The Developer Business Report March 1997

AppleDirections

CONTENTS

APPLE NEWS

Apple Announces Future Macintosh Operating System Strategy and Road Map

Mac OS Upgrades to Continue; First "Rhapsody" Release Scheduled to Ship in Early 1998

Last January at MACWORLD Expo San Francisco, Apple announced a dual-track operating system strategy that calls for the continuation and periodic updating of the current Mac OS operating system, along with the creation of a new operating system, code-named *Rhapsody,* that will merge technologies from Apple and NeXT Software. This approach will also provide strong backward compatibility for existing Mac OS software. (For details, see "Mac OS Compatibility on Rhapsody" on page 14 of this issue.)

Apple expects Rhapsody to provide customers and developers with a platform for exceptional, cutting-edge applications, while maintaining the investment in the current Mac OS. Apple also believes that the advanced technical underpinnings and rapid development environment of Rhapsody (including the integration of NeXT's OPENSTEP development environment into Rhapsody) will allow developers to create new applications that leapfrog those of other operating systems, such as Windows NT.

Apple expects to launch the first release of Rhapsody to developers in mid-to-late

please turn to page 7

STRATEGY MOSAIC

Apple's Java Strategy Moves Forward

By Gregg Williams, Apple Directions *staff*

Castanet Adds to Richness of Java Experience on the Mac OS

In the last quarter of 1996, Apple announced its strategy for supporting Java™, Sun's language and environment for building software that runs on multiple platforms. (You can read a summary of that strategy in my article "Doin' the Java Jump," in the November/December 1996 issue of *Apple Directions*.)

Now, a bit over a quarter later, it's scorecard time. What has Apple done about Java? What's it going to do? How is Apple going to fulfill its promise of making the Mac OS platform deliver the best Java experience for both users and developers?

This article attempts to answer these questions. The first part of this article looks at Apple's current support for Java and its plans for improving that support later in 1997. The second part looks at a new software-delivery technology, called *Castanet,* that Apple will be bundling with the next release of Java.

Mac OS Runtime for Java, Present and Future

In January, Apple delivered on its promise to make the Java environment an integral part of the Mac OS by delivering Mac OS Runtime for Java (MRJ) 1.0; you can get a copy of it by going to **http://www.applejava.apple.com** on the World Wide Web. But, as I stated in my "Doin' the Java Jump" article, one of Apple's goals for Java is to make the Mac OS the platform with the richest Java support for both

please turn to page 4

AppleDirections

Volume 5, Number 3

Apple Directions, the monthly developer newsletter of Apple Computer, Inc., communicates Apple's strategic, business, and technical directions to decision makers at development companies to help maximize their development dollar.

Editor
Patty Bing-You (bingyou@apple.com)

Technical Editor
Gregg Williams (greggw@apple.com)

Business Editor
Kris Dalebout Newby (newby2@aol.com)

Associate Editor
Anne Szabla (szabla@applelink.apple.com)

Production Editor/Graphic Designer
Lisa Ferdinandsen (ferdinan@apple.com)

Contributors
Meredith Best, Peter Bickford, Caroline Rose, Keith Schaefer

Production Manager
Diane Wilcox

Prep and Print
Consolidated Publications, Inc., Sunnyvale, CA

EDITOR'S NOTE

New ADR Research Reveals Endless "Pasta-bilities"

Apple Developer Relations has just completed a worldwide research study to evaluate the design and delivery of the programs and services it provides to Apple developers. Based on recommendations stemming from this research, ADR will make changes over the next few months to improve the level of service and support you now receive. We will be reporting all changes to you in future issues of Apple Directions *and at the Developer World web site (**http://devworld.apple.com/**).*

Patty Bing-You
Editor

• • •

Listening to 15 developers talk for three hours about what they like and don't like about Apple's developer programs reminds me a little of cooking pasta. Half the people you talk to will swear the secret to really great pasta is in the noodles—those twisted shapes with tricky names that trip over your tongue, like *rigatoni, farfalle, penne, orecchiette, fusilli*—and the other half will tell you it's all in the sauce.

They're both wrong. The key to really great pasta is in the pairing of the pasta and the sauce. It's in the partnership. And the "pasta-bilities" are endless.

That's how I felt about the developer focus group I recently attended: endless possibilities. The focus group was one of nine groups held in four locations around the world—London; Boston; Cupertino, California; and Tokyo—as part of a worldwide research study conducted by Apple Developer Relations (ADR) to assess and improve the design and delivery of the programs and services it provides to Apple developers. The three-part study included qualitative research (focus groups) and quantitative research (telephone and web-based surveys) based on U.S. and international developer feedback and internal ADR input.

The developers—more than 500—who participated in the research study belong to the Macintosh Developer Program, the Apple Media Program (AMP), or both, or receive the Apple Developer Mailing. The study explored a number of areas ranging from general information needed by developers to very specific program components such as Developer Mailings, Developer CDs, Internet use and preferences, training and education, and technical support.

I got lucky and managed to squeeze my way into one of the Cupertino sessions, which was made up of U.S. developers who were members of either the Macintosh Developer Program or AMP. For three hours I hurriedly scribbled notes while opinions flew around the conference table at a dizzying speed. Everyone, even the most shy, retiring, or just plain sleepy, had an opinion on what Apple is doing that is right—and an equally strong opinion on where Apple needs to improve its developer support.

In the end, what I heard was a group of 15 developers who still want to play as a team and who still believe their team can win. They believe in the partnership. And they used the focus group to drive home some really tough points about how their partnership with Apple can be improved.

First of all, I learned that developers think Apple is doing well in the area of overall communications. Eighty-two percent of you feel Apple is doing a better than average to average job of communicating with its developers. Timeliness and accuracy of information are the top developer concerns. You want honest and accurate communication; you want the information to be timely, you want it delivered electronically, and above all, you want it to come to you rather than having to go out and search for it.

Sixty-nine percent of you prefer to get your news electronically from a source like Apple

April *Apple Directions* Online

The April issue of *Apple Directions* will be available by March 15 on the web at **http://www.devworld.apple.com**.

Developer News, ADR's weekly business and technical news bulletin. You also want printed materials like *develop* and *Apple Directions* that are portable and can be used for casual reading on trains, planes, and even in the bathroom! And you want to be able to share these printed periodicals with coworkers.

You gave a hearty thumbs-up to the monthly Developer Mailing and clearly rated it the single most valuable developer program benefit. Within the Developer Mailing, the Developer CD is far and away the most valued component. Ninety-three percent of you rated the CDs extremely or very useful. You believe Apple could improve on its delivery of system software as well as the searching capability of the CDs.

Trailing the monthly Developer Mailing as most valuable program elements are the Software Seeding Program, Developer Technical Support (DTS), and the Hardware Purchase Program. You rated the Software Seeding Program as very valuable. Of those surveyed, 64 percent participate in the Software Seeding Program; for the most part, those of you who don't participate either are unaware of the program's existence or can't participate because the program is not offered in your region.

Forty percent of developers surveyed have participated in the Hardware Purchase Program in the last year. Although fewer developers participate in this program than in the Software Seeding Program, the hardware program received higher marks for value than the seeding program. Over half (56 percent) of those who do participate find the Hardware Purchase Program to be very valuable.

Responses to DTS were mixed, with overall satisfaction in the middle range. Slightly over a third (37 percent) of all developers surveyed have actually used Apple's e-mail–based Developer Technical Support; nearly two-thirds (61 percent) have not. Those who have used DTS gave the service pretty high marks. Most of you also said that DTS's technical support staff is doing a good job: Almost three-quarters (73 percent) rated staff personnel as very or somewhat effective. Overall, most of you would appreciate a quicker response time and consistent quality.

In the area of market content, there is room for improvement. Bottom line, you want more of it and you want it to be less United States–centered. Many of you feel the marketing content is too "Apple-centric" and not objective enough. You want more market research data, such as technology adoption numbers and demographic information.

Most of you think the Developer World web site is an important delivery vehicle but not a replacement for print and CDs. Ninety-one percent of all the developers surveyed have connected to Developer World at least once, and of these, almost half (48 percent) connect weekly. The main reasons you access Developer World are to obtain the latest information and to download code and system software. Most of you (59 percent) feel Developer World contains the kind of information you need, but only 12 percent feel strongly this way.

When it comes to education and training, most of you prefer to learn new technical skills or acquire new knowledge using self-paced training in books (48 percent); the web is a distant second at 14 percent. Only 6 percent of you prefer formal classroom instruction.

We asked members of the Apple Media Program (AMP) to evaluate a number of program components, and the AMP CD emerged as the clear winner. Survival Guides and How-to Guides were close runners-up, with more than half of the members surveyed (54 percent) rating the guides as important. Third-party demos and the AMP Newsletter received mixed reviews. There were marked regional differences regarding the value of AMP market research data: More than four out of ten United States developers (43 percent) rated the information as important, but most international developers found the data too United States–centered.

Well, that's a lot of information. Thanks to your participation in our surveys and focus groups, ADR's shopping cart is overflowing with really great ideas. Keep your eye on this column in future issues to see what we cook up with all this research data. As I said, the "pasta-bilities" are endless! ♣

What's New?

Over the next few months, "What's New?" will bring you information on what's new in the world of ADR programs and services. The changes we will be announcing in this column will be based, for the most part, on recommendations derived from the recent worldwide ADR research study.

This month, it looks like the cook got a head start on us. Since plans to enhance the Apple Developer World web site were simmering on the back burner long before the ADR research study was commissioned, we've backtracked and compared those plans to the results of the study—and all signs indicate we're headed in the right direction.

This month's "What's New" is really more a call to action than an announcement of any new features. We're pleased to announce that the new Members Only area of Developer World is now live, and we're eager to get all members of Apple's support programs (the Macintosh Developer Program, the Apple Media Program, and the Newton Developer Program) registered so you can take advantage of some of the great features this new area has to offer.

Registration is easy—begin by clicking the phrase "Register Now!" on the main Developer World page at **http://www.devworld.apple.com/**. To get your Developer World ID and password for access to the Members Only area, you will need to enter the Apple Customer Membership Number for your company. If you don't know your membership number, check with the person in your company who handles billing or mailing for Apple's support programs. Once you have registered, it will take several days before you receive an e-mail confirming that your ID is active and you can access the Members Only services. While you are waiting for Apple to process your ID, you can participate in one of the many discussion boards and search the public content. If you are not currently a member of one of the Apple Developer Programs, you can get information about the programs at **http://devworld.apple.com/dev/programs.shtml**.

When you visit the Members Only area for the first time, the first thing you'll notice is a little stick figure in a yellow hard hat and the words *Under Construction.* Even as you read this article, ADR is still hard at work building the area. They've already loaded some good information, and will be adding more features closer to the completion date.

If you access the area today, you'll see Apple installed-base and market intelligence data that you can use for assistance with your strategic market planning. You'll also find information on how to get seeded with prerelease Mac OS technologies (before public developer seedings)—what technologies are available, who can qualify to receive them, and how to do so. The Members Only area also includes information on the United States Hardware Purchase program and the price list.

In the near future, you will be able to find additional report and market intelligence information; region-specific program membership information including country price lists, promotions, and special events; Apple's system software, including international versions and system updates; and private discussion boards.

Other future services and features will include access to one centralized location for special information and offers, including special discounts, comarketing opportunities, and more; and access to RadarWeb, Apple's new web-based bug reporting and tracking system, which will allow you to review existing bug information, report new bugs, and check on the status of reported bugs. ♣

STRATEGY MOSAIC

Apple's Java Strategy

continued from page 1

users and developers. The following sections describe Apple's plans for MRJ.

MRJ 1.5

Apple expects to release the next version of Mac OS Runtime for Java, MRJ 1.5, during the second calendar quarter of 1997. This version will include the following:

- Fixes for bugs found in MRJ 1.0
- Performance increases from the tuning of MRJ's code and the inclusion of a just-in-time (JIT) Java compiler
- Marimba's Castanet technology

Castanet is an exciting new technology that is an important addition to MRJ 1.5, one that will take some space to describe fully. For that reason, I'll defer discussion of it until later in this article.

The other major improvement in MRJ 1.5 is the inclusion of the JIT compiler, which can add a considerable speed improvement to the execution of Java code. (For a fuller explanation of JIT compilers, refer to "OpenDoc and Java Beans" in the January 1997 issue of *Apple Directions;* the explanation is in the section titled "The Need for Speed," on page 3 of the issue.)

The speed increase that the JIT compiler delivers varies from a negligible increase to a 20-times increase, depending on the type of code that is executing. Java software that is graphics-intensive (for example, a graphics demo that does nothing but draw to the screen) will show little or no speed-up: The Java code is doing little more than calling QuickDraw routines, which run at their usual speed—so a JIT compiler has no opportunity to speed up Java code execution.

On the other hand, Java software that is compute-intensive (for example, software that computes the graph of a complicated function and then draws it on the screen) will run much, much faster under MRJ 1.5 than it will under MRJ 1.0. The reason for this is that the byte-code interpreter in MRJ 1.0 recompiles a Java instruction each time it encounters the instruction. The JIT compiler in MRJ 1.5 compiles an instruction and stores the resulting compiled code, then recalls the compiled code when it needs to execute the same instruction again. The JIT compiler increases execution speed because recalling the results of an already compiled instruction is faster than recompiling it.

