



AppleDirections

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APPLE NEWS

Don't Be Invisible: Support the Mac OS Software and Hardware Guide

Now more than ever, it's important for you to ensure that all your Mac OS products are listed in the free Mac OS Software and Hardware Guide (<http://www.macsoftware.apple.com>). Apple wants to make this database the single source that customers and Apple itself will use to find Mac OS products.

See page 13 for important information on Mac OS 7.6.

Why is it so important for you to list your software in the Mac OS Software and Hardware Guide? Here are some good reasons:

- The Mac OS Software and Hardware Guide is currently the most popular content page on Apple's web site (second only to the Apple home page itself). People are looking for Mac OS software, and if you're not listed, they won't find out about you.
- The Mac OS Software and Hardware Guide site is available worldwide, so Mac OS customers everywhere will have access to it.
- The *Macintosh Multimedia and Product Registry*, a guide from Redgate Communications that lists all existing Mac OS products, is ceasing publication. As time goes on, the Mac OS Software and Hardware Guide will be the source that people use to search for the Mac OS products they need.

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STRATEGY MOSAIC

OpenDoc and Java Beans

By Gregg Williams, Apple Directions staff

Apple and Sun Plan to Make Them Work Well Together

In last month's Strategy Mosaic, "Doin' the Java Jump," I talked about Apple's Java strategy, which consists of three pieces:

- To ensure that Apple's platforms (Mac OS, Newton, and Pippin) deliver the best Java experience for both users and developers
- To contribute to the evolution of the Java™ platform
- To integrate Java tightly into Apple system technologies—including the Mac OS, OpenDoc, and QuickTime

In covering these topics, I talked about parts of the Apple/Sun alliance, which had just been announced as I was finishing the article.

Since then, I've been able to gather some details about a topic mentioned briefly in the Apple/Sun alliance press release: the relationship between the component software architectures of Apple and JavaSoft—OpenDoc and Java Beans, respectively.

The text of the Apple/Sun alliance states that "Apple and Sun will work to deliver component interoperability between Sun's Java Beans and Apple's OpenDoc component architectures to provide a full suite of component development services in an open, multi-platform environment." One implication of this statement is that OpenDoc and Java Beans had been two independently conceived, divergent component-software technologies, but that the Apple/Sun announcement marked a commitment by both companies to integrate both of these technologies on the desktop. This is an act that

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Editor

Patty Bing-You (bingyou@apple.com)

Technical Editor

Gregg Williams (greggw@apple.com)

Business Editor

Kris Newby (newby.k@applelink.apple.com)

Associate Editor

Anne Szabla (szabla@applelink.apple.com)

Production Editor/Graphic Designer

Lisa Ferdinandsen (ferdinan@apple.com)

Contributors

Meredith Best, Peter Bickford, Roger Boss

Production Manager

Diane Wilcox

Prep and Print

Consolidated Publications, Inc., Sunnyvale, CA

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OpenDoc and Java Beans

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will make both of them useful in new situations.

This article will cover three separate topics related to OpenDoc and Java Beans:

- How OpenDoc and Java Beans are complementary technologies
- What Apple's and Sun's plans are for making the two technologies work with each other
- How Apple plans to improve the performance of Java software through the use of a just-in-time (JIT) Java compiler

OpenDoc and Java Beans: Complementary Technologies

OpenDoc is, of course, the open, cross-platform component software architecture that Apple has incorporated into the Mac OS. Java Beans, on the other hand, is an extension to the Java language that is used to implement Java-based software components; since these components are written in Java, they will work without modification on any platform that supports Java.

It turns out that OpenDoc and Java Beans are complementary technologies. (See the table on page 4.) Each is good at something the other isn't, and together, they provide a better solution for developers than either technology could by itself.

Java Beans

Java Beans is good for implementing small pieces of component software (called *beans*). These include small interface elements, such as buttons, checkboxes, scroll bars, lists, sliders, and text fields. In this way, it's very similar to Microsoft's Visual Basic.

Java Beans is also good for creating non-visual components that provide services to a developer. One relevant example is an FTP-service component—it has no visual interface, but when the developer passes it the address

of a file available from an FTP site, the component retrieves the file.

One characteristic of a Java bean is that the user can manipulate it (for example, the user can click a button bean) but cannot move or resize it inside its container, add a new button to the container, or change the button's attributes during actual usage. (For example, users can't normally change a button bean's color, but they can while manipulating the button bean within a Java Beans authoring program.) A bean is limited to a rectangular shape, and two beans cannot overlap. In addition, it's very difficult for a bean that contains other beans to draw any content of its own outside the embedded beans.

OpenDoc

Live Objects (which are OpenDoc parts that have passed a certification process set up by CI Labs, the group that sets the standards for OpenDoc) have several characteristics that Java beans don't. Users can move and resize Live Objects within their containers, change a Live Object's attributes, and add or copy new Live Objects with a simple drag-and-drop operation. In addition, Live Objects can have any shape and can overlap.

A more important contrast to Java Beans is that both you and users can use OpenDoc to create larger, component-based solutions. Here are some characteristics of OpenDoc that Java Beans doesn't supply:

- Multilevel undo and redo of actions.
- A document storage model based on Bento, a cross-platform file format that can contain any data type and can store alternate representations of a given data type.
- Versatility in viewing data: Live Objects can store their data in standard formats, which allows the same data in a document to be handled by different editors depending on the user's setup and preferences. A Java bean, on the other hand, has its content inextricably joined to the Java Beans object used to display it, giving the user no choice in how the content can be viewed and manipulated.

January Apple Directions Online

This issue of *Apple Directions* will be available by December 15 on the web at <http://www.devworld.apple.com>.

- Binding, which enables a qualifying part editor (of the user's choice) to activate when the user clicks on a given type of data.

- Embedding, which makes it possible for one user to include a certain data type—for example, a QuickTime movie—in an OpenDoc container document, give the document to another user, and have that other user be able to open the document and see the embedded data type.

Combining OpenDoc and Java Beans

Once the necessary programming infrastructure is built, you will be able to combine Java beans and Live Objects within the OpenDoc artifact to create component-based solutions more quickly than you can with OpenDoc alone.

You can use Java Beans to create interface elements more quickly than you could using OpenDoc. For one thing, the Java language is easier to program in and debug than C++ (the language used to create Live Objects). In addition, you may not need to write your own interface-element beans at all—since beans are inherently cross-platform, there will probably be a developer-to-developer market for pre-constructed, commonly used interface-element beans.

Once you have the Java beans and Live Objects you need, you will be able to combine them within the OpenDoc architecture to create complete, robust component-software solutions.

Getting There From Here

By the time you read this, Apple probably will have released the first commercial version of Mac OS Runtime for Java (MRJ), which implements Java on the Mac OS. (MRJ 1.0 is slated for release by the end of 1996. For details on MRJ's architecture, see last month's Strategy Mosaic, "Doin' the Java Jump," which is located on the web at <http://devworld.apple.com/mkt/informed/appledirections/dec96/stratmosaic.html>.)

MRJ 1.0 allows one form of Java—Java applets—to run on the Mac OS, through the Apple Applet Runner (an application that runs applets) and the Apple Applet Viewer (a Live Object that allows applets to be embedded in OpenDoc containers). MRJ 1.0 allows Java-based applications to be run just like conventional Mac OS applications, and it makes it possible for Mac OS applications to embed, call, and display arbitrary pieces of Java code.

That's today, but what's in the future? Here are two things that are expected to happen within the next 12 to 18 months.

Live Object and Java Bean Interchangeability

Apple and JavaSoft (the division of Sun dedicated to Java) are collaborating to ensure that Live Objects will work within Java bean containers and that Java beans will work within OpenDoc containers.

As described earlier in this article, Java developers will be able to take advantage of OpenDoc features not available in Java. Also, OpenDoc developers will be able to use Java beans for many of their smaller components, thus allowing them to bring solutions to market more quickly and with less effort.

Currently, Apple has identified several ways to make Java beans work inside OpenDoc and is evaluating all of them to determine which will produce the best overall implementation.

Writing Live Objects Using Java

Apple also has its own goal of exposing the OpenDoc APIs (application programming interfaces) to Java in a way that will allow you to write Live Objects using the Java programming language.

By programming in Java and using the Java class libraries—including the Abstract Windowing Toolkit (AWT), a platform-independent API for drawing a component's human interface—it may be possible to create Java-based software components that will run on any platform that adequately supports both Java and OpenDoc.

Apple plans to deliver this new technology for the Mac OS platform and will advocate moving this technology to other platforms. Apple is currently investigating the best way to implement and deliver this technology.

The Need for Speed

As you probably know, Java software works in the following way. Once you've written your software in the Java language, you use a Java compiler to compile it into a file of machine-language-like instructions called *bytecodes*. When the user executes Java software on a given platform, this action invokes the platform's implementation of the Java Virtual Machine, which reads the Java software's bytecodes, translates them into the native code of the processor, and executes the code to perform the actions represented by the

bytecodes. In a simple implementation of the Java Virtual Machine, every time it encounters the same set of bytecodes, it retranslates them into native code.

Most programmers would summarize this process by saying that Java is an *interpreted* language, not a compiled language—and it's common knowledge that interpreted languages run much more slowly than compiled languages do.

The fact that Java is interpreted sends up a warning flag for many developers. "Why," they ask, "should I write in Java if the resulting code is going to be slow?" It's a valid question. (I'll lay aside for the moment the argument that the slower execution time is an acceptable tradeoff for the increased productivity that comes when a developer programs in Java.)

Just-in-Time Java Compilers

Currently, the most promising solution for speeding the execution of Java software is something called a *just-in-time (JIT) compiler*. A JIT compiler is a plug-in that enhances the Java Virtual Machine. Stated simply, a JIT compiler translates a series of bytecodes into the native machine language of the processor running the computer, saves this native code in a cache, and executes the code; when the same bytecodes need to be executed again, the JIT compiler looks up the native code from the cache and executes it again. The technology of a JIT compiler is very similar to that of the second-generation dynamic-compilation 680x0 emulator that Apple currently uses in its Power Macintosh computers.

