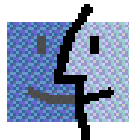




# Mac OS 8

*Foundation for the Next Generation of Personal Computing*



Mac<sup>™</sup>OS

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# Welcome

When Apple introduced the 4-kilobyte Apple® II computer in the late '70s, its technology was considered exotic. People weren't even sure what a personal computer was. Throughout the world, hardly anybody had one.

Today, more than 56 million customers worldwide enjoy the power of Apple personal computers. What was a new technology in the late '70s has, in just 15 years, become central to our lives.

We've all seen incredible changes in computer products since the first Apple II—from the revolutionary graphics-oriented operating system of the Apple Macintosh® computer to the multimedia, intranet/Internet access, and 3-D graphics capabilities of Power® Macintosh computers. One thing that hasn't changed is Apple's basic business: ongoing innovation that insulates people from the computer's complexities, yet gives them access to all of its power.

To deliver even more powerful systems that take advantage of converging and emerging technologies, Apple has launched its most significant software engineering effort to date: the next major release of the Macintosh operating system. Its name is Mac™ OS 8, and it will provide the foundation for a new era in personal computing.

Beyond simply providing a graphical user interface, Mac OS 8 integrates more than a decade of experience and innovation in creating and improving the technology of human interfaces, networking, and communications. By making computers easier to learn and use, improving personal computer hardware performance, and providing the foundation for component-based computing, Mac OS 8 not only will give individuals and organizations the power to work more efficiently today, it will also allow them to work in new ways tomorrow.



# Mac OS 8: Foundation for the Future

Ten years ago, people predicted that computers would bring about the paperless office. In fact, the opposite has become true: with a world of libraries and 50 million people accessible electronically, people find themselves in the midst of a paper and information snowstorm. That's why they need tools that enhance—not limit—their effectiveness, especially in the face of increasing pressure to accomplish more in less time.

Apple's research and development team recognizes that the future of personal computing will involve more than just placing a computer with a graphical user interface on a desktop. It will require helping people function more efficiently in every aspect of their work—from locating and creating information to communicating over networks—so they have more time to innovate, develop their ideas, and accomplish more of what they do best.

While other companies struggle to build into their systems features that Macintosh customers have enjoyed for years, Apple engineers are designing capabilities and features that will carry personal computing into a new era of performance, efficiency, and ease of use.

Creating Mac OS 8: Apple's Four-Point Strategy

To create Mac OS 8, Apple adopted a four-point technology strategy:

- **Advanced foundation technologies.** Adopt RISC technology, a microkernel foundation and the industry-standard OpenDoc® component software architecture as the key technologies to design and develop an openly licensable operating system platform.
- **Next-generation platform.** Widen the Mac OS advantage with the easiest-to-use human interface, the richest environment for graphics and multimedia, and extensive communication and collaboration capabilities.
- **Support for other platforms.** Ensure Mac OS interoperability with DOS- and Windows-based computers, and openly license the Mac OS to system vendors to encourage the development of a wide variety of Mac OS-compatible systems.
- **Network services.** Ensure that the Mac OS integrates seamlessly with leading industry-standard network services, the Internet, and server platforms; make Mac OS-based systems the best network clients.

*The great strength of the Mac OS is its powerful foundation technologies for innovation. It offers more efficient ways of working and communicating; provides unmatched ease of learning, use, configuration, and support; and presents the safest choice for integrating with other platforms and networks.*



#### The Mac OS 8 Advantage

Mac OS 8 harnesses the potential of the advanced PowerPC™ microprocessors to make computing easier and more powerful for everyone, from the least experienced home users to high-end technical users. It offers:

- **Power Beyond Speed.™** In terms of raw computing power, Mac OS 8 is designed to improve the performance of current Macintosh applications, and will drive a new generation of multimedia and productivity applications. That's because Mac OS 8 is optimized to take advantage of the power of PowerPC RISC processors, incorporate advanced multitasking capabilities, and integrate memory protection capabilities to improve the stability of the computing environment. In addition, with its support for the OpenDoc component software architecture, Mac OS 8 will give users an unprecedented ability to extend the usefulness of their applications by dragging and dropping new functionality—for instance, QuickDraw™ 3D, QuickTime® VR, or Internet resources—directly into them.
- **Tools to simplify a complex world.** Mac OS 8 leverages Apple's world-class leadership in ease of use and innovation to give people new tools for managing and navigating a wide range of computer resources and information. It will provide new, more intuitive ways to find, organize, and manage information on local hard drives or networked servers; transparent cross-platform networking capabilities; intranet/Internet access; assistance that extends ease of use to ease of doing; and a customizable interface to match individual levels of computer expertise.