MRJ in Tempo

The next release of the Mac OS, code-named *Tempo,* is expected to ship in mid-1997, and Mac OS Runtime for Java 1.0 will ship with it.

MRJ 2.0

Skipping backward in time slightly, Apple expects to ship a development version of MRJ 2.0 sometime in the second calendar quarter of 1997, with a final MRJ 2.0 release sometime in the third calendar quarter.

What's in MRJ 2.0? The purpose of this release is to keep Mac OS Runtime for Java current with the latest version of Java—in this case, with Sun Microsystems' Java Development Kit (JDK) 1.1. JDK 1.1 is a more sophisticated release of Java that adds the following improvements:

- The ability to create Java applets meant for international markets
- JDBC, the Java API (application programming interface) for accessing SQL (Structured Query Language) databases
- Enhanced security features
- Support for Java Beans, the Java technology for component software

What About Rhapsody?

In the "Doin' the Java Jump" article that I wrote three months ago, I said that Apple is committed to supporting Java on all its platforms—which you can now interpret to mean that Apple's support for Java won't disappear in its next-generation operating system, code-named *Rhapsody.* Apple has announced that Rhapsody will include a Java Virtual Machine and access to Java class libraries. (For the full announcement, see "Apple Announces Future Macintosh Operating System Strategy and Roadmap" on page 1 of this issue.)

Castanet

When Java was first introduced, it promised to deliver the Holy Grail of programming: *write once, run anywhere.* That is to say, a program can be written once and, without modification or even recompilation, it will run on multiple platforms.

The primary method by which developers deliver Java code today is by creating Java applets and embedding them in web pages. This method has two drawbacks. First, the user must be connected to the Internet (or a local intranet) to run the applet. Second, the applet always runs within the human interface of a web browser window.

Castanet, a new technology from Marimba (**http://www.marimba.com**), overcomes the above two drawbacks by delivering data and Java code as if it were an applet, but allowing the user to execute the code as if it were an application. (Technically speaking, Castanet is not tied to delivering Java code; it is able to deliver multifile applications written in many programming languages. However, Castanet's emphasis is currently on the delivery of Java code because the Java environment is the only one that protects the user's computer from possibly being corrupted by "bad" software downloaded from an unknown source.)

How Castanet Works

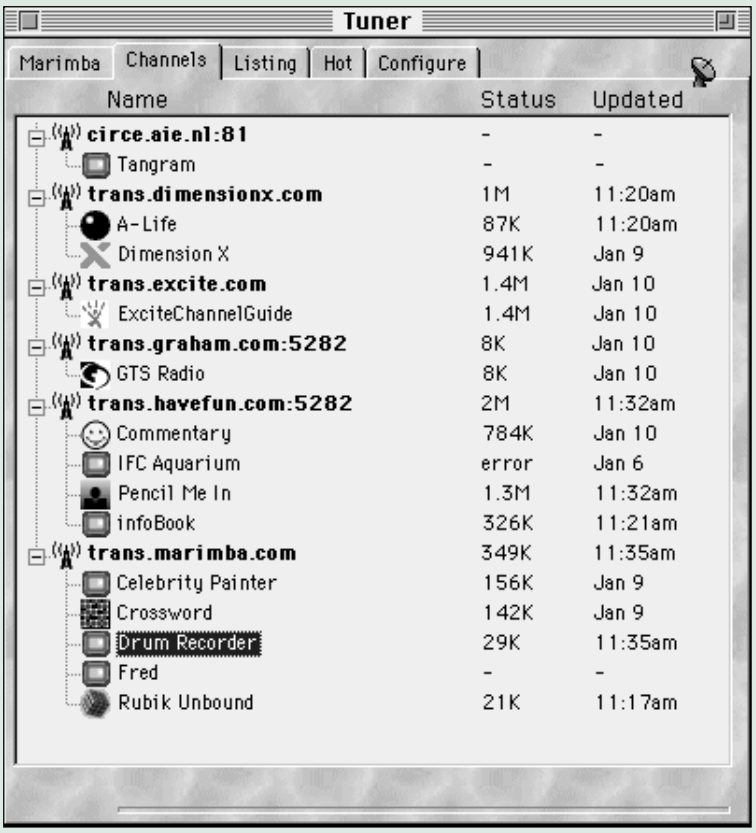
Out on the Internet (or an intranet) are sites called *transmitters.* Each transmitter contains one or more "channels," which are combinations of Java code and associated data. On the user's computer is a program called a *tuner,* which allows the user to "subscribe" to channels by double-clicking them. (Refer to the figure on this page to see what a tuner window looks like.)

When the user subscribes to a channel, the code and data are downloaded and installed on the user's hard disk; see the figure "How Castanet Works" on page 6. From this point on, even if the computer is disconnected from the Internet (as, for example, might be the case with a laptop computer being used in the field), the user can double-click the channel's icon and cause a fully functional, valid version of the channel (the one stored on the computer's hard disk) to execute.

One of the major features of the Castanet technology is the automatic updating of channels. The user tells the tuner how often to check for new content in a channel. Whenever the user's computer is connected to the Internet, the tuner automatically checks all the channels the user has subscribed to (as determined by the update schedule) and updates the channels that have changed. This updating is transparent to the user and can occur even if the channel is currently in use on the user's computer. Channel updates are usually quick because Castanet does differential updates—that is, only the files in the channel that are different from what is already on the user's hard disk are changed.

A second major feature of Castanet is that it liberates Java software from the web browser interface. An open Castanet channel is displayed in one or more unadorned windows—unlike an applet displayed by a browser, which retains the browser's interface elements and window size and has no provisions for displaying the applet's data in multiple windows. In contrast, the Castanet channel has complete control over the size and contents of each of its windows.

A third major feature of Castanet is that the communication between the tuner and the transmitter is two-way—that is, the tuner can send data back to the transmitter. Without this feature, Castanet would be an intelligent software downloading technology. With this feature, however, Castanet channels take on the characteristics of client/server solutions, with the tuner acting like client software and the transmitter acting like server software. This makes Castanet a rich technology for building a much wider variety of software solutions.



The Castanet Tuner. This window shows a list of Castanet transmitters and channels known to the user.

Pencil Me In

Take a look at the Pencil Me In window on page 7. It's a full-featured, networked group scheduling program from Sarrus Software (**http://www.sarrus.com/**). What makes this program of interest here? It turns out that Pencil Me In is implemented as a Castanet channel.

Pencil Me In is a Castanet channel that proves three things. First, it proves that a channel can look exactly like a conventional Mac OS application. Second, it proves that Java can be used to create full-function, commercial-quality software solutions. Third, it proves that you can use Castanet to create software solutions that you can sell to customers in 1997.

Advantages of Developing With Castanet

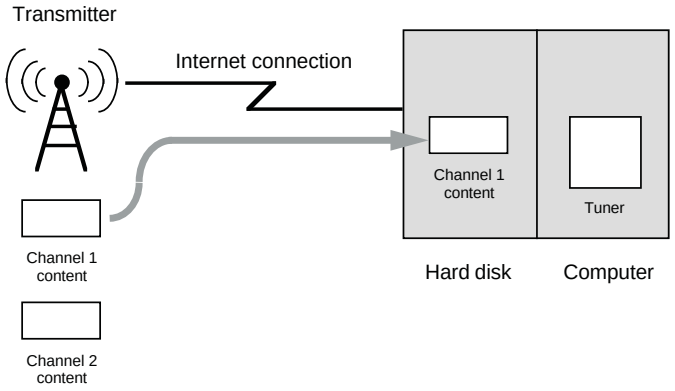
Now that you've seen an example of what Castanet can do, it's time to take a look at the advantages of creating a Castanet-based solution.

First, Castanet gives you a powerful foundation that allows you to deliver full-scale Java applications that can be updated automatically. In addition, the two-way feedback between the Castanet tuner and transmitter enables you to use Castanet to create client/server-like solutions that function correctly when they are disconnected from and reconnected to the transmitter.

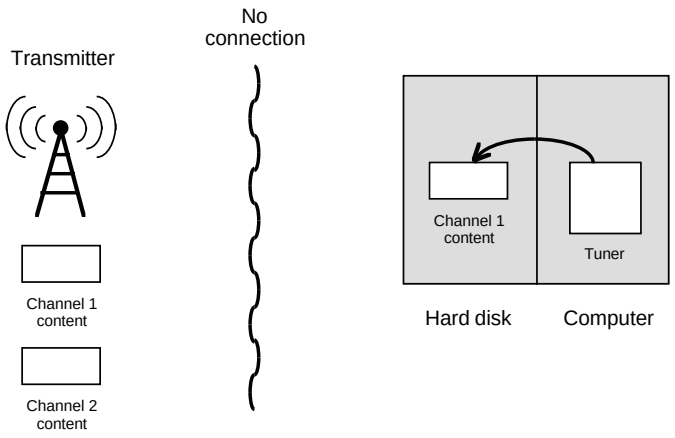
Second, because the Castanet channels I'm talking about are based on Java, you get all the advantages of Java software:

- You can write your software once and have it run—without modifying or even recompiling it—on multiple platforms. (Castanet currently runs on the Mac OS, Solaris, Windows 95, and Windows NT operating systems.)
- It's easier for you to fix bugs and improve your software, because you need to change only one set of source code.

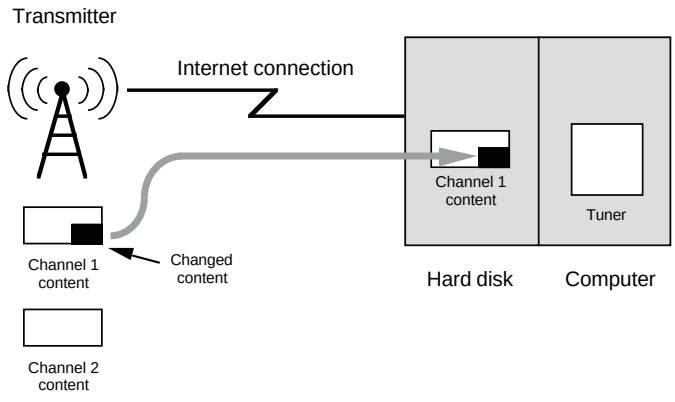
How Castanet Works



When the user subscribes to a channel, the code and data for the channel are downloaded to the user's hard disk.



The tuner always executes the channel from the copy on the hard disk. This allows channels to run even when the computer is not connected to the Internet.



If a channel changes, Castanet automatically updates the copy on the user's hard disk by transmitting only the part that has changed.

• You have a larger audience for your finished product, because it automatically runs on multiple platforms (also making it attractive to customers who must support a mixed-platform environment).

• You can develop software faster in Java than you can in C or C++. Java automatically takes care of memory "garbage collection," so you don't have to write extra code to do this. Also, Java eliminates the use of pointers, which are the source of many programming errors. Some programmers estimate that these two factors reduce your debugging time by approximately half.

Castanet and the Mac OS Platform

At this point you may say, "Why are you making such a big deal about Castanet? After all, the same technology is available for Windows. So how does bundling the Castanet tuner with MRJ 1.5 make the Mac OS platform any better?"

It turns out that the inclusion of Castanet with MRJ 1.5 *does* contribute to Apple's goal of making the Mac OS the platform with the richest Java experience. By mid-1997, Castanet technology will automatically be present on all Java-enabled Mac OS–based computers (that is, those running MRJ 1.5). This will be a big win for Mac OS users, because the Castanet tuner will make Java visibly and immediately more useful. (The same won't be true for Windows customers who are using Java. Even though the Castanet tuner is available for Windows, only a small fraction of Windows users will make the effort to download, install, and use the Castanet tuner.)

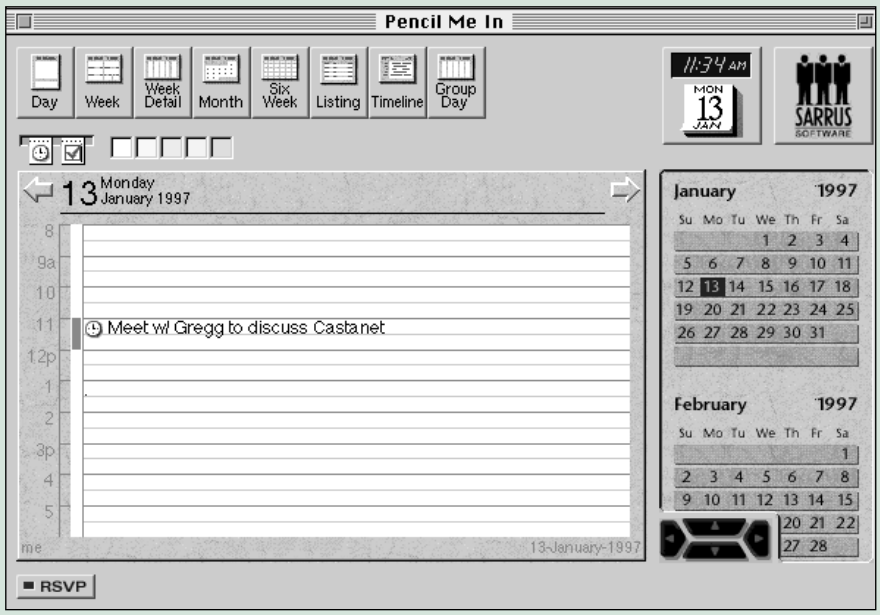
The inclusion of the Castanet tuner with MRJ 1.5 also makes the Mac OS a better platform for your development efforts. You can create Castanet-based solutions, knowing that your product's customers already have the required Castanet tuners on their computers. You can begin building Castanet-based solutions *today* for use on an intranet—and don't forget that a single Java program, written once, will run on multiple platforms, and therefore will have a much larger audience. It is expected that a future version of Castanet will bring you additional business opportunities, including the ability to sell, distribute, and update your Java-based solutions over the Internet.