How much can a JIT compiler increase the speed of Java software? The amount of speedup varies with the type of instruction being executed—for example, pure Java code that doesn't make heavy use of Mac OS routines benefits more from a JIT compiler than code that does. However, here's one data point: I saw a Java benchmark suite run on the current beta version of Mac OS Runtime for Java (which includes a simple Java Virtual Machine) and on an alpha version of an upcoming MRJ that includes a JIT compiler; the JIT compiler version executed the benchmark suite 12 times more quickly than the simple Java Virtual Machine version did.

How does the performance of Java software running under a JIT compiler compare to that of conventionally compiled code? At this point, we don't know. Some research on JIT

A Comparison of Java, Java Beans, and OpenDoc

Feature	Java	Java Beans	OpenDoc
Drawing	•		
Platform independence	•		
Security	•		
Lightweight embedding	•		•
Lightweight layout	•		•
Lightweight data interchange		•	•
Lightweight persistent storage		•	•
Visual property editing		•	
Simple scripting		•	
Sophisticated OSA (Open Scripting Architecture) scripting			•
Undo			•
Palettes			•
Shared menus			•
Replaceable editors			•
Arbitrary embedding			•
Sophisticated layout			•
Rich data interchange			•
Structured persistent storage			•
Language neutrality			•
Based on open standards			•

compilers indicates that in some cases, Java code executed by a JIT compiler can execute more quickly than C++ code because of the optimizations that the JIT compiler can make (at run time) that a C++ compiler can't. On the other hand, some engineers believe that

the overhead of the first compilation of Java code by a JIT compiler will always make such code execute somewhat more slowly than C++ code.

The bottom line about JIT compilers is that a number of companies, Apple included, are

working hard to ensure that JIT compilers give the best possible performance when compared to C++ compilers. Apple's goal is to make the performance of Java software so close to that of conventionally compiled C++ software that users will not perceive whatever speed difference exists between the two.

As I said earlier, Apple is working on an enhanced version of Mac OS Runtime for Java that includes a JIT compiler. Apple plans to deliver this new version first to developers, then to customers, both in the first half of 1997.

Conclusions

Though implementation details are yet to be worked out, the most important statements in this article are that

- OpenDoc and Java Beans are complementary architectures and that you can use them together to create component software more quickly and easily than you can today
- Apple and JavaSoft are collaborating to ensure that Live Objects will work within Java bean containers and that Java beans will work within OpenDoc containers
- Apple plans to expose the OpenDoc APIs to Java in a way that will allow you to write Live Objects using the Java programming language
- Apple will use just-in-time Java compilers to make Java as viable a language as C and C++ for writing commercial-quality software

What does this mean to you? It means that, in the future, the Mac OS will be a first-class platform for running Java software and that you will have a way to use OpenDoc, Java Beans, and the Java language to write software for the Mac OS and other platforms. ♣

APPLE NEWS

Don't Be Invisible

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- Apple will ship CD versions of the database with new Macintosh systems.
- Various groups within Apple will use this database to promote third-party products. In addition, Apple will use it to generate promotional material that will list all the products available for a given market. If your products aren't in the database, you'll miss out on free publicity.

- *Macworld* magazine has included information from the Mac OS Software and Hardware Guide site on its *Web Explorer* CD (which shipped with its January 1997 issue).

- Apple advertisements that highlight developer products will point to the Mac OS Software and Hardware Guide site.
- Mac OS licensees have expressed interest in using this database.

Register all your Macintosh products in the Mac OS Software and Hardware Guide today

to ensure that the database is up-to-date. Please be sure to include a company contact name so that Apple can contact you when necessary. (This contact information is for Apple use only and will not appear in the Mac OS Software and Hardware Guide.)

If your product is included in the database but does not have a "latest update" date on the product description sheet, you'll need to update it; otherwise, Apple will remove such product listings beginning March 31, 1997. When you update your

product, you can also add your web site address (URL) so that viewers can go directly to your web site to get more information about your products.

To add product listings or update them, you need to follow these three easy steps:

1. Look for your products in the Mac OS Software and Hardware Guide at <http://www.macsoftware.apple.com>.

2. Check your company information, product descriptions, and system requirements to see that they are current and all the information is accurate. If there is no date in the “last updated” area of the product description, you need to provide a new one, because all descriptions over a year old will be deleted starting March 31, 1997.

3. Submit new products or product updates by clicking “Submit A Product” on the main navigational bar at <http://www.macsoftware.apple.com>. Be sure to include contact information so that Apple can contact your company. (*Note:* Contact information will not be included in any version of the Mac OS Software and Hardware Guide that becomes available to the general public.)

If you have questions, please contact Gayle Ryan-Westbrook at 408-974-8939 or gayle@apple.com.



Apple Recommends Customers Disable CFM-68K Runtime Enabler

Apple has discovered a bug in the CFM-68K Runtime Enabler extension that can affect the stability of Macintosh computers based on the 680x0 processor. *Macintosh and Mac OS-compatible computers based on the PowerPC processor are not affected by this bug.*

The CFM-68K Runtime Enabler bug occurs when CFM-68K code is executing, an interrupt occurs, and this interrupt causes CFM-68K code to execute, thereby corrupting the Motorola 680x0's A5 register. You can find more information in the Technote located on the World Wide Web at <http://devworld.apple.com/dev/technotes/tn/tn1084.html>.

Apple engineers are currently working on a fix for this bug. Apple wants you to know that the bug exists in all versions of the CFM-68K Runtime Enabler, that you should discontinue

using it, and that customers have been alerted to the bug.

If you are interested in reading the press release, which explains in nontechnical terms what the CFM-68K Runtime Enabler is, how the bug affects customers, and what preventive measures they should take, you can find it on the web at <http://www.macos.apple.com/macos/cfm-68k.html>.



Apple Developer World 2.0 Announced at EDF

Delivering on its promise to expand web-related services for developers, Apple Developer Relations (ADR) unveiled plans at the November European Developer Forum (EDF) to enhance its recently redesigned Apple Developer World web site. The site, which can be found at <http://www.devworld.apple.com/>, provides a summary of the latest Apple developer business and technical news. In outlining the strategy behind the impending enhancements, ADR indicated the changes were scheduled to roll out in three main phases—beginning in November of 1996—and include the following key features and new services:

- *Better server infrastructure and connectivity.* The Apple Developer World site will feature improved server infrastructure and connectivity to make sure that your requests are implemented as quickly as possible. These new features include the addition of high-performance Apple Network Servers, the establishment of mirror sites in Europe (Zeist) and Singapore for better access around the world, expanded network connectivity and bandwidth, and 24-hour, 7-days-per-week support and recovery procedures to give you better service around the clock.

- *A new Developer Online Community area.* With the addition of public and private discussion boards and real-time chat areas, Developer World's new Developer Online Community area will allow you to interact, discuss, and exchange ideas and impressions with Apple and third-party experts.

- *A new “members only” area.* If you're a member of one of Apple's many developer-related programs, you already have access to a lot of critical information and resources. Now Developer World makes your “members only” status even more exclusive with an array of

network resources and new tools specifically geared to enhancing your productivity.

Some of the new features available to members include access to RadarWeb, Apple's new web-based bug reporting and tracking system, which allows you to review existing bug information, report new bugs, and check on the status of reported bugs; private access to Apple's system software, including international versions and system updates; access to Apple's installed base and market intelligence information; secure access to Apple software seeding; and access to one centralized location for special information and offers, including special hardware discounts, comarketing opportunities, and more.

- *A new “worldwide” area.* To ensure that Developer World content is valuable to all developers, regardless of location or geographic interest, Developer World 2.0 will feature a new “worldwide” area containing geographically specific information—a great source if you're seeking information on a specific region or country or if you're looking for marketing opportunities outside your own region.

- *Search and navigation tools.* Two new improvements that will make it easier and faster for you to find what you're looking for on the Developer World web site are enhanced navigation—which includes extended shortcuts and direct access to the site's table of contents, index, graphical map, and search engine—and a more powerful search engine that will allow you to perform advanced searches using Boolean operators (AND, OR, and NOT) on the entire site or on just a finite collection of content areas.



Apple Announces Support of IMAP Mail Protocol

At the second international IMAP Forum in Seattle, Apple announced support of IMAP—the Internet Mail Access Protocol—in future Mac OS Internet mail products, continuing its support of Internet industry standards. In adopting IMAP as an Internet standard for mail services, Apple joins Sun and Netscape in supporting the fast-growing industry mail standard.

IMAP, an evolution of the POP (Post Office Protocol) and SMTP (Simple Mail Transport Protocol) mail protocols in wide use today, offers several key benefits to Mac OS customers. IMAP will provide increased control over the exchange of electronic messages and flexibility in message access. IMAP also enables a user to selectively download messages or message headers at any particular time. All messages are left on the server, and users can retrieve them later using either the same or a different computer.

Apple's support of IMAP means more opportunities for you to create and sell Mac OS IMAP-based products. Companies that have already committed to creating such new IMAP-based products include Baylor University (Mail Drop), CTM (PowerMail for IMAP), CydaSoft (Mulberry), Esys (Simeon), Tree Star Software (Mailstrom), and Piquant Software (IMAP client and server products). Apple intends to work closely with its developer community on IMAP products.

Apple also recently announced support for LDAP (Lightweight Directory Access Protocol) in future Mac OS client and server products. The user directory—the ability to locate users and address mail messages—is an important function of a mail system. LDAP is a platform-independent, broadly supported industry standard for directory services on the Internet. Apple's adoption of LDAP is yet another example of its committed support of Internet industry standards.



Apple Lowers U.S. Prices 12 to 23 Percent on Workgroup Servers

Furthering its strategy to offer high-value client/server solutions, Apple recently announced lower prices to U.S. authorized resellers for its Mac OS–based Workgroup Servers. The price reductions range from 12 percent to 23 percent. The new prices include one of three solution bundles—valued at \$4,000 to \$6,000 if purchased separately—that provide leading software applications for web publishing/Internet solutions, Mac OS–based application services, and high-performance AppleShare file and print services.

“The aggressive price reductions of the Workgroup Servers significantly increase the price/performance and value of Apple's Mac OS client/server solutions,” said John Osborne, senior director of server marketing at Apple. “The new prices allow us to provide customers with easy-to-use server solutions at competitive prices.”