- ***The freedom to create.*** Regardless of the medium used—paper, the Internet, or CD-ROM—Mac OS 8 will make it easier for users to create compelling content and deploy it to a wide range of computing platforms. The Mac OS is already the first choice in the publishing industry, and Mac OS 8 will make print and multimedia publishing even easier by enabling users to work with information in all its forms: text, graphics, animation, sound, live-motion video, and virtual reality images.
- ***Compatibility—backward and forward.*** Like current Mac OS-based systems, Mac OS 8 is designed to run current applications without modification and assure compatibility with mixed networks, so that network access remains transparent. The ability to read and translate different types of files will also be part of the Mac OS foundation, and Mac OS 8 will continue to offer support for applications written for DOS and Windows.

#### Summary

As the next generation of the Mac OS, Mac OS 8 will give people the power to work more efficiently—and in entirely new ways. By combining the performance of PowerPC RISC processors, multitasking, and a microkernel, Mac OS 8 will deliver higher performance and stability. By offering a suite of new tools, Mac OS 8 will make it easier for people to work with and manage information in all its forms. By enhancing the industry-standard platform for publishing and multi-media, Mac OS 8 will make it easier for people to create compelling content for multiple platforms. And by providing backward and forward compatibility with current applications and networks, Mac OS 8 will assure a smooth migration to the new era of personal computing.

*“It would not be an exaggeration to describe the history of the computer industry for the past decade as a massive effort to keep up with Apple. In 1984, critics derided the Mac for its appliance-like simplicity, but it went on to pioneer or popularize almost every innovation in personal computing: the GUI, desktop publishing, built-in networking, plug and play, integrated multimedia. . . .”*

*—BYTE Magazine,  
December 1994*



# Power Beyond Speed: The Mac OS 8 System Foundation

Those interested in raw horsepower will be pleased to learn that Mac OS 8 makes the most of the RISC-based PowerPC microprocessor.

But there's another kind of power that goes beyond speed: the power for people to work the way they want to. By combining the power of RISC processing with support for OpenDoc component software, Mac OS 8 will deliver a high-power, extensible computing environment.

## A New Foundation for Performance

The advanced user interface of Mac OS 8 rests on an operating system foundation that has been redesigned from the ground up. At its core is a microkernel. Though most users will never know—or care—about the microkernel, the capabilities that it delivers will serve the future needs of the operating system for many years. Through this new foundation, Mac OS 8 will deliver:

- Higher overall system performance through operating system software that is optimized for PowerPC, preemptive multitasking services, and algorithmic improvements for performance-critical areas such as the I/O and file systems
- Improved system stability through protected memory
- An improved memory model that uses RAM more efficiently
- Better ways for software developers to add functionality through refined and robust mechanisms (system extensions, volume format plug-ins, etc.)
- A broader choice of computers for customers through a hardware abstraction layer that enables hardware vendors to more easily design and deliver Mac OS-compatible systems

The new foundation also makes possible:

- Greater ease in setting up, using, and administering network services by offering improved communications features and plug-and-play access to major networks
- Software applications that are easier to use, develop, manage, and support through OpenDoc, an industry-standard, multiplatform, component software architecture

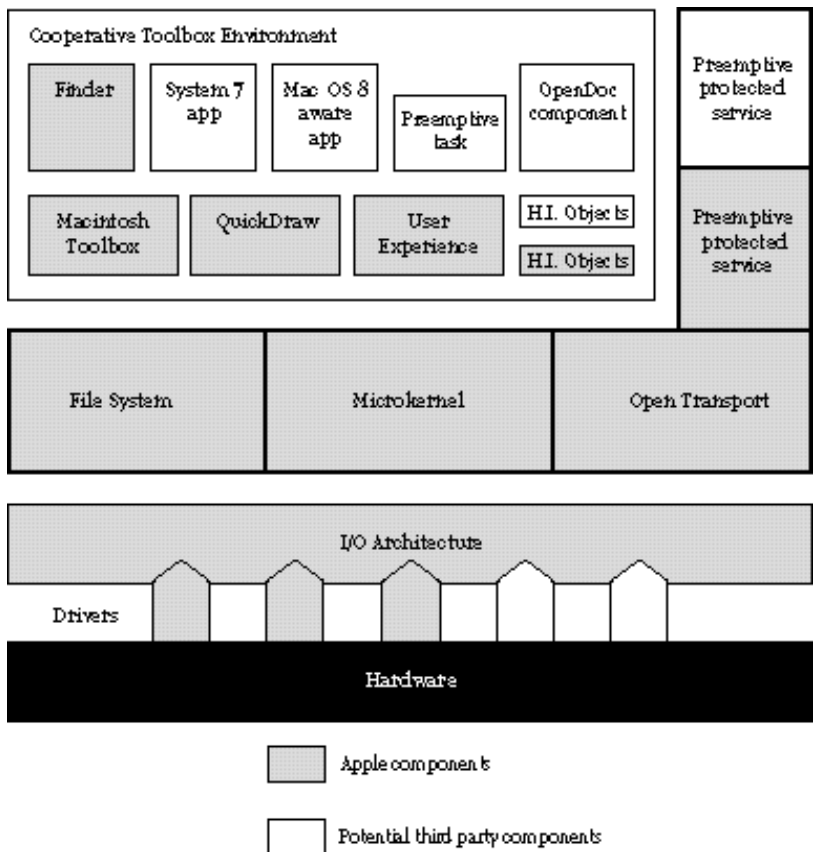
*“The Macintosh market is more manageable for IS and more profitable for vendors than Wintel.”*