Conclusions

It's a fact: Java is now an integral part of the Mac OS. I hope this article has also

convinced you that Apple is committed to improving Java's performance on the Mac OS and to keeping it synchronized with future versions of Java. Apple also continues to look for opportunities to make the Java experience on Mac OS–based computers as rich as possible—and Marimba's Castanet is certainly one technology for doing so. In addition to making the Java experience richer for Mac OS users, Castanet offers you a way to package Java software in a form that you can sell commercially.

All in all, Apple's Java strategy is clear and on track. Apple's upcoming Rhapsody operating system presents some uncertainty about how to develop for the Mac OS platform, but Java's automatic support for multiple platforms guarantees you a large potential audience for any Java-based solutions you might decide to write. Java software is still in its infancy, but it's getting closer to being usable for creating commercially viable solutions. If you decide to do so, you will find Mac OS customers a ready market for your work. ♣



Pencil Me In. Note that this Castanet-based application looks like a normal Mac OS application.

For those of you with access to the World Wide Web, you can find my "Doin' the Java Jump" article at ***http://www.devworld.apple.com/mkt/informed/appledirections/dec96/stratmosaic.html*** *and my "OpenDoc and Java Beans" article at* ***http://www.devworld.apple.com/mkt/informed/appledirections/jan97/stratmosaic.html****.*

NEWS

Operating System Strategy

continued from page 1

1997 and to customers in early 1998, with a second "unified" release that incorporates Mac OS compatibility in mid-1998. According to current plans, Rhapsody will incorporate features such as preemptive multitasking, protected memory, symmetric multiprocessing, and a modern kernel. Apple also expects it to include a new API (application programming interface) based on the OPENSTEP environment. (See the figure "Rhapsody Architecture" at the top of page 8.) This OPENSTEP-based API will enable developers to create new classes of software products that will help differentiate Rhapsody-based products from software written for competing platforms.

In January, Apple released Mac OS 7.6, and Apple has three additional releases—code-named *Tempo, Allegro,* and *Sonata*—scheduled between now and the end of 1998. Apple expects that the scheduled enhancements to the current Mac OS will retain its industry leadership in ease of use and multimedia, while greatly strengthening its Internet capabilities.

OS Strategy Provides Clear Advantages for Customers and Developers

Apple believes that its OS strategy provides clear differentiation from its system software competitors in four areas:

• *Smooth transition.* First, Apple's strategy allows both the Mac OS and Rhapsody to share a similar "look and feel" and provide compatibility with existing Mac OS applications and hardware—giving customers and software developers a smooth upgrade path to next-generation technology. Existing Mac OS software is expected to work within Rhapsody at PowerPC processor speeds. Additionally, Apple expects that Rhapsody will support today's currently shipping Mac OS–based computers, as well as future Mac OS hardware.

• *Advanced operating system.* Second, Apple expects Rhapsody to provide customers and developers with a robust, easy-to-use operating system that delivers features such as preemptive multitasking, protected memory, symmetric multiprocessing, and a modern kernel. The integration of NeXT's OPENSTEP environment in Rhapsody will provide developers, in-house development teams, and new media specialists with a powerful component-software environment. This will allow developers to create new classes of software quickly and easily.

• *Multimedia leadership.* Third, Apple's OS strategy will allow it to continue to lead the market in multimedia innovation. Apple intends to optimize its QuickTime Media Layer (QTML) for both the Mac OS and Rhapsody, providing all Apple customers with superior platforms for creating and using multimedia. Apple also intends to use high-performance PowerPC processors and new hardware acceleration technology to improve the multimedia capabilities of Macintosh systems.

• *Superior Internet integration.* Fourth, Apple plans to carry forward key technologies such as OpenDoc, Meta Content Format (MCF), and easy-to-use TCP/IP connectivity to

maintain the Macintosh as a leading system for Internet access and the delivery of Internet content. The integration of Java—Sun Microsystems' platform-independent application environment for the Internet and corporate networks—will allow Apple to make both the Mac OS and Rhapsody preeminent development and deployment platforms for Java technology. (Apple has already released Mac OS Runtime for Java 1.0 and has further plans; see "Apple's Java Strategy Moves Forward" on page 1 of this issue.)

Apple plans to integrate Java fully into Rhapsody, including a Java virtual machine and access to Java class libraries. In addition, Apple expects that technology such as NeXT's WebObjects will further reinforce the Mac OS platform's Internet capabilities.

Road Map Shows Complementary Approach

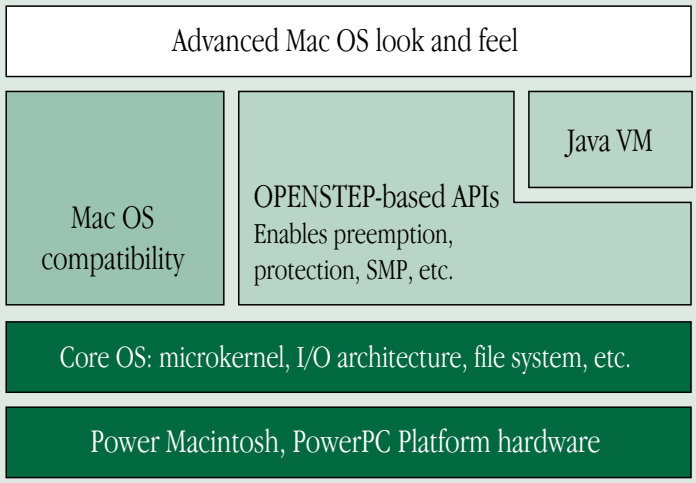
Apple's OS strategy offers two complementary product lines moving forward—the Mac OS and Rhapsody. Customers in each of Apple's markets can migrate to Apple's next-generation operating system, Rhapsody, at their own speed. Apple also believes that this new operating system strategy will reinvigorate its presence in key market segments, particularly the enterprise market. Because Apple anticipates that many customers will remain on the Mac OS for a number of years, the company intends to continue upgrading this operating system in regular twice-yearly installments as long as users value and demand such enhancements.

Mac OS Road Map

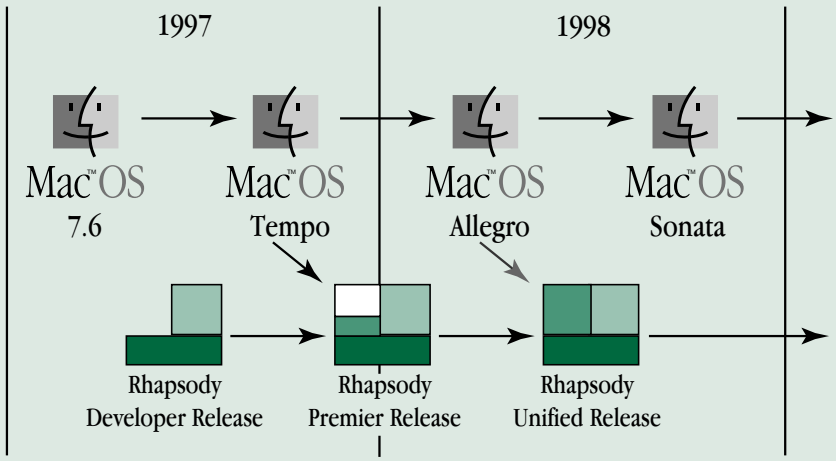
Mac OS 7.6, which was delivered at the end of January, is the first step in Apple's strategy to deliver significant improvements to the Mac OS twice per year for owners of both 680x0 and PowerPC processor–based hardware. Mac OS 7.6 integrates a host of Apple technologies to offer customers best-of-class Internet access, state-of-the-art multimedia, built-in OpenDoc support, enhanced compatibility with DOS and Windows files, and improved productivity and reliability.

Three future releases of Mac OS are already slated—code-named *Tempo, Allegro,* and *Sonata.*

Tempo, targeted for July 1997, will continue to improve the overall ease of use of the Mac OS and offer leading Internet integration.



Rhapsody Architecture.



System Software Road Map. The Rhapsody Premier Release (bottom center) is distinguished by limited compatibility with the Mac OS (as denoted by the partially full box), while the Rhapsody Unified Release will include a complete native implementation of the Mac OS.

Plans for Tempo include a new PowerPC processor–native, multithreaded Finder, which will allow customers to execute multiple tasks—such as launching applications and copying files—at the same time. Tempo will also include a new 3D look and other user interface enhancements. In the Internet area, Tempo will integrate Cyberdog 2.0, Mac OS Runtime for Java, and Personal Web Sharing (which enables every Mac OS–based computer to be an Internet web server).

Allegro is expected to be released in early 1998, and Sonata is due at the end of 1998. Apple will provide details on its Allegro and Sonata releases at a later date.

Rhapsody Road Map

The road map for Apple's next-generation operating system, Rhapsody, is as follows:

• *Developer release.* Apple plans a Rhapsody Developer Release by the end of 1997 to provide developers with a robust platform they can use to create next-generation applications, incorporating NeXT's OPENSTEP development environment. As stated earlier, this release is expected to include key operating

system technologies such as preemptive multitasking, protected memory, symmetric multiprocessing, and a modern kernel. The presence of the object-oriented OPENSTEP API and component-software development tools will allow developers to quickly and easily create applications for Rhapsody's first customer release.

• *Premier release.* The first customer release is planned for delivery in early 1998. The Rhapsody Premier Release is intended for early adopters of new technology in various market segments. Apple plans for the premier release to include an evolution of the Mac OS look, combining the best of Apple and NeXT technology to provide a state-of-the-art user experience that will be familiar to today's Macintosh customers and exciting to new users. This release is intended to enable new Rhapsody software applications to run in a fully preemptive and protected environment; the release will also have limited compatibility with Mac OS applications.

• *Unified release.* Intended as a general release for Apple's customer base, the Rhapsody Unified Release is expected to offer the advanced capabilities introduced in the developer and premier releases, as well as compatibility with existing and future Mac OS applications. Rhapsody is expected to support today's software through a Mac OS compatibility environment, which will be a complete native implementation of the Mac OS. This is not a software "emulation" layer; instead, Mac OS will be ported to the advanced Rhapsody base. The unified release of Rhapsody is scheduled for shipment in mid-1998.

PowerPC and the Mac OS

Both the Mac OS and Rhapsody will be optimized for PowerPC processor–based hardware. Rhapsody is expected to support all currently shipping PowerPC processor–based systems sold by Apple and Apple licensees today. Rhapsody is also expected to support all upcoming products, including the PowerPC platform (also known as the *Common Hardware Reference Platform*). Apple also intends to continue to develop, sell, and support NeXT software products for other platforms such as Pentium, Sparc, and Windows NT.

Disclaimer: *Statements in this article regarding Rhapsody and future versions of the Mac OS are forward-looking statements that involve risks and uncertainties, including successful and timely development of future versions of the Mac OS and of Rhapsody. The success of new products depends on a number of factors, including technological feasibility, the ability of the company to develop and make the product at an acceptable cost, market acceptance, and the company's ability to manage the risks associated with product transitions.*

Note: As this issue was going to press, Ellen Hancock, chief technology officer of Apple, and Avie Tevanian, vice president of NeXT Software, announced that Apple would be using the Mach microkernel as part of the core operating system for Rhapsody. (The microkernel is that portion of the system that manages a subset of operating services necessary to control the computer—including tasks, synchronization between tasks, timing, and messaging. These services form the basis of preemptive multitasking, memory protection, and symmetric multiprocessing.) You can view the full text of the announcement on the web at **http://www .devworld.apple.com/**. Apple will release more information as it becomes available.

■ ■ ■

Apple Reports First Fiscal Quarter Results

In his letter of January 15, 1997, to Apple customers, Apple's chairman and chief executive officer Dr. Gilbert F. Amelio got right to the point in summing up the results of Apple's fiscal 1997 first quarter: "Simply put, we had a disappointing quarter and we posted a $120 million loss." For the first quarter, which began in October 1996, Apple generated revenues of $2.1 billion and unit sales of 923,000—a sequential decline of 8 percent and 1 percent, respectively, from the fourth fiscal quarter of 1996, which ended in September. The company recorded a net loss of $120 million for the quarter ($.96 per share) compared to a profit of $25 million ($.20 per share) in the fourth fiscal quarter of 1996, and a net loss of $69 million ($.56 per share) in the first fiscal quarter of 1996.

Apple achieved gross margins of 19 percent during the quarter, compared to 22 percent in the fourth fiscal quarter of 1996, and 15 percent in the corresponding quarter a year ago. International sales constituted 56 percent of the company's quarterly revenues.

Apple experienced shortfalls in its planned sales of consumer-oriented Performa-branded systems in the United States during the quarter. The weakness in demand for Performa products necessitated aggressive pricing and rebate activities that adversely affected gross margins. Those actions, coupled with the overall unit shortfall, resulted in the significant loss for the quarter.