These price reductions may result in lower U.S. retail prices. Actual prices may vary and customers should consult their local Apple-authorized reseller.



First Beta Release of Mac OS Runtime for Java

Apple recently announced the availability of the first beta release of Mac OS Runtime for Java. Mac OS Runtime for Java is an implementation of Sun Microsystems' Java virtual machine and run-time environment that

enables you to create Java applets and stand-alone Java applications and embed Java functionality into applications written in native PowerPC or 680x0 code.

Mac OS Runtime for Java includes the high-level API as well as a lower-level invocation API. This means you can load Java class libraries, create Java objects, and call Java methods in order to build hybrid Mac OS–Java applications. When used with currently available Java development environments, Mac OS Runtime for Java includes several technologies that will enable you to incorporate Java into existing applications, as well as use Java to create new applications. Here are some of those technologies:

- JManager, a simple high-level API that allows an existing application to embed or host Java applets and applications.
- JShell, the basic format for developing stand-alone Macintosh applications written in Java. By using a simple shell, you can easily combine your Java code into JShell format to create a stand-alone “double-clickable” application.

Estimated U.S. Retail Prices for Workgroup Servers

Model	New Estimated Range	Previous Estimated Range
Workgroup Server 6150/66 16 MB RAM/1.2 GB HD 4x CD-ROM drive/Internet	U.S. \$1,900–2,000	\$2,300–2,400
Workgroup Server 7250/120 16 MB/2 GB/8x	U.S. \$2,000–2,100	\$2,600–2,700
Workgroup Server 7250/120 16 MB/2 GB/8x/AppleShare	U.S. \$2,800–2,900	\$3,400–3,500
Workgroup Server 7250/120 16 MB/2 GB/8x/Internet	U.S. \$2,400–2,500	\$3,000–3,100
Workgroup Server 8550/200 32 MB/2 GB/8x/AppleShare	U.S. \$5,100–5,200	\$5,800–5,930
Workgroup Server 8550/200 32 MB/2 GB/8x/Internet	U.S. \$4,700–4,800	\$5,400–5,500
Workgroup Server 8550/200 32 MB/2 GB/8x/DAT	U.S. \$5,200–5,300	\$6,100–6,200
Workgroup Server 8550/200 32 MB/2 GB/8x/DAT/AppleShare	U.S. \$6,000–6,100	\$6,900–7,000

- JBindery, a utility that allows you to easily convert a zip/JAR/.class package into a JShell-based application.

- JRI, the standard interface from Sun for calling Java code from C/C++ code. JRI provides more complete control over MRJ than does JManager. This means you can use as much of JRI as you feel is appropriate, in addition to the basic functionality of JManager.

- Apple Applet Runner, a simple player that allows you to view Java applets and applications. The full source code to this viewer is included in the SDK.

As part of the beta 1.0 release of Mac OS Runtime for Java, Apple also announced the MRJ Coding Contest, a great opportunity for you to create interesting and innovative Mac OS-based applications and win new Apple products!

For official rules and submission information, visit the MRJ web site at <http://www.devtools.apple.com/mrj/>. You can also download the beta version of Mac OS Runtime for Java and the corresponding SDK (software development kit) from this site.



Apple Launches Campaign to “Bring Learning Home”

Underscoring its commitment to the consumer market, Apple kicked off its much publicized and multifaceted “Bring Learning Home” campaign just in time for the holiday season. The campaign is designed to take advantage of the tremendous educational potential of today’s multimedia and Internet technologies and features a full-blown promotional campaign that includes television commercials, print advertisements, radio spots, and a new 30-minute Apple “infomercial.”

Apple’s new campaign takes its lead from a 1996 American Learning Household study, which reported that 80 percent of family PC buyers cite children’s education as the primary reason for purchasing a home computer. “Bring

Learning Home” will focus on providing computing solutions and programs to the family PC market—with workshops for parents, age-specific educational software solutions, and a host

of special programs designed to close the gap between home and school learning.

More Affordable Home Learning Solutions

The latest aggressive price cuts for Apple Macintosh Performa computers position Apple as a true value leader with prices at or below the cost of any similar-performance IBM-compatible product. In addition, Apple is offering a “holiday savings” promotion through January 17, 1997, that features a \$150 rebate to customers who purchase a Performa, any Apple monitor, and an Apple StyleWriter printer.

More Affordable Computers for Schools

Apple is also making it easier for parents to help schools purchase computer equipment through the new School Rewards Program, which allows parents who buy Apple products to assign “points” to any participating school. The school can then use its points to purchase computers, software, and peripherals from Apple.

Closing the Gap Between School and Home Learning

Apple is now offering family computing workshops that provide teachers with the materials they need to educate parents about the benefits of technology on their children’s learning. In addition, the Bring Learning Home Alliance—formed by Apple, the Computer Learning Foundation, the National Geographic Society, PBS, and Scholastic—is focusing on educating parents and teachers about how technology can be used to enhance and improve upon children’s education.

Award-Winning Multimedia Software for Education

As part of its campaign to “Bring Learning Home,” Apple is offering Apple Quality bundles—hand-picked software bundles that include a collection of award-winning home learning software programs targeted at specific age groups.

Easier Internet Access

Apple is making a Personalized Internet Launcher available as a free service that makes it easy for parents and children to find and organize high-quality web sites that match their personal and educational interests by automatically searching a database of thousands of Internet sites.

True Ease-of-Use

While Apple products are noted in the computer industry for their ease-of-use, Apple is making setup even easier. Each Macintosh Performa will include a user-friendly, self-guided tour, which features a multimedia “host” that walks new users through the setup process.



Cyberdog 1.2 Beta 2 Available on the Web

The latest beta version of Cyberdog 1.2 includes a number of new features and performance enhancements, such as greater international and localization support, expanded AppleScript support, support for transparent GIFs (Power Macintosh version only), and support for 2-byte user names in the AppleTalk browser.

This version of Cyberdog delivers several performance improvements; for example, e-mail and news messages open faster, and moving, deleting, and empty Trash operations in Mail have better performance.

In addition, users will be able to import Claris EMailer address books, perform “paste as quote” operations, quote selected text in messages, and use the AppleTalk browser to connect to the To Selected Address feature.

Key features in this release of Cyberdog include the following:

- “Cyberbutton” improvements, including transparent and labeled buttons
- Better feedback on POP error messages when users check for mail
- The ability to add to the notebook by dragging files from the Finder, and to display files (for instance, HTML) in the Navigator window by dragging them from the Finder
- Keyboard shortcuts for deleting and navigating to the next and previous messages
- Keyboard shortcuts for manipulating text in the Message Editor
- The ability to save the positions and sizes of Mail Trays and News windows
- The ability to mark messages as read or unread by clicking in the Mail and News windows

The release also offers a number of pop-up menus, including a Move to Tray pop-up menu that allows users to choose which tray they

want to move messages to; a New Message pop-up menu that allows users to choose letterhead for messages; and a Reply pop-up menu that allows users to choose letterhead for reply messages.

The beta 2 version of Cyberdog is available for downloading at the Cyberdog web site at <http://cyberdog.apple.com/>.



Apple Announces Apple Internet Connection Kit 1.2

Furthering its commitment to make the Macintosh the easiest-to-use, most media-rich Internet computing experience right out of the box—and at the same time strengthen the market for your Mac OS Internet products—Apple recently announced the release of Apple Internet Connection Kit (AICK) 1.2. Apple plans to include the Apple Internet Connection Kit with every copy of the Mac OS and with every Macintosh computer.

An updated version of the popular integrated suite of “best of class” Apple and third-party Internet access software for the Mac OS, the Apple Internet Connection Kit features an impressive array of software, including the Apple Internet Dialer and Apple Internet Status 1.1.4; Apple Guides for the Apple Internet Connection Kit; Netscape Navigator™ 3.0; Claris EMailer Lite 1.1 version 4; Fetch FTP Software 3.0.1; Newswatcher 2.1.3; NCSA Telnet 2.6; QuickTime plug-in 1.0; QuickTime VR plug-in component 1.0.2; Macromedia Shockwave plug-ins for Director (5.0.1), Authorware (3.5), and FreeHand (5.0); Live Audio plug-in 1.0.2; Progressive Networks’ RealAudio™ Player 2.0; Adobe™ Acrobat™ Reader 2.1; Aladdin Stuffit Expander 4.0.2 and DropStuff 4.0; OnBase Technology DragNet 1.12LE; Farallon Look@Me 1.0.1; Lewis/Quinn Internet Config 1.3; MacPPP 2.5.1; InterCon InterSLIP 1.0.1; MacPING 3.0.3; and Macintosh System 7.5.3 Update 2.0 and System 7.5.5.

New to this version of AICK is Farallon’s Look@Me software, which allows a user to view another user’s screen in real time across the Internet. Another new application is OnBase Technology’s DragNet, which allows users to organize their favorite web sites, newsgroups, and FTP sites.

The estimated retail price for the Apple Internet Connection Kit is U.S. \$49. If you’re interested in upgrading to version 1.2 of AICK, you can order the upgrade for U.S. \$19 plus shipping and handling for CD-ROM or floppy disks by calling Claris at 800-293-6617 ext. 1411, or you can order the upgrade electronically through the AICK home page at <http://aick.apple.com/>.



Apple Reduces U.S. Prices on High-End Power Macintosh Computers

Consistent with its strategy to offer high-value, competitively priced personal computers to the corporate and professional marketplace, Apple recently announced that it is lowering prices to its United States authorized resellers for most of its flagship line of Power Macintosh computers. The price reductions, effective November 2, 1996, range from 9 to 30 percent on these computers, which are typically purchased by a wide variety of business and creative professionals. Outside the United States, Apple has already reduced prices on these computers in most of its major markets.

“The new pricing on the Power Macintosh line allows us to compete very aggressively in both performance and price,” said Gary Little, senior vice president and general manager of Apple’s Power Macintosh division. “Now, when a business customer does a feature-for-feature comparison between a Power Macintosh and a

Wintel Pentium Pro, that customer will find the Power Macintosh competitively priced.”

For Mac OS developers, reduced prices on the Power Macintosh line should equal increased demand in the market for third-party products. And if you’ve been thinking of upgrading your staff to higher powered Mac OS development systems, the timing has never been better to take advantage of reductions on these high-end systems.