—Datamation,  
September 15, 1995

*The power of RISC for higher performance.* When Apple introduced the Power Macintosh platform in 1994, the Mac OS became the first mainstream, RISC-based operating system for personal computers. Mac OS 8 fully exploits RISC performance to provide the power needed to run today's and tomorrow's applications—from disk-intensive multimedia applications to math-intensive business applications or graphics-intensive publishing applications.

To improve overall system responsiveness—yet maintain compatibility with the thousands of applications available for Mac OS today—Mac OS 8 will use a combination of cooperative and preemptive multitasking to perform many operations concurrently, such as writing and reading files, retrieving and sending information over networks, or rendering text or graphics for display or printing.

Mac OS 8 will employ preemptive multitasking for application subprocesses and low-level operating system services such as the I/O system, file system, networking services, and system extensions. At the same time, it will maintain a cooperative processing model to provide backward compatibility for System 7.5-based applications. This approach will preserve the user's investment in existing software while delivering advances in multitasking that offer immediate benefits—initially at the operating system level and in the future through new applications designed specifically for Mac OS 8.



*Radically redesigned, Mac OS 8 provides a superior foundation for performance, flexibility, and growth.*

***Memory protection for better system reliability.*** To increase system reliability, Mac OS 8 will introduce a new memory protection model that protects applications that are currently running from interfering with the microkernel and other critical OS services (such as the file system, I/O, and networking services). Software applications also will be able to exploit this mechanism by partitioning critical services—for instance, database manipulation or three-dimensional modeling—to run in the background in their own protected memory spaces.

The Mac OS 8 memory protection model will translate directly to improved overall system reliability. With Mac OS 8, users will be less likely to lose data or network connections should an errant application unexpectedly crash.

***A more efficient—and cost-effective—memory model.*** The advanced capabilities of Mac OS 8 can lead to dramatic improvements in overall user productivity—without increasing RAM requirements.

Mac OS 8 will introduce an important new approach to minimizing memory requirements. It will load into RAM just the small elements, or libraries, of system and application software that the user needs at any given time. So, even though an application may be 5 megabytes in size, Mac OS 8 will load only small code and data segments, and only as needed. This means that users will be able to exploit the full richness of the Mac OS without worrying about RAM.

***Improved system functionality.*** One significant advantage of the Mac OS is that it will give Apple and independent software vendors (ISVs)—and, ultimately, users—very easy and cost-effective ways to add new system functionality. In Mac OS 8, Apple will provide dramatically improved and very robust mechanisms to add functionality through system extensions, volume format plug-ins, and OpenDoc components, etc., all of which can be created to operate more predictably on a wide variety of Mac OS-compatible systems.

***A wider range of hardware options.*** Today, Mac OS-compatible applications run on Apple's Macintosh systems as well as systems from several Mac OS licensees. In the future, Mac OS 8 will enable a wide variety of computers to be delivered from multiple vendors. These computers will be based on the PowerPC platform (PPCP) that has been developed by Apple, IBM, and Motorola. That means much greater choice for customers, who will be able to purchase systems that meet their specific requirements.

OpenDoc: Software That Works the Way You Work

Mac OS 8 will incorporate OpenDoc, an industry standard for component software. OpenDoc allows developers to deploy small, standalone software components (called “parts”) that users can mix and match to customize and extend the functionality of their applications. OpenDoc offers the following benefits:

- OpenDoc will make working on a computer simpler and more intuitive. It breaks down the barriers between applications, allowing users, for example, to employ the same graphing component in all applications rather than learn to use different graphing functionality in each one.