Based on first-quarter results, the company plans to develop additional restructuring programs during the second quarter with the goals of reducing its break-even point to $8 billion in annual revenues and enabling the company to return to profitability by the fourth fiscal quarter, which ends September 26, 1997.

For additional details on first-quarter earnings, see the press release on the World Wide Web at **http://product.info.apple.com/pr/press.releases/1997/q2/970115.pr.rel.q197earning.html**. You can also read Dr. Gil Amelio's letter to customers at **http://product.info.apple.com/pr/letters/1997/970115.pr.ltrs.amelio.html**.

■ ■ ■

Mac OS–Based Computer Sales Grew 9 Percent During Q4 1996

According to Apple's preliminary estimates, Mac OS licensees sold 120,000 computers (+/– 10,000) from October through December of 1996, bringing total quarterly Mac OS– based computer sales up to 1.043 million units. This represents a 9 percent increase in Mac OS–based computers sold over the previous quarter.

By looking at sales estimates from other manufacturers of Mac OS–based computers, you can easily see the positive impact that these compatible sales will have on your installed base in the coming years:

• Analysts say Power Computing sold more than 100,000 units in its first year. (Mike Rosenthal at Power Computing says

his company's first-year unit sales and revenues were higher that the first-year totals of Compaq, Dell, and Gateway Computers combined.)

• Motorola Computer Group shipped more than 40,000 Mac OS–based StarMax computers from its first shipment in mid-November through December 1996. According to Motorola, this number was "way beyond expectations."

• Umax says that it sold nearly 100,000 U.S. Mac OS units during its first six months of shipments.

• DayStar shipped a few thousand Mac OS–based computers into the quad-processor workstation market this year. A DayStar spokesperson said that for every "SGI-equivalent" Mac OS–based system they ship, Apple typically sells ten additional Mac OS support systems at a site.

■ ■ ■

Mac OS 7.6 Offers New Enhancements

Somewhat overshadowed by the announcement of its new sibling—Apple's newer, more advanced operating system, code-named *Rhapsody*—Mac OS 7.6 made its debut at MACWORLD as part of Apple's new strategy to deliver state-of-the-art Macintosh operating system capabilities to its customers on a regular, twice-per-year basis.

In his keynote speech at MACWORLD, Apple's chairman and chief executive officer Dr. Gilbert F. Amelio summarized Apple's continuing commitment to the Mac OS in seven words: "Modern OS?—Yes. Give up Mac?—No." In what can clearly be interpreted as a statement of Apple's continued support for the Mac OS, Dr. Amelio emphasized that the Mac OS will play an important role in Apple's new operating system strategy, allowing customers to migrate to Rhapsody at their own convenience, and not at Apple's.

Anticipating that many customers will remain on the Mac OS for a number of years, Apple plans to provide both 680x0 and PowerPC customers with regular upgrades to the Mac OS, beginning with the release of Mac OS 7.6. Plans are already on the drawing board for three future releases of the Mac OS, code-named *Tempo, Allegro,* and *Sonata.* Tempo is targeted for a mid-1997 release date and will feature improvements to the overall ease of use and emphasize Internet integration.

Mac OS 7.6 integrates a host of new Apple technologies, including the following:

• Best-of-class Internet access through the latest versions of Apple Internet Connection Kit (AICK), OpenDoc, Cyberdog, and Open Transport software, as well as new connectivity tools, such as Open Transport PPP and Apple Remote Access Client

• State-of-the-art multimedia, which brings together the latest versions of the Apple QuickTime Media Layer (QTML), including QuickTime, QuickDraw 3D, and Text-to-Speech, plus the OpenDoc Essentials Kit

• Enhanced features related to DOS and Windows compatibility, including Dataviz MacLink Plus translators, an enhanced Macintosh PC Exchange utility, and Macintosh Easy Open

• Improved productivity and reliability, including a new installer program that makes Mac OS 7.6 easier to load and a new Extensions Manager that makes it easier to use extensions

Pricing and additional product information is available at the Mac OS web site at **http://macos.apple.com/macos/releases.html**. ♣

Technology

develop Issue 29: QD3D, TSM, ACGIs, and NIE

There's an article behind each of these acronyms in Issue 29 of *develop, The Apple Technical Journal.*

• "Easy 3D With the QuickDraw 3D Viewer"—The QuickDraw 3D Viewer will allow users to view and manipulate 3D objects in your application with a standard, intuitive interface. Implementing the Viewer, which has been enhanced in QuickDraw 3D 1.5, requires only a few extra calls.

• "Gearing Up for Asia With the Text Services Manager and TSMTE"—Supporting the Text Services Manager (TSM) allows your application to transparently make use of the wide variety of text input methods required by 2-byte languages like Chinese, Japanese, and Korean. And TSMTE makes support of TSM a simple matter.

• "High-Performance ACGIs in C"—Most simple ACGI (Asynchronous Common Gateway Interface) programs are written in AppleScript, but for greater speed or for handling more than one request at a time, a high-level language like C is more suitable. This article presents a C shell that you can use to build your own high-performance ACGIs.

• "Using Newton Internet Enabler to Create a Web Server"—The Newton Internet Enabler (NIE) lets loose a flood of possible applications by bringing the industry-standard TCP/IP protocol stack to the Newton platform. A working web server illustrates the details of using NIE.

And that's not all. You'll also find columns on how to make the most efficient use of memory in OpenDoc, the right way to send PostScript™ files to a LaserWriter printer, and how and when to interact with the user in

please turn to page 16

Reference Library Edition, March 1997

The content of the Developer CD Series has expanded greatly since the first Developer CD was launched at the 1989 Worldwide Developers Conference. (You may remember Phil and Dave's Excellent CD!) The content has increased so much, in fact, that I find myself acting as content juggler, removing material or moving it around to make room for more stuff. For instance, I did have to temporarily pull the QuickDraw GX Library from this edition to free some space; however, keep in mind that you can view the books in HTML or download Adobe™ Acrobat files directly from the web at **http://devworld.apple.com/dev/techsupport/insidemac/**.

Now that I've completed one rotation of the series (SDK, System Software, Tool Chest, and, now, Reference Library editions), it's quite clear that I must embark on a mission for more space so that we can include all of the incredible material we have around here for developers. Now let's take a look at the new and revised packages for the March 1997 Reference Library CD. . . .

Apple Game Sprockets

Apple Game Sprockets are Apple's solution for developers writing games on the Macintosh. They include NetSprocket, for network games; InputSprocket, for joysticks and other game devices; DrawSprocket, which provides access to page flipping and double buffering in a single API (application programming interface); SoundSprocket, for 3D sound; and RAVE, a low-level layer for 3D game developers interested in hardware acceleration.

This Game Sprockets package has a new version of InputSprocket (1.1), DrawSprocket (1.1GM), and NetSprocket (1.0.3). All other sprockets are unchanged.

Note: The current versions of these sprockets run only on PowerPC processor–based computers.

ATA Demo*f*

This ATA Manager sample scans the ATA (AT-Attachment) bus and gathers info on ATA devices, such as ATA hard disk drives (sometimes referred to as *integrated drive electronics drives* or *IDE drives*) and ATAPI (ATA Packet Interface) devices.

develop Issue 29

This is the electronic version of *develop, The Apple Technical Journal.* For highlights of articles in Issue 29, see "*develop* Issue 29: QD3D, TSM, ACGIs, and NIE" on this page.

Developer Notes Update

This folder contains descriptions of new hardware and software features, comparisons with existing computer models, and information on expansion card design. This month, Developer Notes Update features the following new notes:

• *ATA Software Guide.* This developer note describes the system software that controls ATA (AT-Attachment) devices, such as ATA hard disk drives (sometimes referred to as *integrated drive electronics drives,* or *IDE drives*) installed in a Macintosh computer. This note also provides information for ATAPI (ATA Packet Interface) CD-ROM and PCMCIA devices.

• *Macintosh PowerBook 3400.* This note provides a concise description of the Macintosh PowerBook 3400 computer, with emphasis on the features that are new or different from those of the Macintosh PowerBook 5300 computer.

• *PowerMac 5500 & 6500 Computers.* This note describes the main logic board used in

please turn to page 16

Design Now for the Future

By Peter Bickford

For those who want to become Famous Interface Designers, I've always thought the best advice is to (1) never actually design a real product, and (2) avoid making predictions about the future. Do either, and you're just setting yourself up to look silly. Having already messed up on the first count, I figured it was time to throw caution to the wind and seal my fate. This month, I'm going to get out the Magic Eight Ball and make a few predictions about what will change, what will stay the same, and what you should be doing about the future of human interface design.

Of course, certain things require no guesswork at all; otherwise, the "trained psychics" on those late-night 900 telephone lines would be forced to look for day jobs. Sometime in the future there will be more flooding along the nation's waterways. The influence of the Internet will continue to grow, causing more and more business to create ill-conceived ads featuring web site addresses. The average speed of computers will continue to double every year or two, and my mother will call me approximately every four months to wonder why the computer she "just bought" is practically obsolete. The press coverage of next year's MACWORLD Expo will once again express worry about the demise of Apple, while marveling at the 80,000 or so people attending and all the neat new products on display. And the next version of MegaWrite Professional will ship late, require more memory and a faster computer, and be billed as (among other things) "having dozens of new features to make your life simpler."

Anyone who has even a passing familiarity with our industry can predict all of these things. If you really want to test the folks at your favorite psychic telephone service, ask them about product forecasting or operating system strategies. I'd *definitely* pay $3.99 per minute to hear those answers.

Here, then, are my predictions for the years ahead.

Human Limits Will Remain the Same

The basic "platform" we will be developing for—that is, the users—will not be substantially upgraded in the years to come. Sure, we'll hear some talk about vague improvements in the distant future, but the truth is that our users' own memory, processing speed, and reaction times aren't likely to be significantly better than they are now. In fact, the sheer overload of information they'll be forced to deal with may actually make some of their specifications, such as attention span, worse than they are today. Improvements on this basic platform come only as a result of evolution. And it takes evolution even longer to make upgrades than it does for the local cable company to add the Sci-Fi Channel to its standard lineup.

We need to start designing with these limitations in mind. For those of us who have no life outside computers, it's not that big a deal to master the hundreds of new toolbar icons, menu items, and assorted tricks that go with moving from one version of a program to the next. More casual users, however, will find it harder to keep up, and will give up instead.

In many cases, the majority of our users are not using a majority of their applications' features. Refusal to upgrade is becoming a more common (and often sensible) alternative. If we want to win new customers over and keep our current customers on board, we've got to balance the urge to create new features with the need for greater simplicity and elegance. Unless we can do this, we'll just build software that won't run on our target platform.

Human Nature Will Not Change

No matter how many years you go back into history or forward into the future, I suspect you'll discover that people have the same basic traits. Although we sometimes wish it weren't so, human nature includes being forgetful, greedy, curious, lazy, and sense-driven—and never reading the darn manual.

The most successful product designers take human nature into account from start to finish. Their products appeal to the senses as well as to the intellect, and they seduce their customers into using them. These designers know that unless users can accomplish something interesting within a few minutes of encountering the product, they're unlikely to come back. Successful products give help as it's needed instead of expecting the user to plow through a lengthy (or even a short) instruction manual to find answers. Instead of punishing an error with a "you dummy" alert message, these products try to correct for the error, or better yet prevent it in the first place. All of these qualities can be found in the best luxury cars, ultra-high-end stereo equipment, and virtually every successful game in the local arcade.

Technology Will Change, and Change Quickly

The form is hard to predict, but technological change at astonishing speed and scale is almost a given. The old yardstick of "Gordon Moore's law"—that computer speed and memory seem to double every 18 months—has proved surprisingly accurate. A similar law seems to govern the growth of the Internet.

The interesting part comes when the sheer scale of increase brings about changes in the medium itself. It's not a coincidence that modem speeds increased alongside the growth in the Internet's popularity. Faster speeds and other changes made it possible to commonly transmit graphics as well as text. This in turn opened up the Internet to a legion of users who wouldn't have realized its possibilities before. In the same way, users' methods for handling file system storage and directories became very different when the Find File utility became ten times faster, or when the Alta Vista Internet search engine could search terabytes of data in seconds. Now, it's not nearly as important to know a piece of information's precise location as it is to know how to find the information when you need it.

The Future Will Be Media-Rich

The current state of the Internet is a throwback to the past that can't possibly last. The entire history of communications has been a story of first getting the technology to work at all, then steadily increasing the "bandwidth" and the richness of what can be conveyed with it.

The telegraph, with its Morse code, capital letters, and lack of punctuation marks, naturally gave way to the Teletype and the facsimile machine. Black-and-white television gave way to color, which will in turn give way to HDTV (high-definition television). Computers, once limited to typing capital letters on streams of paper, first gained a full range of ASCII characters, then fonts, then graphics, and can now produce and transmit the most detailed page layouts or subtle illustrations.

Periodically, we go through a time of adjustment wherein a new but crude technology that promises a greater audience is substituted for an older, slower, but more expressive technology. An example is the introduction of movable type on a Gutenberg press, which temporarily displaced both woodcut type and the gorgeous illuminated manuscripts that were hand-copied through years of monastic labor. Although the expedience of movable type won the battle, the need for richer expression eventually brought improvements in printing that allowed printed documents to reproduce the same artistry and quality that had been there before.