These price reductions may result in lower U.S. retail prices. Actual prices may vary and customers should consult their local Apple-authorized reseller.

You can review the complete Apple press release on the web at <http://product.info.apple.com/pr/press.releases/1997/q1/961031.pr.rel.pmprices.html>.



Apple Americas Sets Four-Point Plan for U.S. Sales Channel Modernization

Robin Abrams, vice president and general manager of Apple Americas, recently outlined a four-point plan aimed at simplifying the U.S. sales channel structure, clarifying product lines, and improving the visibility of Apple products in the marketplace. Concerned because Apple’s “current structure does not reward those in the channel who are strong advocates of Apple products, nor does it encourage them to focus on the markets where Apple has a strong franchise and industry-leading solutions,” Abrams set out a plan consisting of four separate programs:

Estimated Power Macintosh U.S. Retail Prices

Model	11/2/96 Estimated Range	8/2/96 Estimated Range
Power Macintosh 7200/120	U.S. \$1,600–1,650	U.S. \$2,300–2,350
Power Macintosh 7200/120pc	U.S. \$2,300–2,350	U.S. \$2,800–2,850
Power Macintosh 7600/132	U.S. \$2,300–2,350	U.S. \$3,000–3,050
Power Macintosh 8500/150	U.S. \$3,000–3,100	U.S. \$3,600–3,700
Power Macintosh 8500/180	U.S. \$3,700–3,800	U.S. \$4,500–4,600
Power Macintosh 9500/200	U.S. \$4,200–4,300	U.S. \$4,900–5,000

- *The Apple Specialist program.* This program is aimed at resellers who give Apple products high visibility in their stores and drive sales of Macintosh computers over other PCs. Program members will receive a variety of benefits to support them in their marketing activities.

- *The Open Sourcing program.* This program announced at the end of September, allows authorized U.S. resellers to acquire Apple products from any Apple-authorized aggregator or distributor, giving resellers greater access to Apple products, purchase options, and marketing support.

- *The Focus Apple program.* This program is designed to support resellers who have strengths in certain significant market areas such as publishing, entertainment, new media, scientific/technical, and corporate intranet development. Through training and certification programs, Apple will work to align its programs, solutions, and investments with these quickly growing segments. At the same time, Apple will work with those retailers who serve mass markets to support their business model, which is focused on efficient distribution and high volume. Similar objectives are in place to encourage catalog resellers who are advocates of Apple and provide high-quality sales, service, and support.

- *A program to simplify and clarify product offerings.* This plan allows for future redefinition of Apple's product line to provide for clear segmentation between those resellers

who choose to concentrate on sales of either the Power Macintosh or Macintosh Performa families.



Oracle WebServer and Workgroup Server Products Now Certified on Apple Network Servers

Aimed at providing solutions for the burgeoning Internet/intranet server market, Oracle and Apple announced the certification of the Oracle WebServer 2.0 and Oracle Workgroup Server 7.3.2 products for use on AIX-based Apple Network Server computers. Ensuring a high level of compatibility, the certification provides Network Server customers with a full range of scalable, secure web application platforms.

The certification of these products, which is performed jointly by both companies, follows closely on the heels of the previously announced certification of Oracle Universal Server and Oracle 7 on Apple's Network Server and underscores the continuing collaboration between the companies to provide broad support for Oracle solutions on Apple's Network Server platform.

Oracle WebServer 2.0 can be fully integrated with the Oracle 7 database and delivers HTML pages directly through the Web Request Broker, thereby eliminating the need for tedious CGI programs or Perl scripts. By translating and dispatching client requests directly to Oracle's procedural language for Oracle 7, data-driven web applications run much faster than on other web servers.

The Oracle 7 Workgroup Server 7.3.2 provides all the capabilities needed to create business solutions for distributed networks. Graphical administration tools provide intuitive management of one or multiple databases while an integrated WebServer simplifies web access to data. Replication creates local copies for faster access of remote data. Distributed data access allows applications to query, update, and insert data into multiple, distributed databases.

Engineered and designed for high performance and reliability, the departmental Network Servers provide scalable client/server solutions for production, MIS, and network managers in publishing, enterprise, entertainment, and education environments. The Network Servers run the AIX operating system from IBM and are powered by PowerPC 604 or 604e processors with speeds of up to 200 megahertz. ♣

"And that's all we have to say about that."

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Technology

CD Highlights: SDK Edition, January 1997.

Human Interface: Why a “good enough” attitude leads to bad human interfaces.

Feature: Mac OS 7.6.—a first look at what this new version of system software means to developers.

CD HIGHLIGHTS

SDK Edition, January 1997

It's my first time in the Developer CD Series driver's seat, and there are changes up ahead. January is usually the month we deliver the System Software and Software Development Kit (SDK) editions of the Developer CD Series. As you may know, the next reference release of system software—Mac OS 7.6—is scheduled for late January. It is with this in mind that we've decided to delay the January System Software CD. Not to worry, though—you won't receive fewer CDs. In fact, you received a bootable System Software Special Edition CD in the November/December mailing to tide you over while we synchronize the next System Software CD with the reference release of the next system software. And think of all the extra time you'll have to peruse the January SDK CD, which—in addition to updates to snippets, QuickDraw 3D, and QuickDraw GX—includes the following new and revised packages.

Apple Shared Library Manager

The Apple Shared Library Manager allows you to create and use dynamically linkable and loadable shared libraries. ASLM 2.0.1 is a bug-fix release for ASLM 2.0. Included in this folder are the ASLM 2.0.1 installer, the licensing disk, and the SDK. The major changes support PowerPC processor-based ASLM on the Performa 5200, 5300, 6200, and 6300 families of computers. For more detailed information about the bug fixes to this release, see the Change History document.

Advanced Color Imaging on the Mac OS

This *Inside Macintosh* book describes how to enhance your application's color capabilities using the Palette Manager, the Color Picker Manager, the ColorSync Manager, and the Color Manager. Its companion book, *Advanced Color Imaging Reference*, documents the constants, data types, and functions

your application uses to provide color support.

This folder contains revised versions of the two books and provides hypertext links to help you find the new and modified material. For an overview of these changes, see the document What's New in ACL.

Interfaces & Libraries

This folder contains the latest universal interface files and libraries for Macintosh development. Included in the folder are headers and libraries for Game Sprockets 1.0, QuickDraw 3D 1.0.6, and Open Transport 1.1.

OpenDoc 1.1

OpenDoc is an open industry-standard architecture for building reusable, distributed, cross-platform software. OpenDoc is both a specification and a set of technologies used to build components. If you build your applications in accord with the OpenDoc architecture, you can provide software that integrates and cooperates with other OpenDoc software.

With OpenDoc you can provide specialized solutions to meet each customer's specific need. OpenDoc enables you to build more powerful, higher quality software in less time than it takes to develop traditional “monolithic” applications.

This folder contains OpenDoc 1.1 and an updated collection of tools, components, and documentation needed for developing OpenDoc components.

OpenDoc Development Framework

This folder contains release 2 of the OpenDoc Development Framework (ODF). In addition to other improvements, this release of ODF improves the overall stability of your part and makes the framework more usable. This release supports OpenDoc 1.1 and is likely to be the last Mac OS-only release of ODF. Expect to see OpenDoc Windows support in

the next release (ODF 3). For information about changes in this version, see the file ODF Release 2.

OpenDoc International

OpenDoc J-1.1 GM is a localized version of OpenDoc for Japan. This version supports KanjiTalk version 7.5.3 or later. Included in the OpenDoc International folder are Recipes and Development folders along with the OpenDoc J-1.1 installer. These items supplement the OpenDoc SDK and help you understand how to use TSM (Text Services Manager) and TSMTE (Text Services Manager TextEdit) in programming OpenDoc parts.

Open Transport 1.1.1

Apple Open Transport is the modern networking and communications subsystem for the Mac OS. It's based on industry standards and brings a new level of networking connectivity, control, and compatibility to Mac OS computers, while preserving and enhancing the hallmark of the Macintosh and Mac OS built-in support for easy-to-use networking.

This package includes the Open Transport 1.1.1 GM installer, the 1.1.1 SDK, and the Open Transport 1.1.1b9 debug installer, as well as the Open Transport 1.1 SDK and associated 1.1b16 debug installer. Open Transport 1.1.1 is a bug-fix release; the major change in this release is support for the Performa 5200, 5300, 6200, and 6300 families of computers. This release also includes numerous bug fixes for MacTCP backward compatibility and for native PAP implementations.

For a description of the bug fixes in this release, refer to the release notes.

PC Card Manager SDK

The PC Card Manager 3.0 SDK is a comprehensive development environment that describes how the Personal Computer Memory Card International Association (PCMCIA)

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“Good Enough”

By Peter Bickford

This month's article is the fiftieth one I've written for *Apple Directions*. For accuracy's sake, I should note that this total includes last year's controversial article “Users, Who Needs 'Em?”, which my editor had the good sense to kill before it could do irrevocable damage to both Apple's and my reputations.

In the past four years, I've taken on subjects ranging from error messages to elegance, video games to client/server computing. I've also adopted the annual tradition of a holiday “wish list” column, which lets me take shots at lots of little interface annoyances, such as gratuitous toolbar icons, heavy-handed “3D” looks, and people who spell their OK buttons “O-k-a-y.” I was all ready to trot out a new wish list for this article (item 1: “Get rid of those worthless cut/copy/paste/undo icons in toolbars”), but in light of the occasion, I thought it might be a better idea to take a look at the grander issues of human interface design.

So with your indulgence, I'd like to devote the rest of this article to answering the great question we all ask: “Where do bad interfaces come from?”

And no, my smart-aleck friends, the answer is a bit more complicated than “A certain large company headquartered in the Pacific Northwest. . . .”

What Kind of Idiot Built This Thing?

How do we end up with word processors that obscure half the screen with “helpful” tool icons, or with big-budget multimedia encyclopedias that are harder to navigate than most adventure games? Why do otherwise competent engineers design programs that make no sense at all to anyone except themselves?

