkeley to halt distribution of Unix systems without paid licenses from AT&T, but the suit failed. After the settlement, Berkeley released the free and redistributable 4.4 BSD-Lite (BSD stands for "Berkeley Software Distribution"), which contained no AT&T code and no licensing restrictions. The current BSD flavors of Unix - NetBSD, FreeBSD, OpenBSD, BSDI, and now Apple's Darwin - are all descendants of BSD-Lite.

<<http://www.oreillynet.com/pub/a/network/2000/03/17/bsd.html?page=3>>
<<http://www.bsd.org/>>

During the 1980's, Richard Stallman formed the Free Software Foundation (FSF) to write a completely compatible Unix replacement, free of restrictive licensing requirements. In rejection of these licenses, the FSF created the GNU General Public License (GPL), which requires licensed software to be freely redistributable, and has a "viral" clause requiring that derivative works also be licensed under the GPL, and thus freely available and modifiable. The GNU

(which stands for "GNU's Not Unix") project was highly successful in creating powerful tools, such as the ubiquitous gcc compiler and gzip compression program, now considered standard parts of Unix environments. The GNU operating system kernel, known as Hurd, is still under development.

<<http://www.gnu.org/copyleft/gpl.html>>
<<http://www.gnu.org/philosophy/philosophy.html#AbouttheGNUproject>>
<<http://www.fsf.org/software/hurd/hurd.html>>

Linus Torvalds began the Linux project with a similar goal: to develop a free Unix-compatible kernel for Intel PCs, without license encumbrances. To ensure that Linux would be free, it was also licensed under the GPL. An operating system kernel isn't useful by itself, so Linux distributions combine Linux kernels with other free GNU and non-GNU components to build complete operating systems. Thus the FSF's goal of a free Unix-like operating system was attained, though not quite as its founders expected.

<<http://www.gnu.org/gnu/linux-and-gnu.html>>

Linux is generally portrayed as a better, faster, and more stable server alternative to Windows NT/2000. In contrast, BSD Unix rarely crops up in casual conversation, but its users consider it better and more stable than relative newcomer Linux. A number of high-profile Web sites, such as

Yahoo and MCI, apparently share this conviction and rely on BSD-backed Web servers.

The Mac OS X Layer Cake -- Although Apple is introducing Unix to millions of Mac users through Mac OS X, you don't need to start memorizing Unix commands to use it (in fact, you'll have

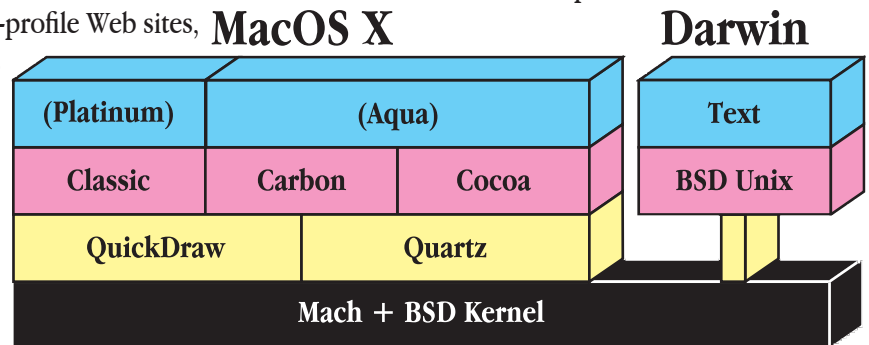
to work to see the Unix command line at all). However, it will be helpful to have a working knowledge of how Unix fits into the inner workings of your Mac.

Think of Mac OS X as a three-layer cake, borrowing its basic recipe from the NeXTstep operating system, leavened with components of Mac OS 9. The lowest level is derived from Carnegie Mellon University's Mach micro-kernel research project, which interacts with the hardware and helps different parts of the next level up communicate with one another, and the BSD kernel, which provides facilities such as networking, device drivers, and file systems - HFS+ and UFS (Universal or Unix File System) are included in Mac OS X. Within Darwin, the second level is a fairly standard Unix environment, including tools ranging from the ls program that lists files and the cp program that copies files, to the aforementioned gzip and the Apache Web server. These two layers are available now from Apple, packaged together as the free open source Darwin operating system.

<<http://www.cs.cmu.edu/afs/cs.cmu.edu/project/mach/public/www/mach.html>>

<<http://www.publicsource.apple.com/projects/darwin/>>
<<http://db.tidbits.com/getbits.acgi?tbart=05994>>

Darwin is a fully capable Unix-like operating system on its own, but it's limited in comparison to the Mac OS. In



particular, Darwin lacks graphics capabilities entirely - in a typical Unix system those would be provided by the X Window System, but Darwin can only display text on the connected monitor. Apple has released Darwin as open source, so people with recent Macs who want to run BSD-style Unix now

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have another free option (projects such as OpenBSD and NetBSD also support many Macintosh hardware configurations). Darwin has already drawn some attention in the computer industry, but it's mostly relevant for Mac users, since several mature BSD options for Intel-based PCs already exist. It remains to be seen whether people will actually use Darwin as an independent product, but it may find popularity on slightly older machines or in dedicated server environments.