We are seeing the same phenomenon at work with the Internet. While some may bemoan the expense of downloading graphics and praise the "purity" of all-text communication, the overwhelming tide has been toward making Internet communication as rich a medium as more traditional communications off the 'net. SGML (Standard Generalized Markup Language) gave way to HTML (Hypertext Markup Language), which was then extended far more quickly than any governing body or standards organization would have allowed. Recently, web publishers gained the ability to write in different fonts. Next will come real WYSIWYG (what you see is what you get) placement of type and images, like the page layout programs of today. I expect that in a relatively short time, even Internet e-mail will come to grips with curly quotation marks, em dashes, and the need to spell the names of Swedish scientists without mangling the diacritical marks.

The Future Will Be Personal

If you walked into a grocery store to buy a comic book 20 years ago, chances are you'd find it on a rotating rack along with a few dozen other comics—assuming the grocer stocked every title then being published. Today, you have five or six hundred comics to choose from every month, and you'd probably buy them from a comics specialty shop. The grocery store, meanwhile, is likely to be stocking two or four times the number of products that it carried a generation ago.

All of this, of course, is not due to a huge rise in demand for either comic books or groceries. In fact, the total number of comics sold today is far smaller than the number sold 25 years ago. The trend at work here is not increased production but *increased segmentation.* The magazine rack at the supermarket tells the story well: Whereas it once contained a few dozen general-interest magazines, it's now likely to be filled with over a hundred smaller publications devoted to the intricacies of needlepoint, bass fishing, or sports-card collecting.

You can expect to see the same trend in computer software. Instead of a few general-purpose machines being available from a manufacturer, computers will increasingly be sold for multimedia use, for home use, for business use, and so on. "Dinosaur" productivity suites will continue to sell, but the total market dollars will increasingly be scooped up by software packages that are targeted at a specific class of users. Even such hobbies as genealogy are seeing major competition among different software packages. To win in the software field will require aggressiveness, a keen knowledge of your users, and the ability to cater to their particular needs.

This won't be a business for the faint of heart or the lazy developer. With the general market being divided up more ways, it will become attractive for large companies to go after smaller categories in search of profit. Expect that your customers will have their choice of products, and that they will only stay with yours if it's truly the best in its class. As always, your best defense against predators is to lock up your customers' loyalty with product excellence.

Design for the Future

Those are some of the bigger trends I see on the horizon—and whether you agree or disagree, I hope they give you some idea of where you want to go today, in order to get where you need to be tomorrow. The important thing to do is to get started. As one wit had it: "When the parade comes to town, you can race around to the head and lead it, you can start your own parade, but if you wait until the parade's gone by, you usually wind up cleaning up after the elephants."

Or, as Alan Kay, the master of interface design, said it best: "The best way to predict the future is to invent it."

Till Next Time,
Doc

Peter Bickford is a human interface senior scientist in Apple's Developer Consulting Group. Send him your interface questions and comments at bickford@apple.com.

Mac OS Compatibility on Rhapsody

To ease transition issues for customers and developers, Apple's next-generation operating system, Rhapsody, will include a compatibility environment that will support Mac OS applications and system extensions. Apple will accomplish this by hosting a complete implementation of the Mac OS run-time environment on the Rhapsody infrastructure, using the latest Mac OS source code and ROM image (that is, the actual machine code contained on the ROMs in a Mac OS–based computer).

While the majority of Mac OS–compatible software will work in this environment, some software will need to be rewritten for Rhapsody—for example, software that interfaces directly with hardware, as well as software that depends on some areas of the system that have been tightly integrated with the NeXT OPENSTEP environment. This situation is a significant improvement over the compatibility strategy for Copland, Apple's earlier operating system project, in which all previous system extensions were rendered obsolete and application compatibility was lower.

This article outlines Apple's plans and expectations based on extensive internal review and comparisons with related products previously shipped by Apple, such as Macintosh Application Environment (MAE), an implementation of the Mac OS for computers that run the UNIX® operating system. Please note that detailed specifications are still being developed.

Benefits for Customers and Developers

Adding Mac OS compatibility to Rhapsody has several important benefits:

- Apple customers can continue to adopt new Mac OS–compatible hardware and software solutions throughout the transition to Rhapsody.
- Mac OS customers can enjoy the new capabilities of Rhapsody, while continuing to use their Mac OS software.
- Most Mac OS customer investments in both hardware and software will be preserved.
- The performance of I/O-intensive Mac OS software will improve on Rhapsody, compared with the then-current Mac OS (that is, the version of the Mac OS that's current when the Mac OS–Rhapsody integration takes place).

Mac OS Compatibility Overview

Apple's goal is for Rhapsody to support Mac OS software through a Mac OS compatibility environment. This environment will be a complete implementation of the then-current Mac OS, hosted on the modern operating system infrastructure provided by Rhapsody. Note that this is not an emulation layer.

The Mac OS compatibility environment will be based entirely on the same source code and ROM image as Apple's Mac OS. This will allow the Mac OS compatibility environment in Rhapsody to quickly inherit improvements to the Mac OS as it evolves.

Because this compatibility is provided by a complete Mac OS implementation, the environment will support both 680x0 and PowerPC processor–based software. This includes the vast majority of Mac OS applications as well as most system extensions. To ensure the overall stability of Rhapsody, applications and extensions that interface directly with hardware will not be supported.

The compatibility environment will be implemented as an OPENSTEP process managed by the microkernel of the operating system. In this way, the compatibility environment will realize the benefits Rhapsody provides, such as modern PowerPC virtual memory system, file system, and networking services. Because each OPENSTEP process will be completely memory-protected, the compatibility environment will be protected from malfunctioning OPENSTEP applications. Perhaps more important, the operating system and OPENSTEP applications will be protected from malfunctioning Mac OS software that may cause the compatibility environment to crash. Such problems will not affect other elements of Rhapsody, and the user can restart the Mac OS compatibility environment without restarting the whole system.

Apple will support the ability to start up either Mac OS or Rhapsody on a single Mac OS–based computer.

The Mac OS compatibility environment will evolve through a series of Rhapsody releases. While the initial version will provide only basic compatibility services, subsequent releases will improve integration and compatibility with the full suite of Mac OS services.

Mac OS Compatibility Details

The following sections outline the details of Apple's goals and objectives based on current plans formulated through extensive internal review. Please note that specific technical details are still under development.

Implementation

Within Rhapsody, Mac OS compatibility will be implemented as a single OPENSTEP process. In the compatibility environment, all applications and system extensions will share a single preemptive thread of execution and the address space of this process—an approach that provides a high degree of compatibility and stability. A Mac OS application crash cannot affect OPENSTEP applications or other elements of the system, even if the application crashes the entire Mac OS environment. For example, even if the Mac OS environment crashes, network connections used by OPENSTEP applications will remain active.

For Rhapsody to provide this high degree of compatibility and stability, Mac OS software will not be permitted to access OPENSTEP services. However, the two environments will be able to communicate through Apple events.

What Will and Won't Work

The Mac OS compatibility environment will support Mac OS software that does not interface directly with hardware and does not manipulate certain system services that are shared with the OPENSTEP or core operating system environments. These restrictions are necessary to ensure the stability and performance that Rhapsody offers.

Most applications, plug-ins, and desk accessories will work, including productivity, publishing, and Internet applications. Examples of applications that may not work include scanner, sound, and video applications that directly manipulate input devices.

System extensions (INITs) that interface directly with hardware will not work. Also, extensions that patch system services that are expected to be universally available cannot work. For example, a Mac OS extension that provides file compression services patches the Mac OS File Manager to intercept all attempts to access the file system. However, software outside the Mac OS compatibility

environment will access the Rhapsody file system, bypassing the file compression software that is implemented by patching the Mac OS File Manager. This situation would cause inconsistent data and potentially dangerous behavior. Extensions that do work will affect only the Mac OS compatibility environment—for example, a Mac OS extension that modifies the appearance of windows and menus will affect only the interface in the Mac OS compatibility environment.

Control panels (of type 'cdev') and Chooser devices (of type 'RDEV') that contain INIT resources fall into the category of system extensions, described above. Other control panels and Chooser devices should work correctly.

Installers, fonts, sounds, sound sifters, and sound and video compressors/decompressors (codecs) should work with the Mac OS compatibility environment. User Authentication Modules (UAMs) that work in conjunction with AppleShare, Translation Manager translators that work with Macintosh Easy Open, and Apple Shared Library Manager (ASLM) libraries should also work.

Network and serial-based printer drivers that don't interface directly with hardware should work. This applies to most printer drivers, as they generally make use of system networking and serial services.

Drivers that interface directly with hardware won't work; however, software-only drivers, such as utilities for mounting disk images, should work. Most SCSI and Apple Desktop Bus (ADB) devices should work, including ADB-based copy-protection devices (sometimes called "dongles").

File System Manager (FSM) and Foreign File Access (FFA) modules—such as Macintosh PC Exchange and modules that provide CD-ROM support—may continue to work, depending on their implementations. However, most services that would use these modules will be provided to the Mac OS compatibility environment by the core operating system and will be available in both environments simultaneously. Any services that aren't provided by the core operating system but are provided by Mac OS–compatible software will be available only in the Mac OS compatibility environment.

Text Services Manager (TSM) modules—such as input methods for Japanese, Chinese, and other languages—may require modification, because the Mac OS event system must be modified to support integration with the OPENSTEP environment.

Debuggers will require some modification in order to work with the Mac OS compatibility environment.

Most Mac OS applications, plug-ins, and desk accessories will work with Rhapsody, but drivers that interface directly with hardware won't work.

System Services

Networking services within the Mac OS compatibility environment for serial, AppleTalk (including the Chooser), and TCP/IP connections will be provided through Open Transport. Network and serial-based printing will also be supported.

In the user interface, virtual memory will appear to be turned off for software in the Mac OS compatibility environment. However, because this environment is implemented within an OPENSTEP process, software in the Mac OS compatibility environment will automatically take full advantage of OPENSTEP's high-performance demand-paged virtual memory system.

Interoperability

The entire Mac OS compatibility environment will appear in one window within the OPENSTEP display environment, so Mac OS windows can share the display with OPENSTEP windows. The Mac OS compatibility window will be able to take over the entire display to provide a user experience consistent with running the Mac OS directly. Also, Rhapsody will support multiple monitors as the Mac OS does today. The shared application menu will list all Mac OS and OPENSTEP applications.

Because Mac OS applications will be able to communicate with OPENSTEP applications through Apple events, customers will be able to combine both types of applications to create customized workflow solutions that solve their specialized problems.

Rhapsody will support copy and paste operations between Mac OS and OPENSTEP applications. Drag-and-drop operations will work within each environment, but may not work between the two environments.

Performance

The Mac OS compatibility environment in Rhapsody will meet or exceed the user-level performance of the then-current Mac OS; this performance level assumes that whenever OPENSTEP applications are open in the background, they are not active. The display performance of the Mac OS compatibility environment will be better when the Mac OS occupies the entire display.

Performance of large I/O read and write operations should improve significantly relative to the then-current Mac OS.

Summary

The Mac OS compatibility environment in Rhapsody will preserve customer investments in Mac OS–based hardware and software solutions through a complete implementation of the Mac OS. Apple expects the vast majority of Mac OS applications and most system extensions to work in this environment. ♣

Disclaimer: *This article discusses features and capabilities planned for a future product release, but this discussion does not represent a commitment on the part of Apple Computer, Inc., to provide or ship these features and capabilities. Information is subject to change without notice. Statements in this article regarding Rhapsody and future versions of the Mac OS are forward-looking statements that involve risks and uncertainties, including successful and timely development of future versions of the Mac OS and of Rhapsody.*

CD HIGHLIGHTS

Reference Library Edition

continued from page 11

the Power Macintosh 5500 and 6500 computers and emphasizes features that are new or different from those of previous Power Macintosh models.

• *PowerMac 7300, 7600, 8600, 9600.* This note describes the new Power Macintosh 7300, 7600, 8600, and 9600 models—but only the changes that make the new models different from their earlier counterparts.

Installer SDK Cornucopia 1.0.1

Installer 4.0.6 is now released and licensable. As before, the goal of this SDK (software development kit) is to provide the latest and greatest Installer tools and helpful utilities, as well as to provide a look at where Apple is headed with the tools and the Installer itself. This SDK update includes all the regular great stuff—updated contents from the previous SDKs—in addition to tools and tidbits, a prerelease version of Installer Engine 4.1, and the final version of Installer 4.0.6. Here are some of the update's features:

• Installer application—release and prerelease versions
• Installer tools—compression tools, Installer scripting tools
• Tidbits: nifty stuff for Installer script development
• Up-to-date Installer Developer Interfaces
• Many Installer script examples

Note: Because some items are prerelease versions, they may have some bugs. Prerelease versions are clearly marked as such.

MoreFiles 1.4.5

MoreFiles is a collection of high-level routines written over the last couple of years to answer File Manager questions from developers.

The routines in MoreFiles have been tested (but not stress-tested), documented, and code-reviewed by Apple.

MoreFiles provides the following:

• High-level and FSSpec-style routines for parameter-block-only File Manager calls and for Desktop Manager calls
• Useful utility routines that perform many common File Manager–related operations
• A robust file-copy routine
• A recursive directory-copy routine
• Catalog-searching routines
• Routines for dealing with pathnames

See the file !MoreFiles Read Me for a description of fixes and improvements in version 1.4.5.