Making the (presumably) safe assumption that the designers aren't simply evil sadists who enjoy tormenting unsuspecting users, I can think of only four types of people who could perpetrate some of the interfaces I've seen:

- People who don't realize that human interface design is an issue at all
- People who don't have the knowledge or skill to design better interfaces

- People who have strange ideas about what a good design is in the first place
- People who think that designing a good interface isn't worth the effort

Strange as it may seem, I have both hope and sympathy for people in the first three groups. You can convince people who didn't know interface was important that nothing else matters if the end-user can't make sense of the product. You can teach people the skills to become better interface designers. If you're clever enough, you can even persuade people who have bizarre interface ideas to do a reality check with actual users to see if their designs make sense.

The only ones who worry me—and they worry me a lot—are the people in the final group. They're the ones who know in advance that their interfaces have real problems and that their users are likely to complain and run into difficulty, but who decide to go ahead and ship them anyway. “After all,” they reason, “it may not be great, but it's *good enough*.”

From an interface standpoint, as soon as a product's developers are willing to live with a product that's just “good enough,” the game is all over. You can protest, complain, implore, and argue for hours with them to make it better, but whatever creative spirit drove them forward has left the building. At that point, you've got to hope that the product really is good enough, because it's not going to get any better as long as the developers feel that way.

The Curse of Mediocrity

I can't help it. Certain phrases just set my teeth on edge, and “it's good enough” is one of them. (“Paulie Shore movie” is another, but that's another story.) The reason I can't stand the “it's good enough” phrase is that it indicates that developers who utter it have just ceased caring about whatever it is they were referring to.

If developers have any sense of professionalism, they know that what they're usually doing with their “good enough” attitude is kidding themselves that everything's OK—and hoping that not too many people complain. They've given up trying to make things better

and are bracing themselves for damage control. This lack of caring explains how otherwise good developers do things like creating a bloated word processor that runs at a fraction of the speed of its predecessor, or creating a computer that you can't add memory to without disassembling the entire machine.

As bad as such products are, they're worse in that they tend to lower our standards in general. If we put up with one bulky, overblown word processor, getting hit with an equally unwieldy spreadsheet program is less of a shock. The same degradation of expectations happens when developers of a popular application decide to ignore interface guidelines. Not only must we as users learn to tolerate the application's eccentricities, but other developers may actually copy them, thinking that the application somehow marks a new standard. Mediocrity breeds mediocrity, and everybody suffers.

Excellence Requires Effort

There's a reason that Disney animations flow and sparkle unlike any of their contemporaries and that Disneyland is a richer and substantially more “magical” place than any of its competing amusement parks. If you watch a Disney film such as *The Hunchback of Notre Dame*, stick around for the credits. The secret to Disney's legendary animation prowess can be found in the legions of top animators, storyboard artists, sound designers, editors, and others whose names seem to go on for ages at the end of the feature.

Disney has a decades-long record of creating animation masterpieces, from *Fantasia* to *Sleeping Beauty*. Whenever I've read interviews with the old animators, however, what I'm impressed with is how very hard they worked to get it all right. Traditional animation is incredibly time-consuming work, requiring thousands of cels to be drawn and colored for every few minutes of finished film. Throughout the entire process, Disney maintains an absolutely obsessive level of quality, defying the corner cutting and sloppy work that can be found at other studios. It drove the old animators crazy sometimes, but they all acknowledge that the results were worth it. They had a standard to meet, and doing anything less simply “wouldn't have been Disney.”

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HUMAN INTERFACE**“Good Enough”***continued from page 11*

Great animation, great programs, great works of art . . . for that matter, all the really neat things that put a smile on our faces and give us a sense of wonder all have a common thread. They were created by people who couldn't stop caring about what they do. While true perfection may be beyond our grasp as human beings, the people who create things that are great hold high standards for themselves, and they don't stop working until those

standards are met. As time goes by, getting the product out the door isn't nearly as important as being proud of the effort that went into it. People who build great products know this in their hearts.

If I have one holiday wish this year, it's that we raise our standards as to what constitutes “good enough” in our industry. As it stands today, “good enough” seems to describe products that are embarrassingly clumsy, bug-ridden, and poorly conceived. They are created by people who simply don't care anymore.

When it's all said and done, *caring* is what differentiates the good things in life from the

bad. This holiday season, next year, and in the years that follow, I hope we can find it in ourselves to care more about the things we do. I guarantee you, the world will be a better place because of it.

*Happy Holidays,
Doc*

Peter Bickford is a senior scientist in Apple's Developer Consulting Group. If you have interface questions you'd like to address to him, send e-mail to bickford@apple.com.

CD HIGHLIGHTS**SDK Edition***continued from page 10*

expansion card interface is implemented in the PowerBook 3400.

The PC Card Manager 3.0 SDK is the future architecture for upcoming PowerBook Hooper 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.

Speech Recognition Manager

We're pleased to provide you with this package, which contains version 1.5.1 of Apple's Speech Recognition Manager. Version 1.5.1 of the Speech Recognition extension implements the second officially supported developer release of the Speech Recognition Manager.

The documentation describes version 1.5 (the previous release) of the Speech Recognition extension and the API (application programming interface) and Toolbox it embodies. In addition, the Speech Recognition Manager Docs folder contains a What's New file that describes the bug fixes and feature enhancements in version 1.5.1 (the

current release) of the Speech Recognition extension.

Input from early adopters of Apple's speech recognition technology has contributed greatly to the Speech Recognition Manager API. If you find bugs in the extension or documentation, please use the Apple Bug Reporter stack. Include the version information in the problem description and e-mail it to apple.bugs@applelink.apple.com.

See the READ ME FIRST! document for details.

Speech Synthesis Manager

In this folder you'll find everything you need to know to make your applications talk using Apple's English and Spanish text-to-speech software.

In addition to this text-to-speech developer information, you'll find a PlainTalk 1.5 folder that contains the English Text-to-Speech and Mexican Spanish Text-to-Speech installers. Apple's installer scripts for text-to-speech ensure that the appropriate speech synthesizers are installed for the available hardware and system software. They also remove the outdated versions of text-to-speech. Because there are currently four speech synthesizers, each with differing requirements, as well as many previous configurations that were released under a variety of names, getting this right is

no simple task. If you ship text-to-speech with your application, please take advantage of Apple's installer scripts, either by directly licensing and including the English Text-to-Speech and Mexican Spanish Text-to-Speech installers (available both as disk images and as network or hard-disk installers) or by working from the source for the scripts, which is provided here.

You can obtain the system software that lets your Mac OS computer talk in any of three ways:

- Users can find it preinstalled on many Macintosh computers.
- Users can download Apple's PlainTalk English Text-to-Speech and Mexican Spanish Text-to-Speech software from Apple's web site.
- Developers can license this software for distribution with their applications. For more information about licensing Apple software, contact Apple's licensing group at 512-919-2645 or sw.license@applelink.apple.com.

You can find more information on Apple's web site at <http://www.speech.apple.com/>.

*Meredith Best
Developer CD Leader
and Online Content Librarian*

Mac OS 7.6

Roger Boss, *ADR Technology Marketing Communications*

New Reference Release Delivers More Reliable, Internet-Everywhere OS

The first of Apple's twice-yearly system software installments (due to ship in January) delivers on Apple's intent to provide the latest and best technologies to developers and users on a regular, more frequent basis. Mac OS 7.6 will allow Apple to rigorously qualify the operating system no less than twice per year—even if individual technologies are released or updated on the World Wide Web between releases. For users, Mac OS 7.6 will allow them to install system software much more easily, drag and drop live Internet links into OpenDoc-aware documents, more easily configure their systems, and extend support of other platforms by opening and editing more types of Windows 95 files.

Announced in Apple CEO Gil Amelio's keynote address at Macworld Boston last August, the change in release strategy allows Apple to deliver new software to customers more quickly, so that both customers and developers can take advantage of new technologies sooner. This strategy offers you an opportunity to take advantage of the latest Apple technologies in your products, with the knowledge that a growing installed base will have these features installed on their systems. In support of this plan, Apple will deliver complete reference releases twice yearly—around January and July—with system updates that address the most pressing customer and developer issues delivered between these releases.

Extending Apple's ease-of-use advantage while enhancing performance and reliability, Mac OS 7.6 advances four key areas of the Mac OS:

- Internet integration and access
- Overall performance and productivity
- Multimedia capabilities
- PC compatibility

This translates into greater business opportunities for those who develop cutting-edge solutions based on key Apple technologies, and provides increased stability, performance, and reliability for your applications.

The screenshot shows a window titled "Mac OS" with the instruction "Perform the following four steps to upgrade your system software." The steps are:

- 1. Read important information before you install**: Click the button at the right to read about upgrading your system software. (Icon: Document with checkmark)
- 2. Update your hard disk driver**: Click the button at the right to use Drive Setup to update your disk driver. (Icon: Hard disk)
- 3. Check your hard disk for problems**: Click the button at the right to use Disk First Aid to check and repair your hard disk. (Icon: Hard disk with checkmark)
- 4. Use the Installer**: Click the button at the right to start installing your new software. (Icon: Downward arrow)

The Mac OS 7.6 Installer. The new installer displays the recommended process for ensuring a successful system upgrade.

Mac OS 7.6 will support all Macintosh and Mac OS-compatible computers that are 32-bit clean as originally shipped, including models that first shipped as far back as 1989. (A complete list of computers *not* supported by this release is given later in the article.) In addition, Mac OS 7.6 is an Open Transport-only release, and provides the first steps toward creating a "licensee-friendly" version of the Mac OS. It is based on System 7, ensuring excellent backward compatibility with other System 7 releases and preserving customers' investment in existing applications.

Features and Improvements

With the introduction behind us, let's "open the hood" and get a better look at Mac OS 7.6.

Bringing the Internet to the Desktop

Mac OS 7.6 delivers the widest array of Internet connectivity of any operating system—bringing integrated Internet capabilities to the desktop. The combination of Cyberdog and OpenDoc brings the Internet to applications by making it possible to add live Internet links to OpenDoc-aware documents. Users can now save web addresses (URLs) as Finder objects and launch them directly from the Finder. In addition to these key tools, Apple is bundling America Online (AOL) and the Apple Internet

Connection Kit 1.2 (AICK) to offer "best of class" Internet applications with its operating system and to make it easier for users to access the Internet.