<<http://www.x.org/>>
<<http://www.macosxinfo.org/kernel.html>>
<<http://www.openbsd.org/>>
<<http://www.netbsd.org/>>

Confusingly, Apple uses the name Darwin for several related projects which have different releases but the same source code: the self-contained Darwin operating system package and the bottom layer of Mac OS X. Direct access to Unix applications on a Mac OS X system is entirely optional, which makes the system much more palatable for Mac users who prefer to avoid Unix. But double-clicking the Terminal program included in Mac OS X Public Beta invokes a command line, giving full access to Unix functionality, just like logging into a machine running the free Darwin operating system.

<<http://db.tidbits.com/getbits.acgi?tlkthrd=1188>>

The second and third levels of the Mac OS X layer cake, not included in the free Darwin package, are the proprietary code that makes it a Macintosh operating system with a graphical interface: the QuickDraw and Quartz graphic environments that programs use to draw to the screen and the whole set of Application Programming Interfaces (APIs) that enable Macintosh programs (as opposed to Unix programs) to run. The main APIs in Mac OS 9 are collectively called the Macintosh Toolbox. Mac OS X includes a much larger set of overlapping APIs, due to its hybrid Unix/NeXT/Apple heritage.

Classic applications rely on the venerable QuickDraw for display of text and graphics. Carbon applications can use Apple's new Quartz display engine, but QuickDraw remains available to them as

well, and so they'll probably stick with QuickDraw as long as developers want to provide a single application file that can run under both Mac OS 9 and Mac OS X. Cocoa applications rely entirely on Quartz, which is based on Adobe's Portable Document Format (PDF), and provides improved capabilities for print and layout. In addition, Mac OS X also provides OpenGL and QuickTime, which may help availability and performance of games and scientific computing software for Macs.

Macintosh programs that can run under Mac OS X come in three main flavors: Carbon, Classic (existing Mac OS 9 programs), and Cocoa. New and updated programs which use Carbon are full-fledged Mac OS X applications and take advantage of Mac OS X's protected memory and preemptive multitasking. Current programs run under Mac OS 9 within the Classic environment, providing compatibility with existing software. And Cocoa programs rely on a set of APIs originally derived from NeXTstep, so Mac OS X can run NeXTstep-derived programs.

The frosting on this layer cake is a new graphical design for Mac OS X, called Aqua. All Carbon and Cocoa applications in Mac OS X use Aqua, which specifies larger text and buttons, heavy usage of anti-aliased text and transparency, and a new set of design guidelines for windows, menus, and other interface elements. As a result, Mac OS X applications are prettier and livelier, with correspondingly increased demands on processor power and screen size. Specifically, Mac OS X effectively requires a minimum screen resolution of 800 by 600 pixels, while Mac OS 9 was usable at 640 by 480 pixels. (Also see "A Quick Dip into Aqua, the Mac OS X Interface" in TidBITS-513.)

<<http://www.apple.com/macosx/technologies/inside.html>>
<<http://db.tidbits.com/getbits.acgi?tbart=05773>>

Okay, let's see if we can put it all together - this diagram may look more like a game of Hack than a layer cake, but it should give you an overview of where everything fits. Remember there's no graphical environment under BSD Unix in Darwin.

To continue our analogy, the Mac OS X Public Beta available now includes candles on the cake - user applications (both included with Mac OS X and installed by users), which use either the Platinum (Classic) or Aqua appearance, depending on the APIs to which they're written. Bundled applications include the Finder/Desktop, Internet Explorer, Mail, Sherlock, System Preferences, an MP3/CD player, and others. The whole installation provides approximately the same feature set as Mac OS 9, but as you'd expect in a beta, some of the new components are more primitive than the mature ones from Mac OS 9. The best example of this is the new Dock, which replaces Mac OS 9's Apple and Application menus and desktop, but doesn't offer the same level of flexibility as the older tools in Mac OS 9.

As a Macintosh system, the most obvious changes in Mac OS X are the visual interface - Aqua - and the file system layout. The underlying system is already more stable, but this is a less obvious change. Classic Mac developers are beginning to move their software to Carbon, and as they do so they will begin to take advantage of Carbon's new capabilities and advantages. For those interested in exploring further, there's a wealth of new territory. NeXT developers are quickly moving over to Mac OS X, and adapting their applications for Cocoa. Darwin's Unix environment provides a whole new range of capabilities, particularly in the areas of networking and programming. This is foreign ground for many Mac users, but the potential is considerable.

In the next installment of this article, I'll talk about how the computer industry stands to be affected by Mac OS X's merger of an underlying Unix structure with the qualities that make a Macintosh.

Look for Part 2 in next months Maclanta!!!

Chris Pepper is a systems administrator in New York, and he's just delighted that his "personal" Mac workstations are now running Unix like the servers he coddles for a living. Check out his Mac OS X Software and Information site for more on Apple's new operating system.

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