OT Server Sample 1.0.1

The Virtual Server is an attempt to provide sample code that uses the native Open Transport API and is complex enough to demonstrate real issues an application developer needs to deal with. It also demonstrates the speed that Open Transport, when used properly, is capable of.

This version of the Virtual Server simply opens a listening endpoint and as many accepting endpoints as you want using TCP. It waits for an inbound connection request, accepts the connection, and hands it off to an accepting endpoint. The accepting endpoint waits for a 128-byte "request" packet, then returns a predefined amount of data from memory to the client. Virtual Server then does an orderly release and puts the endpoint back into its idle queue.

And it's *fast.* Running on Open Transport 1.1.1, a Power Macintosh 7100/80 on a 10-Mbit Ethernet LAN using 8K downloads almost reaches the connection's capacity. If a 200-MHz Power Macintosh is used on the same network with 1K downloads, the server sustains more than 300 connections per second.

OT/PPP Control Strip Sample

OT/PPP Control Strip Sample is a CodeWarrior 10 project that demonstrates how to interact with the Open Transport PPP control point. The control strip sample shows how to determine whether OT/PPP exists and whether it has loaded. This example will set up a PPP control point notifier.

Note that this sample is not complete—it will not issue a connect or disconnect. This capability is planned for the next version.

This sample requires Open Transport 1.1.2 and Open Transport PPP built with Open Transport 1.1.2 includes and libraries.

PC Card Manager v3.0 SDK

The PC Card Manager 3.0 SDK is a comprehensive development environment that describes how the PCMCIA expansion card interface is implemented in the PowerBook 3400 computer (code-named *Hooper)*.

This SDK is the future architecture for upcoming PowerBook 3400 products. If you want to produce PC Cards for the PowerBook 190, 5300, and 1400 series of computers, refer to the PC Card Manager 2.0 SDK. The support offered by the PC Card Manager 3.0 SDK includes system interfaces, a PowerPC library, documentation, and sample code; the SDK requires Macintosh System 7.5.3 or later.

• • •

Don't hesitate to send comments or suggestions for the Developer CD to me at mbest@apple.com.

Meredith Best
Developer CD Leader and Online Content Librarian

---

develop

continued from page 11

response to Apple events. Joe Williams, of the company that created Spaceward Ho, expounds on the concept of "digital karma" as it fits into the company's network game in progress, and two guest puzzlers tackle a tricky dialog-related problem in this issue's Puzzle Page.

There should be plenty in *develop* Issue 29 for your edification and your amusement. So we hope you'll take a look at it on the web at **http://www.devworld.apple.com/develop/**, on this month's Developer CD, or in print if you've subscribed through the *Apple Developer Catalog.* (If you're not a subscriber, you might want to check it out: The extra portability and readability come cheap!) And please, send us your feedback at develop@apple.com; we need to be sure *develop* is working for you.

Caroline Rose
Editor, develop

Business

Traffic-Building Strategies for Web Sites

By Keith Schaefer, Cybernautics

A little over 20 years ago, an unknown country musician named C.W. McCall wrote a song about the then-new technology of citizens band (CB) radio. The lyrics celebrated the freedom of the road and the camaraderie fostered by this new way of communicating. The Hollywood movie industry further fueled the popularity of CB radio by releasing films such as *Smokey and the Bandit.* Seemingly overnight, there was a national obsession with this technology.

In many ways, the Internet phenomenon is similar to the CB radio craze. At Cybernautics—a web design and audience development company—we see many parallels in the evolution of these two technologies. As with CB radio, no single entity is "in charge" of Internet communications; the Internet provides unregulated access to a broad, largely anonymous population of users at a minimal cost; and it takes some forethought to be heard above all the traffic and noise.

CB mania ultimately resulted in absolute congestion of the airwaves. The quantity of communications reduced the quality of communications so substantially that large numbers of people stopped using the medium. We're just beginning to see similar congestion on the World Wide Web. The well-publicized gridlock of America Online servers is a recent example of this trend. And if the CB radio experience is an indicator of things to come, this condition may only get worse.

It's our premise that you have to do more to get your message across than design a web site with glitzy graphics and animations: You need a strategic marketing plan that identifies and communicates with a specific target audience to maximize the effectiveness of your web site.

Getting a "Handle" on the Internet

The establishment and maintenance of a web site—the equivalent of a CB radio "handle" (a broadcast persona)—requires no small budget commitment. Costs can range from just a few thousand dollars to more than a million dollars annually for a highly interactive site. Increasing competition has made it much more difficult to achieve the rate of visitors, or "hits," that warrants that kind of investment. Consequently, some companies have begun to pull the plug on their web sites—in fact, 20 percent this year, according to International Data Corporation (IDC) research.

If the startup costs of a web site are so high, and traffic is increasingly difficult to attract, then why bother? As a developer, you can't afford not to bother, for the following reasons:

- *Your competitors will be doing it.* A study conducted by the Business Research Group (BRG) reported that $20 million in Internet transactions took place in 1993. BRG estimates that by the year 2000, electronic commerce will grow to $30 billion. Forrester Research estimates revenues of $6.9 billion by the year 2000; IDC expects to see an astronomical $150 billion by the same year. No matter which estimate you believe, the fact remains that your customers will increasingly purchase products over the web, and if your Internet-selling infrastructure is not up and running, you'll lose sales to your competitors.
- *Your hottest prospects will be shopping on the Internet.* It's estimated that 20 million people are online today, and Morgan Stanley boldly predicts that 152 million Americans will be using the Internet by the year 2000. Statistically, the average Internet user offers demographics that Apple developers should find desirable: the majority of Internet browsers are in their late thirties, they have high levels of education, they buy a lot of software, and they have plenty of disposable cash. Though some of these users are lured to the Internet for its potential to inform and entertain, fully half use the Internet for business purposes—and their numbers are growing rapidly.

The Internet's potential to revolutionize communications and commerce has persuaded hordes of companies to set up shop in "cyberspace." For developers, there's so much near-term business on the Internet, you simply cannot afford to ignore it.

Avoiding a "Field of Dreams" Web Site

Today, the most frequent response to Internet competition is to make a web site more attractive. Thousands of dollars are spent on adding new graphics and animations, shortening download times, and tweaking back-end technologies. At Cybernautics, we call this the *build-it-and-they-will-come* approach, popularized by the movie *Field of Dreams.* This approach assumes that if a company builds a cool web site, target customers will find it telepathically, just as paying customers in *Field of Dreams* made their way to the magical baseball field hidden in an Iowa cornfield.

Good design and solid content are still essential to any successful web site, but companies must also realize that the key to web site success is to *actively market the site to prospects.* If you don't aggressively draw "web surfers" to your web site, it doesn't matter how nice the page looks.

Your challenge can be quantified in this way: At this moment in time, there are approximately 300,000 sites on or linked to the World Wide Web, and another 3,000 sites are launched every week. Not more than 18 months ago the most popular Internet search engines—Yahoo and Lycos—carried only three or four web sites per category. In the past, simply listing the site with one of these search engines produced thousands of hits per month. Today, most categories list 200 or more web sites, and it has become easy for a web site to get lost on the "information superhighway." Even the major Internet search engines have mounted

advertising campaigns to raise visibility and differentiate their products.

Web Site Marketing 101

Effective web site marketing requires a true understanding of the intricate structure of the Internet and how you can use it to your advantage. At Cybernautics, we've developed a methodology for web marketing that starts with a compelling web site design, then is followed up with a systematic promotion of that site throughout the World Wide Web. This synergy between design and marketing has produced some impressive results—our clients typically see a 335 percent increase in the average number of site visits after applying our methods.

After a web site is designed, we begin an aggressive marketing program for that site. Our objective is to make the site ubiquitous on the web. In other words, we see to it that links, information, and inducements to visit our client's site appear wherever target audiences browse.

We usually begin a web project using search engines and directories to identify and target online groups according to user demographics and interests. We then link the client's site to other sites that these target audiences frequent. This careful targeting of audiences is an important step in effective web site marketing: It not only generates a high volume of visits, but it also increases repeat visits to the client's web site. The process is time consuming, demands constant attention, and requires a true knowledge of how the Internet works and is evolving. This approach produces results that can help a company sell more products, convey information to larger audiences, or simply improve the market's perception of the company.

Planning Your Web Site "Blitz"

Web site marketing requires a significant effort, and we have found that a successful program requires the use of several online communication channels. These channels range from quantity to quality in the bulleted list below. All of them ultimately enable the professional communicator to take advantage of the true power of the Internet—one-on-one relationships.

• *Optimize search engine and index links.* Search Engines and Indexes are, in essence, the "Yellow Pages" of the Internet. At Cybernautics, we maintain a database of more than 350 directories in which information about a web site can be posted. When a new site is launched, we "blitz" these directories with information through e-mail *and* phone calls to ensure that the site gets listed. Placing a single link to a directory is not enough: You need to link the site to several key subcategories within the directory.

Once the site is posted, the work is only just beginning. Directories have a tendency to drop listings during reindexing, so it's important to periodically recheck them. There are also a few secrets in web page design that can help you take advantage of how the search engines operate. For example, by highlighting keywords on a web page with HTML "meta tags," your site will appear first in searches that use Lycos or Excite search engines.

Our clients typically see a 335 percent increase in the average number of site visits after applying our methods.

• *Pitch your site to the online media.* A media site can be an online newspaper, the online extension of a print magazine, or an Internet-only "e-zine." In the same way you use traditional media publications, you can use "cyber-coverage" to leverage the relationships and credibility that publications have with their readers. We've identified more than 4,000 of these electronic publications on the Internet, and we regularly target them for web site alerts and activity updates.

• *Lobby for attention on award sites.* There are more than 300 sites on the web that are updated daily with tips on new and interesting sites to visit. Many even provide reviews, awards, or "cool site of the day" lists. We've found that a listing or award on one of these heavily trafficked sites can dramatically increase the number of visitors to a site.

• *Orchestrate a "cybercafé" promotion.* Marketers have long used in-store promotions to boost sales. The Internet offers an equivalent to a storefront, typically called a "cybercafé." Cybercafés are, in their most popular format, coffee shops with high-speed Internet and game terminals set up for visitors. Some are sole proprietorships, and others are part of a national chain. By building relationships with these cybercafés, you can gain valuable exposure and sales through in-store promotions, listings on café menus, and online or on-site events.

• *Leverage newsgroups.* One factor driving the popularity of the Internet is its ability to create a sense of community among users with common interests and objectives. These virtual communities often communicate through newsgroups, and we typically identify 50 to 100 related newsgroups for each client's target audience. Right now there are more than 200,000 Usenet newsgroup postings per day, a fourfold increase over two years ago, and the average newsgroup receives between 15 to 20 postings per day.

Newsgroups represent a powerful resource for raising site awareness, but be aware that it's crucial to learn about a group's focus and rules of "netiquette." A simple netiquette faux pas or off-topic message can undermine an otherwise well-organized marketing program.

• *Research and link to affinity sites.* The web has been called the world's largest vanity press, because anyone can self-publish information about a product, industry, or area of interest. "Affinity" sites are web areas that attract your target customers, even though they may not be directly related to your product or market. (For example, Apple found that the demographics of its target customers closely matched that of BMW automobiles, so it initiated a joint promotion that linked the companies' web sites together.) Finding these sites requires some custom research, but taking advantage of this angle can yield a handsome payoff.

• *Post to mailing lists.* Internet mailing lists deliver focused news and information right to subscribers' electronic mailboxes. Because subscribers select the topics they're interested in, these users can be accurately defined and targeted. This precision results

in a highly effective communication and marketing effort.

Measuring Web Site Success

Measuring the success of a web site is a challenge that all businesses on the Internet face. How success is measured is often directly related to the site's objective. If a site aims to sell products, the primary goal should be to present the merchandise to as many potential buyers as possible, and then get site visitors to buy it. If a site aims to sell space to advertisers, then the goal is to maximize the number of times visitors see ads on a web page—it's what the advertisers pay for.

Counting visitor hits is by far the easiest yardstick, and we have found that the marketing tactics discussed in the previous section produce incredible results. Analyzing the numbers and types of links to your web site is also a useful metric, because it can show whether the popularity of your site is increasing or decreasing. We recommend tracking visitor hits daily or weekly and analyzing links monthly. (See the box on this page for a list of tools that can help you work with these parameters.)

One of the beauties of the Internet is the speed with which customer information can be gathered. Unlike traditional consumer surveys, which can take weeks or months to conduct and evaluate, information is almost instantly available when you set up the right measurement tools. Savvy marketers or site managers stay on top of this information and use it to tweak the content of their web sites, so that they're continually attracting more of their target audiences.

By highlighting keywords on a web page with HTML "meta tags," your site will appear first in searches that use Lycos or Excite search engines.

In the Final Analysis

In the final analysis, it's a good bet that the Internet is not destined to go the way of CB radio. In fact, web content and traffic are not likely to do anything but continue to grow in size, volume, and complexity. But like the CB radio, the value of the Internet will be most keenly enjoyed by those who understand this exciting new tool and are able to use it to deliver on the promise of the World Wide Web—one-on-one contact with customers. ♣

*Keith Schaefer is president and CEO of Cybernautics (**http://www.cybernautics.com/**), a leading web development and marketing firm headquartered in Sausalito, California. Previously, Schaefer served as president of Paramount Technology Group, chairman and CEO of Computer Curriculum Corporation, and executive vice president and general manager of NEC Technologies; he also held an executive post at Atari.*

Tools for Measuring Web Site Success

Here's a list of some tools that can help you measure the success of your web site. For a more extensive list of tools for web page development and maintenance, see the newly updated directory of Mac OS–compatible Internet tools at the Developer World web site **http://www.devtools.apple.com/internet-tools/internet_tools.html**.