Due to issues with Code Fragment Manager 68K (CFM-68K), Mac OS 7.6 supplies OpenDoc and Cyberdog only for PowerPC processor-based Mac OS-compatible computers. Apple will continue to work toward providing versions of OpenDoc and Cyberdog for 680x0 processor-based computers and deliver them as soon as possible. For more information on the CFM-68K issue, please refer to Technotes 1077 and 1084 located at <http://devworld.apple.com/dev/technotes.shtml>. America Online and the Apple Internet Connection Kit are not affected by the CFM-68K issue, and are still available to customers running Mac OS 7.6 on 680x0 processor-based computers.

Extending OpenDoc's Presence

Mac OS 7.6 makes the OpenDoc component-software architecture immediately useful by adding the OpenDoc Essentials Kit—a suite of OpenDoc components that act as a "starter kit" for graphics and multimedia. With the OpenDoc Essentials Kit, users will be able to create OpenDoc-based documents simply by dragging the supplied OpenDoc parts into an OpenDoc container document.

Faster, More Reliable Networking

Open Transport and key connectivity tools—such as TCP/IP, Open Transport/PPP, and Apple Remote Access for all supported computers—make it easy for users to connect to the Internet and local and remote networks. Open Transport/PPP delivers a better overall user experience than MacPPP by providing a faster, more stable networking environment.

State-of-the-Art Multimedia and Graphics

Extending Apple's leadership in graphics and multimedia, Mac OS 7.6 delivers Apple's QuickTime technologies, known as the *QuickTime Media Layer (QTML)*—which is a cross-platform industry standard for adding and playing back media elements. These technologies will give customers transparent access to QuickTime 2.5 and Apple PlainTalk technology. For PowerPC processor-based computers, Mac OS 7.6 will add access to QuickDraw 3D, making it easy to deliver high-impact media with video, 3D graphics, and virtual-reality scenes. In addition, the OpenDoc Essentials Kit will enable users to create high-impact communications by supporting QuickDraw 3D components, sound, and different image formats (PICT, GIF, TIFF, and JPEG). Users will continue to have access to QuickDraw GX, TrueType scalable font technology, desktop printing capabilities, and improved printer selection.

A Simple, Safe Way to Install Software

The installer features a new “wrapper” technology that was originally conceived as part of Mac OS 8. It provides a step-by-step process for easy, clean, safe installation of system software (see the figure on page 13). This new installer simplifies the software installation experience by walking the user through a recommended process for installing system software, updating drivers, checking disks, and installing optional software.

The installer consolidates four separate tasks, including updating Apple-formatted hard disk drivers and inspecting the disk's file system. Prior system software releases provided documentation that prompted the user to check disk drive volumes in a separate process. But in Mac OS 7.6, the process of checking and verifying the integrity of the volume occurs automatically before the software is installed. Integration of the hard disk driver update and code from Disk First Aid into the standard installation process will

result in a more reliable installation and will increase the system's overall stability: More problems will be fixed and potential conflicts will be reported before the new system software is installed on the computer.

The Mac OS 7.6 installer allows the user to install multiple Apple software products in

Mac OS 7.6 allows you to create a new kind of application control panel of type 'APPC'. This new control panel type enjoys all the privileges of a full application, such as being scriptable and having its own menu bar.

one pass without having to restart the computer. Users will also be able to create a “universal system,” which can be started up from any Mac OS-compatible computer that supports Mac OS 7.6—including some of the more current models, such as the PowerBook 1400—adding value for the enterprise customer or IS manager who supports large groups of Mac OS-based computers.

Powerful, More Flexible Extensions Manager

Extensions Manager 4.0, which comes with Mac OS 7.6, provides the foundation for feature-management capabilities to be used by future versions of the Mac OS. It provides better organization, control, and information on system extensions and control panels by adopting the CCI resource standard. This allows you to provide specific, customized information about control panels and extensions. By grouping these by the 'vers' 2 resource mechanism, Extensions Manager 4.0 allows users to track the system files that belong together and disable all or some of them with a single click. (See the figure on page 15.)

Mac OS 7.6 allows you to create a new kind of application control panel of type 'APPC' (today's control panels are of type 'cdev'). This new control panel type enjoys all the privileges of a full application, such as being scriptable and having its own menu bar. An APPC is auto-routed to the Control Panels folder when dropped into a closed System Folder and can have an 'INIT' code resource that loads at startup.

In the past, settings files were stored as resources in one preference file and could not be exported or transferred. With this version, settings are stored as individual files within the Extensions Manager Preferences folder, which is in the main Preferences folder. These files can be treated as any other file—allowing users to share settings with or apply them to other users.

The Extensions Manager Preferences folder can also store read-only settings files, making it easier for developers and system administrators to ensure that recommended settings cannot be changed. You can convert any set into a read-only set by changing its type from 'ESet' to 'RSet'.

Virtual Memory, Modern Memory Manager, and Improved System Cache Speed

Mac OS 7.6 removes 24-bit support for virtual memory in the operating system—allowing code to run faster and require less memory. In addition, 32-bit addressing can no longer be disabled in the Memory control panel. This reduces the number of configurations you must test before shipping your software.

These changes, combined with other internal optimizations and improvements, result in better virtual memory performance compared to System 7.5.5, including reduced launch times, greater stability, and the ability to have more programs open simultaneously. In tests run on a Power Macintosh 7200/75 and 8100/80, launch times for Microsoft Word and Adobe Photoshop improved by as much as 50 percent, compared to launch times with the virtual memory shipped with System 7.5.3. Other applications showed more modest improvements. Performance increases vary by system, virtual memory setting, and application—virtual memory settings alone will not guarantee that your applications will show any significant increase in performance.

With this release, virtual memory is turned on by default when users perform a clean installation; however, they will have the option to turn it off. For instance, if the cus-

tomers installing Mac OS 7.6 over an existing System Folder (a “dirty installation”), the installer will leave virtual memory the way it was unless there is less than 16 MB of memory—in which case virtual memory will be turned on to guarantee 16 MB of total (built-in and virtual) memory.

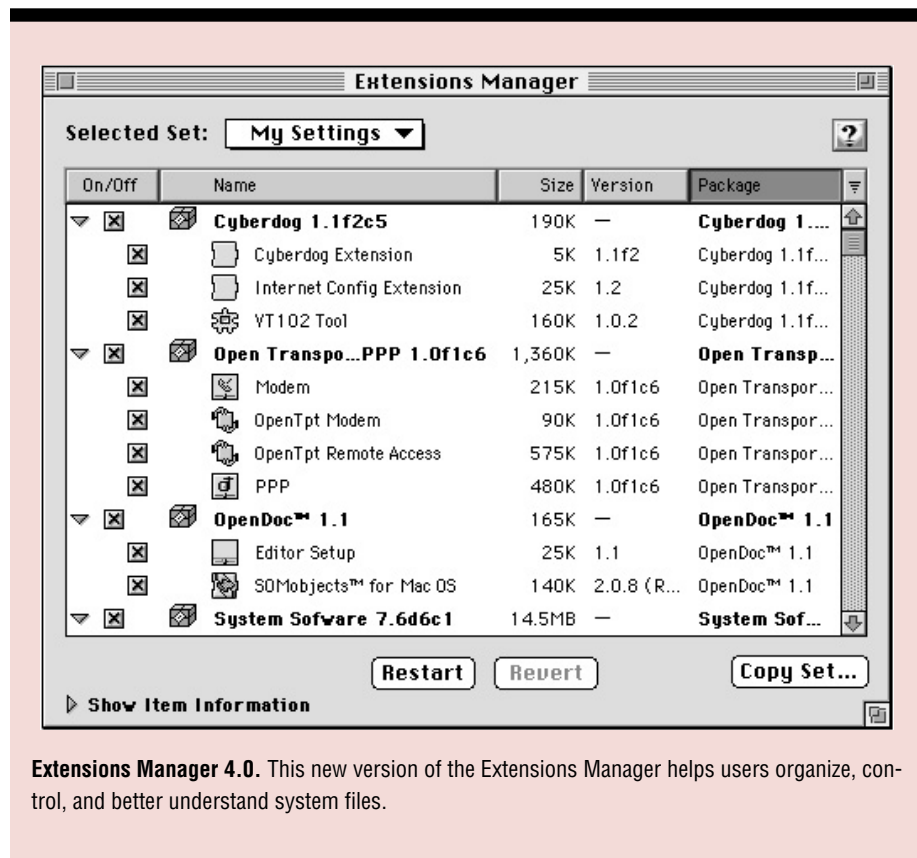
For customers installing Mac OS 7.6 on a blank hard disk, or as an additional System Folder on a system (a “clean installation”), the installer will make certain assumptions about virtual memory preferences. On 68030 or 68040 processor-based systems with less than 16 MB of memory, virtual memory will be turned on to provide 16 MB of total memory. If the system has 16 MB or more memory, virtual memory will not be turned on because of limited performance benefits. On PowerPC processor-based systems, virtual memory will be turned on to add 1 MB to the total memory or to provide a total of 16 MB, whichever results in greater total memory.

As a result of feedback from customers and developers, the memory footprint for Open Transport and the system heap are significantly reduced. In addition, the Finder heap has been increased to reduce the number of “out of memory” errors that occur when memory is available.

Memory requirements for Mac OS 7.6 include a minimum of 8 MB of installed memory (with virtual memory turned on to reach 16 MB of total memory) or a minimum of 16 MB of installed memory.

The Modern Memory Manager, a faster method for OS and Toolbox memory management, can no longer be disabled in the Memory control panel. It will remain on by default and is expected to improve system reliability and ensure that your applications will always benefit from the Modern Memory Manager’s increased efficiency. The decision against disabling the Modern Memory Manager was made because Apple was not aware of any current applications that run with the Modern Memory Manager turned off. This allowed Apple to focus its testing resources and test the system only with the Modern Memory Manager turned on by default. With the Modern Memory Manager always on, customers will not be able to create system configurations that may cause problems for your applications.

A more robust file system cache provides a better user experience by flushing written data to the disk during idle time rather than relying



Extensions Manager 4.0. This new version of the Extensions Manager helps users organize, control, and better understand system files.

solely on the application to flush the cache. This process makes it less likely that users will lose data in the event of a crash or system failure. Your applications should still flush the cache periodically, since the new file system cache relieves only some of the burden on the applications.

Faster, Easier Printing

LaserWriter 8.4 incorporates several functions originally slated for Mac OS 8. Its features have been enhanced and are more flexible and less modal than the version originally shipped as part of System 7.5.3. It speeds printing, simplifies setup, improves print dialogs, and offers enhanced printing capabilities (including *n*-up printing)—all without requiring trips to the Chooser or Page Setup. The enhanced LaserWriter capabilities will be installed only on PowerPC processor-based systems as a result of the issue with CFM-68K (previously mentioned), which LaserWriter 8.4.x requires. Apple will continue to work toward providing LaserWriter 8.4.x for 680x0 processor-based computers and will distribute this software in an upcoming release. Until then, Mac OS 7.6 will install LaserWriter 8.3.4 on 680x0 processor-based systems.

Improved PC Compatibility

Mac OS 7.6 improves compatibility with PC files by providing better support for opening, viewing, and saving files from DOS and Windows media into either Mac OS or PC formats. Building on a strong foundation of existing software (Macintosh PC Exchange, Macintosh Easy Open, and Dataviz MacLinkPlus), Mac OS 7.6 allows users to share files easily—opening Mac OS and Windows files by using the translators supplied in MacLinkPlus.

Mac OS 7.6 adds support for the DMF disk format for some Windows 95-based systems, thus adding to existing Mac OS support of DOS and Windows 3.x floppies, SCSI drives, and third-party removable media. DMF file support is provided only for PCI-based and 6100- and 630-series computers.

In addition, several bug fixes were made to Macintosh PC Exchange in response to customer and developer feedback. Finally, Mac OS 7.6 will not deliver an updated version of DOS-compatible software, because a more current version will be available on the Internet when Mac OS 7.6 starts shipping.

Additional Improvements for Productivity and Efficiency

Mac OS 7.6 is the first release of system soft-

ware that builds in support for the latest multiprocessor computers from Apple and third parties. This allows multiprocessor-aware applications to run faster by allowing math-intensive computations to be offloaded to an idle processor for greater speed.

The Apple System Profiler gathers detailed data about the operating system, control panels and extensions, and devices (such as SCSI devices and other hardware) installed on specific 68040 and PowerPC processor-based models. Because the Apple System Profiler is used by Apple customer support in diagnosing software incompatibilities and other configuration problems, Apple has moved this software from the Apple Extras folder to the Apple Menu Items folder in Mac OS 7.6. In addition, your own technical support staff can benefit by using the Apple System Profiler as a first diagnostic step in providing support for your applications.

Listening to Our Partners

Mac OS developers have a long history of offering advice on ways to enhance the Mac OS. In 1996, the MacHack conference, an annual gathering of veteran Mac OS developers (see <http://www.machack.com>), returned many key issues for Apple to address, including driving the adoption of core Apple technologies, providing features and enhancements that improve overall performance, and providing a straightforward approach to version numbering. Apple has addressed many of these issues in Mac OS 7.6.

Apple has taken efforts to give you more business opportunities by including technologies such as OpenDoc and the OpenDoc Essentials Kit as part of the system software installation for PowerPC processor-based computers. In addition, features such as an enhanced installer, Extensions Manager, LaserWriter software, and file system cache will improve overall system performance and reliability—thus making your software work better.

Developers will also find that Apple has continued its simplified system software version numbering. Beginning with the System 7.5.5 Update, a change in the first digit of the version number marks a major architectural change. A change in the second digit marks a new, complete system software release, including performance and reliability enhancements (hence the numbering of this release as *Mac OS 7.6*). Finally, a change in the third digit denotes an update that primarily includes

reliability and can include performance enhancements.

A System for Licensees

Mac OS 7.6 is the first Mac OS version to be “licensee-friendly”—that is, it removes several of the most visible references to the Macin-

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tosh brand name, making it easier for Mac OS licensees to use Mac OS 7.6 without modification. Users will find the “Welcome to Macintosh” screen replaced by the Mac OS logo startup screen, while menu items such as About This Macintosh, Macintosh Easy Open, and Macintosh Guide have been changed so that the Mac OS can be used more easily on licensees’ hardware. You may want to look at this as an opportunity to “sanitize” your applications by removing references to the Macintosh brand name.

Support for Large Volumes

Finally, the new system software supports large hard drive volumes (up to 2 terabytes in size) for 68040 and NuBus™-based PowerPC processor-based systems, thus strengthening the Mac OS as the platform of choice for solutions that involve extremely large files—solutions for video editing, multimedia, and animation (PCI-based Mac OS systems already have had this capability). You should expect the presence of large volumes attached to Mac OS-compatible computers in the near future. Since a large volume will allocate a minimum block size for even the smallest files (164 KB on a 10 GB volume), you may want to consid-

er decreasing the number of files your application creates, especially if it is likely to be used on computers that will have very large mass-storage volumes. If you are a developer of large-capacity storage devices (4 GB and up), you may want to consider extending support to 68040 processor-based computers and NuBus-based, PowerPC processor-based computers to extend your market share.

Issues

At the time of this writing, Mac OS 7.6 will not allow CFM-68K to load on 680x0 processor-based Mac OS computers, and CFM-68K Runtime Enabler is not included as part of this release. This means system software dependent upon CFM-68K Runtime Enabler—including OpenDoc, Cyberdog, and LaserWriter 8.4.x—will not be installed on 680x0 processor-based systems. Mac OS 7.6 will substitute LaserWriter 8.3.4 for LaserWriter 8.4.x on these systems. Apple has assigned a team of engineers to develop a solution for the CFM-68K Runtime Enabler bug, and there is currently not enough information to make any statements about solution delivery.

You should also remember that Mac OS 7.6 is designed to support 32-bit clean Macintosh and Mac OS-compatible models. This includes the majority of 680x0 processor-based and all PowerPC processor-based systems. Please note that Mac OS 7.6 will not support the following models:

- Macintosh Portable
- Macintosh Plus
- Macintosh PowerBook 100
- Macintosh SE
- Macintosh SE/30
- Macintosh II
- Macintosh IIfx
- Macintosh IIfx
- Macintosh LC
- Macintosh Classic®

The previous Mac OS release, System 7.5.5, provides support for all Macintosh models back to the Macintosh Plus.

Mac OS 7.6 completes the transition to Open Transport as the sole networking protocol for the Mac OS, providing improved performance, especially on PowerPC processor-based computers. This means Mac OS 7.6 will not support classic AppleTalk directly. However, Open Transport will provide an API compatibility layer that allows old AppleTalk-based software to work with some performance degradation, just as it does today.

Users will not be exposed to pre-Open Transport control panels, such as the MacTCP control panel, and they won't have the option of disabling Open Transport in favor of classic AppleTalk. Future networking improvements will be implemented in Open Transport only, so you should continue to convert your network-based applications to Open Transport and write new applications using Open Transport to take advantage of enhanced features and improved performance and stability.

Finally, while Mac OS 7.6 and later releases will be compatible only with computers that support 32-bit addressing, you will still need to ensure that your applications run on models that support 24-bit addressing so that your products will be compatible with previous system software releases and Macintosh models not supported by Mac OS 7.6.

Opportunities

Apple's success is directly connected to the success of our developers—when you win, we win. Mac OS 7.6 provides another step in delivering a superior user experience. The market for your products remains strong and

continues to grow—there are over 60 million Mac OS users worldwide and over 26 million Mac OS computers sold. The Software Publishers Association said Mac OS worldwide software revenues reached \$1.4 billion in 1995.

According to a June study by IDC, the Internet, intranets, and the World Wide Web provide significant opportunities for software development and “represent the best opportunity for the software market.” Mac OS 7.6 capitalizes on this trend by delivering easy and pervasive Internet capabilities in an “Internet-everywhere” release. Advanced, cross-platform multimedia technologies such as Apple's QuickTime technologies enable easy creation of high-impact communications. You can enable users to extend the usefulness of your applications by allowing them to embed new technologies into your OpenDoc-enabled containers.

Mac OS 7.6 has reduced the obstacle of PC compatibility by adding compatibility for Windows 95 disks. And Apple will continue to provide and license key technologies and the Mac OS to ensure the broadest market for our products and yours.

Looking Forward

As Apple continues to issue frequent and regular system software releases, it is better able to provide exciting new enhancements that deliver new functionality on a predictable, more timely basis. Compatibility between Mac OS 7.6 and previous System 7 releases means customers can upgrade their operating system when they want access to new features and functionality without concern. For instance, customers wishing to take advantage of improved Internet integration and Live Objects will find Mac OS 7.6 especially attractive, since all of the latest Apple system software technologies are in one convenient place.

Apple will strive to release Mac OS technologies as quickly as possible as they become available—and Apple will continue to develop new services for improved multitasking, better memory protection, and enhanced performance. For more specific technical information on Mac OS 7.6, visit the Technotes page on the Apple Developer World web site located at <http://devworld.apple.com/dev/technotes.shtml>. ♣

Internet Resources for This Issue

News

- Mac OS Software and Hardware Guide—<http://www.macsoftware.apple.com>
- “Doin’ the Java Jump”—<http://devworld.apple.com/mkt/informed/appledirections/dec96/stratmosaic.html>
- CFM-68K Runtime Enabler Technote—<http://devworld.apple.com/dev/technotes/tn/tn1084.html>
- Press release on CFM-68K Runtime Enabler bug—<http://www.macos.apple.com/macos/cfm-68k.html>
- Apple Developer World—[- \[devworld.apple.com/\]\(http://devworld.apple.com/\)
 - Mac OS Runtime for Java—<http://www.devtools.apple.com/mrj/>
 - Beta 2 version of Cyberdog—<http://cyberdog.apple.com/>
 - Apple Internet Connection Kit upgrade—<http://aick.apple.com/>
 - Press release on Power Macintosh price reductions—<http://product.info.apple.com/pr/press.releases/1997/q1/961031.pr.rel.pmprices.html>](http://www

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Technology

- Speech Synthesis Manager—<http://www.speech.apple.com/>
- Technotes—<http://devworld.apple.com/dev/technotes.shtml>

- MacHack conference—<http://www.machack.com>

Business

- RDC Interactive media samples—<http://www.rdc-online.com>
- I.con Interactive media samples—<http://www.mediacon.com>
- Announcement about Apple Media Tool 2.1—<http://product.info.apple.com/pr/press.releases/1996/q4/960917.pr.rel.mediatool.html>
- Apple Developer Catalog—<http://www.devcatalog.apple.com>

Business

Business Feature: In this case study, an architect-turned-developer describes how he used Apple Media Tool and QuickTime VR to quickly create a virtual reality showcase home for a manufacturer of home improvement products.