Bolero From Everywhere Development

http://www.everywhere.com

This application tracks web site activity and stores user data in an SQL database, making it available for real-time reporting and analysis. Bolero's advanced features can dynamically track the number of users accessing your web site.

Bounce From Net.Dreams

http://www.netdreams.com

Bounce is a WebSTAR plug-in that logs the use of outgoing links on your server.

LogDoor From Open Door Networks

http://www2.opendoor.com/logdoor/

This multisite "log processor" works with your web server to compile individual, real-time log files and web statistics for each site on your server.

SurfReport From Bien Logic

http://software.bienlogic.com/SurfReport/index.html

Bien Logic's Internet tracking software has an easy-to-use interface that enables you to analyze the number of visitors to a web site and the most popular web pages at a site. This statistical analysis package also has a menu-driven interface that makes it easy to create custom reports.

WebMaster Pro From HeyerTech

http://www.heyertech.com

This integrated relational database system for design, testing, and maintenance of web sites also manages workgroup development. It can import, analyze, and archive the contents of any web site in minutes.

Hybrids–How to Tell an Apple From an Orange

SPA Creates New Hybrid Category

By Patty Bing-You
Editor, Apple Directions

When I was a kid, math was simple. You just counted up all the apples and wrote down your total, and then you counted all the oranges and wrote down that total. What you got was, well, what you got.

Enter the hybrid—an uneasy offspring of apples and oranges that is a mixture of multiplatform versions of software in a single package—and math just got a lot harder.

A couple of new surveys confirm that the hybrid is gobbling up retail shelf space faster than you can say, "Mac OS." According to sales data from *PC Data: Macintosh Reports,* total sales of Mac OS hybrid software have been climbing steadily since calendar year 1994 (CY94) and accounted for more than 50 percent of Mac OS–compatible software sales in CY95. A look at recent data confirms that sales of Mac OS hybrids continued to increase in CY96 and, in the second half of CY96, sales of Mac OS hybrids completely dominated the total number of Mac OS–compatible software units sold (see the chart on this page).

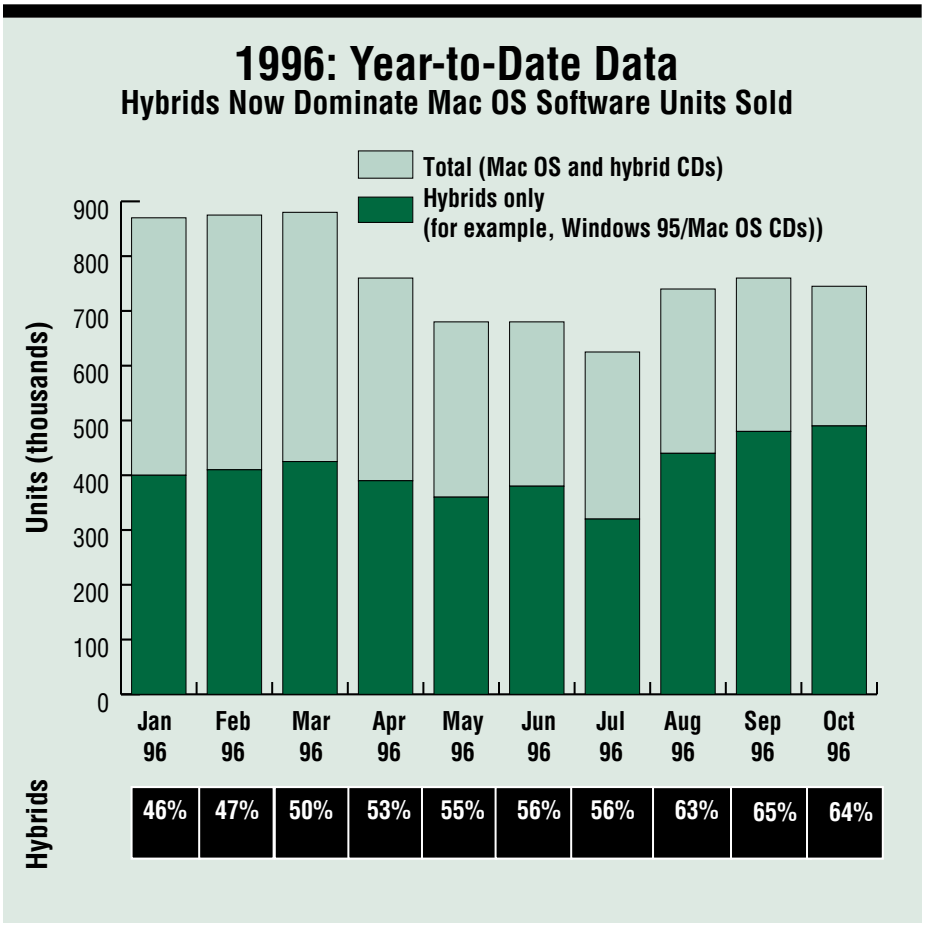
At the same time that Mac OS hybrid software sales have continued to increase, sales of Macintosh computers and Mac OS CD titles have declined. Hybrids have increased from one in five Macintosh software units in CY94 to one in two in CY96; see the quarterly comparison chart on page 21 (source: *PC Data: Macintosh Reports*). According to market research firm PC Data, retail sales of Mac OS software has slipped from 15.3 percent in January 1996 to 11.6 percent in August 1996—while hybrid sales continue to grow.

If this current trend endures and hybrid sales continue their steady climb while Mac OS–only software sales continue to decline, the Mac OS presence in the retail software marketplace could end up an "endangered species." According to an article by Roger C. Lanctot in *Computer Retail World* (**http://techweb.cmp.com/crw/06NEWS1996/mac1024.html**), a new SofTrends study of consumer software purchasing behavior by the NPD Group reveals that the increase in Mac OS hybrids may be skewing the true size of the Macintosh customer base. Phillip Robinson, in his article "Hard Look at Software Titles Available for PCs, Macs" in the *San Jose Mercury News* (**http://www.sjmercury.com/business/compute/phil0105.htm**), points out that "the No. 1 knock against the Macintosh [is] there aren't enough software titles." If this is the perception, what can Apple do to promote the facts—and convince Macintosh customers that the Mac OS is still alive and healthy in the retail software marketplace?

For starters, Apple has been working with the Software Publishers Association (SPA) to set up a new process by which the SPA collects survey figures for sales of hybrid software. This is in response to inconsistencies in the SPA's reported North American sales figures for the first half of 1995, which inaccurately reflected that Mac OS–compatible software sales for the second quarter of 1995 were down 21.1 percent from the same period a year earlier (source: *Macintosh Daily Journal,* October 25, 1996).

The SPA has taken steps to address the inaccuracies in previous survey reports on hybrid sales figures, and beginning in January 1997, the SPA will measure CDs that contain a software title supporting more than one operating system as a "hybrid" unit. "SPA is excited about the new hybrid category," says Jim Sanders, the SPA's director of research. "Hybrid software is now becoming widespread due to the reduction of shelf space and the economies of distribution. This change will improve the quality of measurement in this difficult-to-measure area. Our solution continues our philosophy of using actual sales shipment data."

Clearly, changing the way in which hybrid sales figures are reported is a big step, but this change alone won't solve all of Apple's problems. If, according to Apple's *Q3 1996 U.S. Recent Buyer Survey,* less than half (45 percent) of recent buyers recognize that hybrid software can be found in both the Macintosh and DOS/Windows sections of stores, the customer's perception remains the same: fewer Mac OS titles. And just four in ten (42 percent) recent buyers are aware that some software



developers distribute their programs in just one package, including both the Mac OS and Windows versions in the same box.

With over 60 percent of all Macintosh buyers purchasing additional software for their new computers and more than one-third of these buyers purchasing their software from a retail computer store, the diminishing presence of Mac OS titles in retail shopping aisles is a growing concern for Apple and software developers alike.

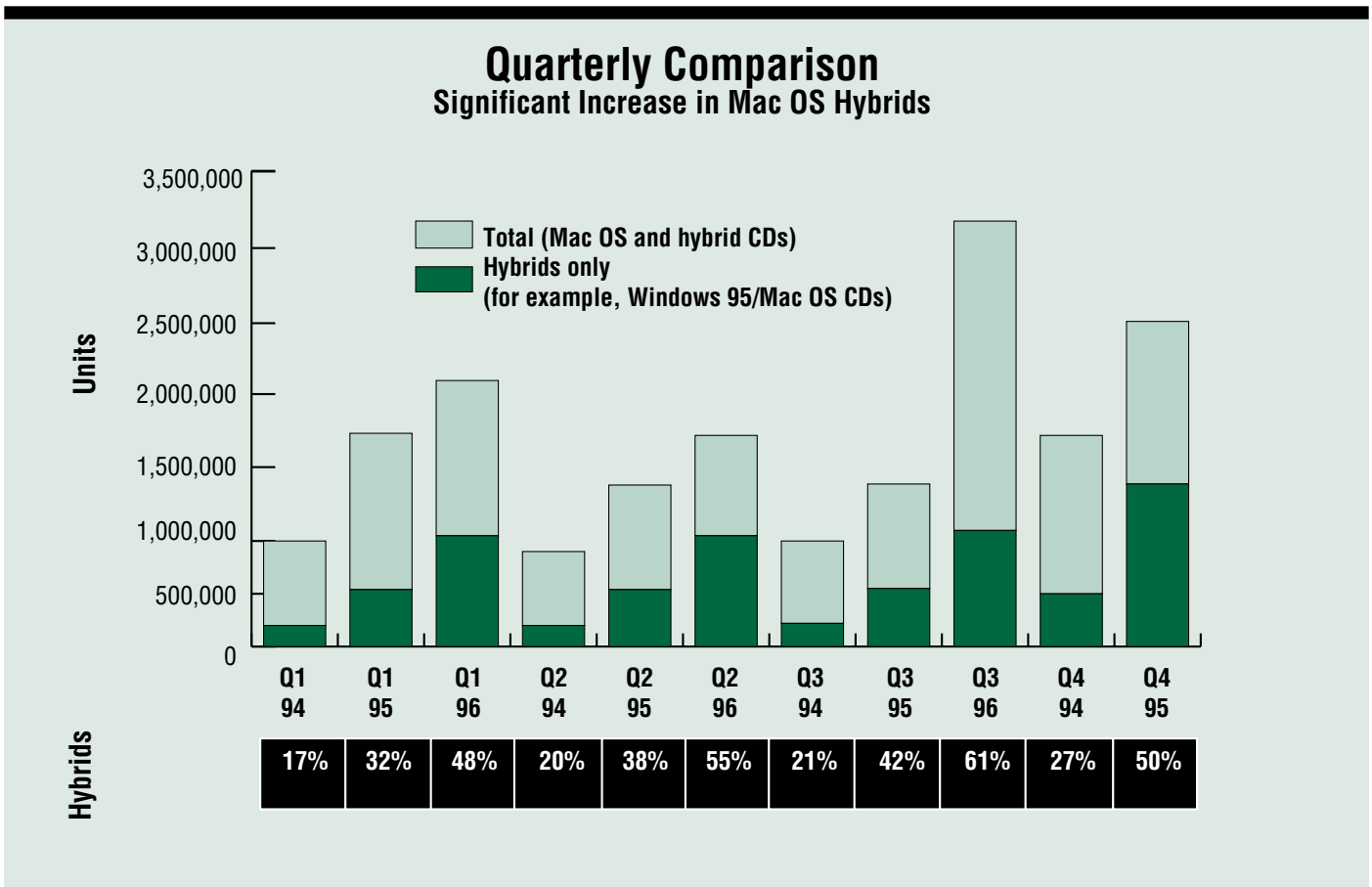
Apple Developer Relations (ADR) is addressing the issue of visibility in retail stores with its marketing campaign "All great software wears this face," which is designed to promote third-party software for the Mac OS by making it easier for customers to locate, identify, and purchase Mac OS software products. The first objective of the campaign, introduced in November 1996, is to help customers identify hybrid titles. Brightly colored "shelf talkers" and "take-one" cards explain what a hybrid is and how to identify all software that runs on the Mac OS. In-store merchandising supporting the hybrid messaging features large banners, posters, and floor decals.

ADR plans to continue merchandising retail locations throughout CY97 with the "All great software wears this face" campaign. In addition, ADR will be working closely with retailers to create permanent merchandising that works best with their store layouts and customers.

The second objective of the campaign is to increase the visibility of selected third-party Mac OS software titles. Apple recently launched an advertising campaign in major consumer publications (including *Southern Living, Martha Stewart Living, Parenting, Money, US News, Computer Life, Family PC, Home PC, Wired, Macworld, Smart Money, Family Fun, Family Life, Entertainment Weekly, MacHome Journal, MacAddict, MacUser, Your New PC, Computing Gaming World, PC Gamer, PC Games,* and *Strategy Plus*) that points readers to the nearest store that sells Mac OS software and to the Mac OS Software and Hardware Guide, a web site database of developer products. (The guide is located at **http://www.macsoftware.apple.com**. Click "Submit a Product" in the main page's upper-left corner to add your products to the database.)

ADR is also encouraging developers to support the "All great software wears this face" campaign by taking advantage of a very affordable "pay-to-play" model, which will allow developers to participate in Apple's Mac OS software channel ads scheduled to run in various issues of *Computer Retail Week* throughout CY97. An earlier ad ran in the January and February issues of *Computer Retail Week;* the headline was "Ten of the greatest post-holiday moneymakers since..." followed by a photo of two AA batteries. The second ad, scheduled for the March and April issues of *Computer Retail Week,* will feature ten software titles in the personal productivity and lifestyle categories.

If, thanks to the hybrid, the Mac OS software market is bigger than meets the eye, Apple needs to make sure that everyone knows it. After all, what good is a hybrid to Apple, if all the consumer sees are fewer and fewer apples, and the sky is raining down oranges? ♣



DEVELOPER SPOTLIGHT

Hanna-Barbera's Quest for a Digital Style Guide

By Kris Dalebout Newby,
Apple Directions *staff*

In the cartoon industry, character licensing isn't just kids' stuff—it's big business. Almost all cartoon producers garner extra revenues and publicity by licensing character images to other companies. These images can end up on everything from burger boxes to T-shirts, and guidelines for their use are typically delivered to licensees in a printed book called a *style guide.* These books include a collection of character artwork, guidelines for image placement and color, and other relevant character information.

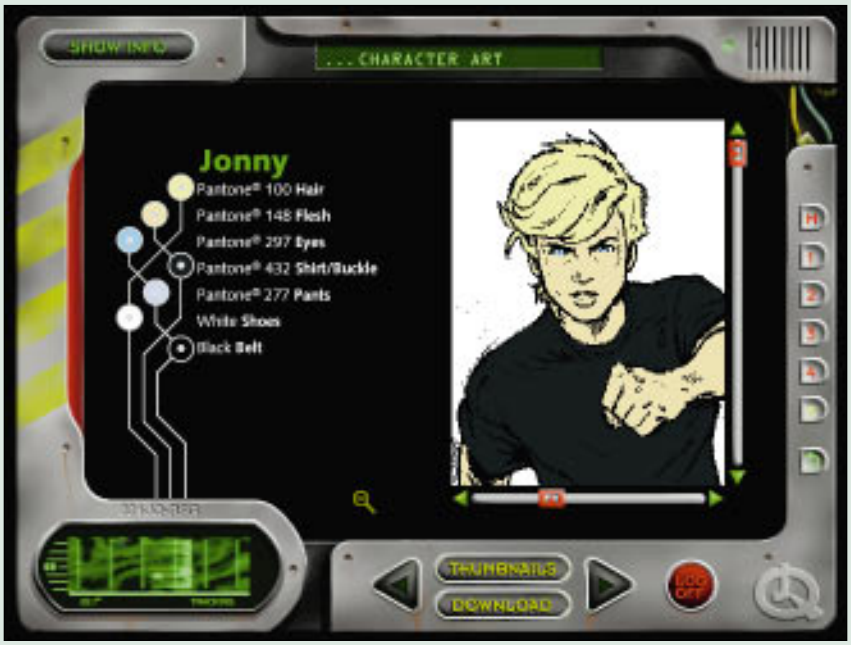
One thing that Mike Schelske, director of business operations at Orbit City Art Company (a subsidiary of Hanna-Barbera) realized was that these paper-based style guides were rapidly becoming the weak link between their creative team and character licensees. Orbit City artists used Macintosh computers to create cartoon characters for Hanna-Barbera, but once they published the character images in paper style guides, licensees were burdened with the error-prone process of scanning to load them onto their own graphics workstations.

As Orbit City prepared art images for the launch of the updated *Jonny Quest* animated series, Schelske and Russell Hicks, Orbit City's vice president of creative development, decided it was time do things differently. This time they'd publish the licensing industry's first-ever CD-ROM–based *digital* style guide.

"Intuitively, we knew that creating a digital style guide would save everyone involved time and money," said Schelske, "but in the past, I'd received quotes of up to $300,000 for such a project. I knew there had to be an easier way. We found it when some people at Apple Computer introduced us to Apple Media Tool and Christopher Deppe of TSE International."

The Ease of "Revving" Virtual Engines

Deppe was running TSE International, a development firm based in Berkeley, California when he was introduced to the *Jonny Quest* team. His expertise in designing powerful multimedia databases was perfect for the project. After several rounds of discussions, Deppe and Schelske came up with a proposal that



The new *Jonny Quest* digital style guide is helping Hanna-Barbera reduce guide revision costs and speed up product approval cycles.

TSE International
Berkeley, California

TSE International specializes in the development of new media titles and technologies. Founder Christopher Deppe's proprietary run-time framework and database technology is used by many clients to cost-effectively create database-driven media titles.

Media samples

- Send e-mail requests to cdeppe@tseint.com or call 510-525-0532.

Toolbox

Hardware

- Power Macintosh 6100, 48 MB RAM
- Power Macintosh 9500, 48 MB RAM

Software

- Adobe Illustrator
- Adobe Photoshop
- Apple Media Tool
- Apple Macintosh Programmer's Workshop (MPW)
- Custom C source-code database engine

Apple Media Tool Benefits

- *Ease of learning.* Apple Media Tool enables nontechnical people to create sophisticated multimedia content without having to learn programming.
- *Collaboration.* Apple Media Tool's ease of use promotes collaboration between artists and programmers.
- *Development speed.* Apple Media Tool's intuitive media browser facilitates shorter development cycles.
- *Reliable cross-platform porting.* Moving a Macintosh-based project to the Windows platform is fast and reliable.

For more information, see the Apple Media Tool web site at **http://www.amt.apple.com**.

would make digital style guides a cost-effective alternative to paper guides.

"By developing a dedicated run-time framework coupled to a back-end media database, I knew I'd be able to create a style guide engine that could be reused for future projects," said Deppe. "Up-front costs would be fairly high, but future guides could be done quickly and inexpensively with minimal programming."

According to Deppe, the biggest challenge in creating this digital style guide was the schedule: "We had committed to delivering the CD to the New York Licensing Show, and there was no turning back. We had six weeks to teach Orbit City artists Apple Media Tool, resize printed guide images into my database format, build the style guide framework, and ship the CDs."

At the start of the project, Deppe spent most of his time creating the style guide engine and production tools, laying the groundwork for efficient guide revisions. His engine, which was developed primarily using Apple's MPW development environment, was built with a lot of object-oriented and shared Apple Media Tool code. At the core of the engine was his own database-driven guide framework. It was designed so that media elements could rapidly move in and out of the interface template as needed, freeing Deppe from creating custom code for every screen. His custom storage routines sped up the swapping process, as the image files had to reside on the CD for copyright reasons.

Apple Media Tool as a Communication Tool

While Deppe developed the engine, Orbit City created interface screens, which included graphics, buttons, pictures, and backgrounds.

"Orbit City has great artists, and I didn't want to encumber them with having to learn a programming environment," said Deppe, "so I created a custom engine for Apple Media Tool that allowed us to communicate with one another. Artists really relate well to Apple Media Tool, because it's a visual tool rather than a programming tool."

Orbit City artists could then design screens with the tools that they were already familiar with—Adobe Illustrator and Photoshop. By using the custom engine, it was then a simple matter for artists to place screen information into an Apple Media Tool project file. Deppe used this file data to create his run-time databases. Because all source and database files were platform-neutral, no additional work was required to create the Windows version. In the end, the project shipped on time and on budget, and it was a big hit at the New York Licensing Show.

A Savings of Eight Weeks and $100,000

Schelske and Orbit City have already begun reaping the rewards of their digital style guide. Because they eliminated the time required for film and plate creation, printing, and binding (it only takes a few minutes to reproduce a CD), they were able to reduce guide turnaround time by about eight weeks. And since they're now delivering character art in a format that's readily usable by their licensees, they've seen a reduction in special artwork requests.

The new digital style guide also minimizes licensee hand-holding and approvals. There are no more scanning questions. And they've eliminated one of the most common reasons for rejecting licensee products—image distortion and line drop-out from improper scanning.

Digital style guides enable cartoon producers to provide higher quality, easier-to-use artwork and media clips to licensees.

Orbit City expects to yield the most dramatic savings as future guides are published: "After we complete the first three or four guides," said Schelske, "we should see a production cost savings close to $100,000 per new style guide. We'll also save on guide reprints. For example, it would normally cost about $80,000 to reprint a guide in a black-and-white format. In the digital format, we can revise a style guide for under $20,000. And because it's so inexpensive to create CDs in low quantities, we can now afford to publish guides for niche properties. Digital style guides are going to help us spend more time in the creative process, and less in the production process," says Schelske. "These guides also let us supply licensees with other media elements, such as video clips and audio tracks."

Schelske and his team are so pleased with the outcome of this project that they're looking toward the next step in the evolution of digital style guides—an Internet-based version. TSE International is also helping them develop three new digital style guides for *Scooby Doo, Wizard of Oz,* and Hanna-Barbera classics, such as *The Flintstones.*

Though Deppe's style guide engine was first used in the cartoon industry, it's easy to see how his custom technology, which essentially combines a powerful media database with Apple Media Tool, could be applied to such uses as corporate identity systems or retail display guidelines. And that's enough to make a creative director stand up like the Fred Flintstone cartoon character and shout, "Yabba Dabba Doo." ♣

Apple Media Tool at a Glance

• **Apple Media Tool (AMT) from Apple Computer.** Winner of *MacUser* magazine's 1993 "Best New Multimedia Product" Eddy Award, this product is an object-based, cross-platform multimedia development tool that uses a screen-map storyboard metaphor. It allows users to quickly and easily drop QuickTime VR, QuickTime movie, PICT, text (RTF), and sound files into a storyboard, then add interactivity using a visual, no-scripting interface. Version 2.1, which was announced in September 1996 (**http://product.info.apple.com/pr/press.releases/1996/q4/960917.pr.rel.mediatool.html**), features extended support for QuickTime VR, expanded user interface control, and the ability to launch applications and web sites from within an Apple Media Tool run-time environment. AMT features and projects can be customized with Apple Media Tool Programming Environment. Titles created with these products can be distributed royalty-free.

• **Apple Media Tool Programming Environment (AMTPE) from Apple Computer.** This object-oriented language and application framework allows programmers to customize features of the Apple Media Tool authoring environment and add functionality to interactive projects created with Apple Media Tool. All code written with this product compiles for both Macintosh and Windows platforms.

Internet Resources for This Issue

News

• Developer World web site—http://www.devworld.apple.com/
• Announcement on Mach microkernel—http://www.devworld.apple.com
• Apple Developer Programs—http://devworld.apple.com/dev/programs.shtml
• Press release on Apple's first-quarter earnings—http://product.info.apple.com/pr/press.releases/1997/q2/970115.pr.rel.q197earning.html
• Dr. Gil Amelio's letter to customers—http://product.info.apple.com/pr/letters/1997/970115.pr.ltrs.amelio.html
• Mac OS 7.6 information—http://macos.apple.com/macos/releases.html
• Mac OS Runtime for Java—http://www.applejava.apple.com
• Castanet from Marimba—http://www.marimba.com
• Pencil Me In from Sarrus Software—http://www.sarrus.com/
• Gregg Williams's "Doin' the Java Jump" article—http://www.devworld.apple.com/mkt/informed/appledirections/dec96/stratmosaic.html
• Gregg Willliams's "OpenDoc and Java Beans" article—http://www.devworld.apple.com/mkt/informed/appledirections/jan97/stratmosaic.html

Technology

• QuickDraw GX Library—http://devworld.apple.com/dev/techsupport/insidemac/
• *develop*—http://www.devworld.apple.com/develop/

Business

• Directory of Mac OS-compatible Internet tools—http://www.devtools.apple.com/internet-tools/internet_tools.html
• Bolero from Everywhere Development—http://www.everywhere.com
• Bounce from Net.Dreams—http://www.netdreams.com
• LogDoor from Open Door Networks—http://www2.opendoor.com/logdoor/
• SurfReport from Bien Logic—http://software.bienlogic.com/SurfReport/index.html
• WebMaster Pro from HeyerTech—http://www.heyertech.com
• Cybernautics—http://www.cybernautics.com/
• Lanctot article in *Computer Retail World*—http://techweb.cmp.com/crw/06NEWS1996/mac1024.html
• *San Jose Mercury News*—http://www.sjmercury.com/business/compute/phil0105.htm
• Mac OS Software and Hardware Guide—http://www.macsoftware.apple.com
• Apple Media Tool—http://www.amt.apple.com
• Apple Media Tool 2.1 Announcement—http://product.info.apple.com/pr/press.releases/1996/q4/960917.pr.rel.mediatool.html

Apple Developer Catalog Ordering Information

To place an *Apple Developer Catalog* order from within the United States, contact Apple Developer Catalog at 800-282-2732; in Canada, call 800-637-0029. For those who need to call the U.S. office from abroad, the number is 716-871-6555. Or, send e-mail to APDA@applelink.apple.com. The *Apple Developer Catalog* is also available online on the web (**http://www.devcatalog.apple.com/**).