DEVELOPER SPOTLIGHT

The House That Apple Media Tool Built

By Kris Newby, Apple Directions staff

Masco Corporation, a leading manufacturer of building and home improvement fixtures, typically builds a new showcase home every year to promote its products to attendees of the National Association of Home Builders (NAHB) Show. Last year, Terry Beaubois, president of RDC Interactive Media, proposed an alternative to this rather costly project—building a virtual showcase house that attendees could literally take home.

Beaubois's pitch to Masco was straightforward: Photograph Masco's existing showcase home in Columbia, Maryland, and create a CD-ROM-based interactive model of it using Apple Media Tool and QuickTime VR. Let show attendees take virtual walks through the showcase home on computer kiosks. Let viewers pick up and rotate Masco fixtures—everything from doorknobs to kitchen sinks—from inside the virtual home. And let industry builders and buyers take the Masco CD back to their offices for use as a convenient, digital product directory.

Skip Cypert, Masco's director of corporate communication, was quick to see the benefits of the virtual showcase concept. Building a house out of bits rather than boards would save Masco money in the long run; it would provide customers with a more memorable marketing deliverable; and, most important, it would position Masco as a technology leader in the building industry. Cypert gave the project the go-ahead, but there was just one catch—RDC had to build the Masco interactive CD (using pre-release versions of both QuickTime VR and Apple Media Tool 2.0) in just three months.

An Architect Turns Developer

Beaubois, like many multimedia developers, didn't begin his career as a programmer. Ten years ago he was working as an architect, running his own residential design practice, when

he bought his first Macintosh computer. It was "love at first site," and over time he was using computer-aided drafting software, digital cameras, 3D modeling packages, and databases for all aspects of his practice. Today, in addition to his architectural practice, Beaubois is running a thriving business that specializes in interactive media projects for the building and architecture trades.

When RDC began the Masco project in October 1995, they'd just completed a large Apple Media Tool project for *Builder Magazine*. (For details, see the article "A Tale of Three CDs," *Apple Directions*, November 1994.) Given the time constraints and size of the Masco project, Beaubois and RDC's technical guru, Greg Miller, decided to enlist the development expertise of Calvin Carter and his staff at I.con Interactive. (Founder Calvin Carter began his programming career as a 13-year-old, when he set up an online dating service on his networked Apple II+ computer.)

The first step of the project was to design the CD's interface. Because QuickTime VR was so new, there wasn't a cast-in-concrete navigation scheme that they could use to help viewers walk around "inside" a virtual building. What's more, the interface also had to be easy enough for non-computer-literate builders and architects to use. To meet these requirements, RDC decided to provide users with three ways to examine the showcase home's contents—by navigating around in the QuickTime VR window; by clicking "hot spots" on a floor plan; or by highlighting list items categorized by product, manufacturer, location, and function. (You can see the final interface on page 19.)

At that point, the team realized that one of the main technical challenges would be organizing and accessing information on the 65 different Masco products, in the multiple ways that the interface allowed.

RDC Interactive Media Palo Alto, California

RDC Interactive Media produces and develops interactive media projects and web sites for businesses with a focus on the architecture and building trades. They have also produced the annual Builder Magazine Electronic Buyer's Guide CD for the last three years with publisher Hanley-Wood.

Media samples:

- <http://www.rdc-online.com>

I.con Interactive Dallas, Texas

I.con Interactive, a division of Integrated Consulting, designs and develops interactive catalogs, kiosks, Internet web solutions, and CD-ROM discs for businesses.

Media samples:

- <http://www.mediacon.com>

Apple Media Tool Benefits

- *Development speed.* Apple Media Tool's intuitive media browser and programming language enable shorter development cycles.
- *Compatibility with QuickTime technologies.* Apple Media Tool supports high-quality, cross-platform QuickTime movies and VR files.
- *Object-oriented programming capabilities.* These facilities enable object reuse, easy linking to databases, and fewer lines of code.
- *Reliable cross-platform porting.* Moving a Macintosh-based project to the Windows platform is fast and reliable.

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 (<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.

The Fine Art of QuickTime VR Photography

Beaubois knew that NAHB Show attendees would be a tough crowd to please when it came to architectural photographs. This audience, after all, was accustomed to the quality of photographs found in magazines like *Architectural Digest*. His challenge was to find a photographer with architectural and QuickTime VR project experience. Ultimately, he enlisted the aid of Scott Highton, a photogra-

pher based in San Carlos, California, who had been the principal photographer for the Apple Company Store virtual reality tour.

"In traditional interior photography, one of the biggest challenges is balancing the inside and outside lighting of a building," says Highton. "To get the balance right, it might take all day to get two or three high-quality shots. Because of this project's tight schedule and the size of the Masco showcase home (8,000 square feet), we decided, at the

start, to primarily use available lighting in the house. We made adjustments to lighting during the shoot where we could, then planned to correct everything else in post-production."

At the showcase home, Highton selected 60 locations, called *VR nodes*, for photographing interior spaces. At each node, he positioned his 35-mm Nikon camera (with a 15-mm lens) on a tripod with a custom rotating mount. Then he took photographs in 30-degree increments around each node. It took three days to shoot the whole house. A product photographer and an engineer with a special QuickTime VR rig were hired to take pictures of free-standing fixtures, such as sinks and faucets. These would later be dropped into QuickTime VR as objects that could be rotated in space by CD users.

Once the interior photography was done, images were digitally scanned onto CDs using Kodak Photo CD technology. Highton supervised this process to make sure that the lighting and color on node-specific images would blend well. Then, these images were loaded into QuickTime VR, where the 12 images around each node were "stitched" together into a panoramic cylinder. Lighting correction was done with Adobe Photoshop, and in most cases, window views had to be cropped out of room shots, then pasted back in with better outside exposures. After that process, each node could be viewed through the QuickTime VR window, which created the illusion that a viewer was standing in a room looking around. QuickTime VR's perspective correction filter made the resulting panoramic view look more realistic.

Framing the Project With AMT

By the time the VR nodes were completed (using a pre-beta copy of QuickTime VR), it was late November. That left just one month for RDC and Carter's team to piece together the final title. Because Carter was a veteran of massive client/server development projects, he wasn't intimidated by the project's size.

"One thing that helps us with projects like this is to simplify them by eliminating redundancies," says Carter. "While RDC was gathering content, we used Apple Media Tool as a computer-aided software engineering (CASE) tool, setting up a framework that we could hang data on later. We wouldn't have been able to finish all the changes and debugging if we had to hard code in all the links to product information.



The Masco Showcase Home Interface. Viewers can examine the Masco showcase home's contents by navigating around in the QuickTime VR window, by clicking "hot spots" on a floor plan, or by highlighting a list item.

"First, we used Apple Media Tool to create a generic product data structure. This structure was built with calls that could access our custom database of product attributes (names, descriptions, placement coordinates, manufacturers, PICT files, QuickTime VR files, and so on). This way we could drop product information into a one-size-fits-all structure at any point in the project, without causing a delay. We took the same approach in implementing the screen floor plan: By using one generic floor plan, we could cut and paste in specifics for the other two floors."

Another thing Carter correctly anticipated was that the product and list menus would be changing up to the last minute. He realized that a major change late in the project could jeopardize the schedule. To cope with this eventuality, he again detached specific product data from his list menu interface. First, he created a generic list menu with 13 line items. Then he linked one list menu to the room part of his database, one to the product part of the database, one to the manufacturer part of the database, and so on. He created a 60-frames-per-second QuickTime movie with different list lines highlighted using the ConvertTo-Movie shareware utility. This way, when a user selects a list item, the QuickTime movie frame

with the highlighted line appears, along with the proper product photo.

Carter adds, "The Apple Media Tool Programming Environment includes a truly object-oriented programming language, where we could create multifunctional buttons that could call up data from our database. The process wouldn't have been nearly as fast or flexible if we'd had to use a non-object-oriented authoring tool, such as Macromedia Director."

New Year's Resolution: Cross-Platform CD On Time, On Budget

"On about December 15th, we delivered a first-floor-only version of the CD," says Carter. "If we all hadn't worked with Apple Media Tool before, we would've been worried about getting everything done in just two weeks. But once we got the first-floor bugs out, all we had to do was load the rest of the product database. Almost overnight, we'd implemented 85 percent of the CD's functionality."

During the week following Christmas, RDC and I.con Interactive completed the final

debugging and compiled a Windows version of their program in Apple Media Tool. Now both the Mac OS and Windows programs could run on a single hybrid CD. At that point they just had to make a few software patches and performance tweaks.

"On January 5, 1996—three months after we began the project—we shipped the first-ever virtual showcase home to the NAHB Show on schedule *and* on budget," says Beaubois. "We couldn't have done it without the stability, performance, and cross-platform facilities offered by Apple Media Tool."

The Masco showcase home CD was a big hit at the 1996 NAHB Show, and this development team's innovative use of Apple Media Tool and QuickTime VR technology is still garnering national television and newspaper publicity for both Masco and RDC. ♣

Kris Newby (newby.k@applelink.apple.com) is business editor of Apple Directions and a freelance writer based in Palo Alto, California.

Toolbox

Hardware

- Power Macintosh 8100/80AV, 8500/120, and 6150/66 computers
- PCs for testing and for Windows-version compiling

Software

- Adobe Photoshop
- Apple Macintosh Programmer's Workshop (MPW)
- Apple Media Tool Programming Environment
- Apple Media Tool
- Apple QuickTime
- Apple QuickTime VR
- ConvertToMovie shareware utility
- I.con's custom MDM database

Masco's CD-Based Product Catalog. On the Masco CD, users can click on some of the house fixtures to call up a QuickTime VR representation of the part that can be rotated in three-dimensional space.

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/>).