- OpenDoc will let users tailor applications to their own needs. Users will be able to easily add functionality to applications simply by dragging and dropping OpenDoc components—for example, a graph, table, outline, or World Wide Web site—into a document.
- OpenDoc will give users faster access to new technologies because developers will no longer need to provide explicit support for them. And since Mac OS 8 packages many existing and emerging Apple technologies as OpenDoc components, developers only need code to one cross-platform standard—the OpenDoc standard—and get the rest of Apple’s technologies with no extra effort, even advanced technologies such as QuickDraw 3D and QuickTime VR.
- Because OpenDoc is a cross-platform standard, organizations will be able to easily standardize on the same software across platforms and seamlessly combine applications and services from different vendors.

OpenDoc enjoys widespread industry support as the standard in software component architecture. Available for Mac OS Windows, OS/2 and UNIX,<sup>®</sup> OpenDoc is also designed to provide full interoperability with other component software architectures such as Microsoft OLE 2.0.

#### Summary

The radically redesigned, microkernel-based operating system of Mac OS 8 lays a solid foundation for superior system performance and stability, and it assures unprecedented flexibility and room for growth. With Mac OS 8, it will be easier to add functionality. Easier to use, develop, and support applications. And easier to choose exactly the features that meet individual needs. As a result, Mac OS 8 will assure customers of the best value in price and performance of any personal computer.

## Tools to Simplify a Complex World

A computer's usefulness is determined largely by the ease with which it allows people to work efficiently and productively. Traditionally, ease of use has been associated with a graphical user interface, and the Macintosh was the first personal computer to offer one. It popularized now-standard features such as pull-down menus, icons, drag and drop, and windows, and "Mac-like" became the ultimate accolade as other computer companies rushed to build their own graphical user interfaces that mimic the Mac OS.

But a graphical user interface is only one part of what makes a computer easy to use. For personal computers to be truly easy to use today, they must provide the tools people need to more intuitively find, manage, and use the virtual mountains of information residing on local and networked resources; streamline desktop operations; connect seamlessly to networks, including the Internet; quickly execute complex tasks without having to remember strings of command sequences; and work in an environment that matches their computing skills.

That's why Apple is moving beyond today's user interface capabilities, and is raising ease-of-use standards with richer information management capabilities and breakthroughs in the overall user experience.

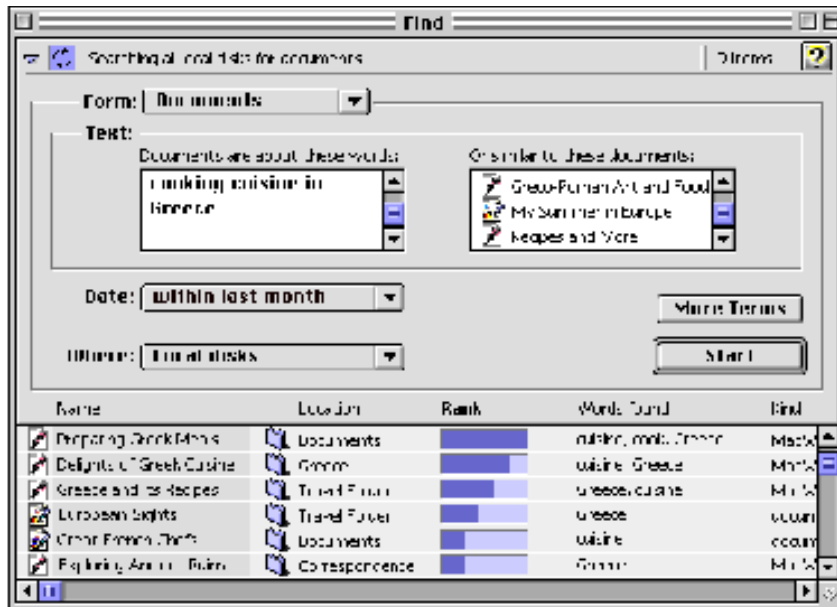
### Taking Control of Information Overload

In a world of gigabyte-sized hard disks and distributed network servers, Mac OS 8 will deliver a new set of tools that give users easier and more intuitive ways to find, organize, and manage information.

***Faster information access.*** Because it takes advantage of the speed of the PowerPC architecture and the multitasking capabilities of the Mac OS, Mac OS 8 will provide faster access to information in two important ways:

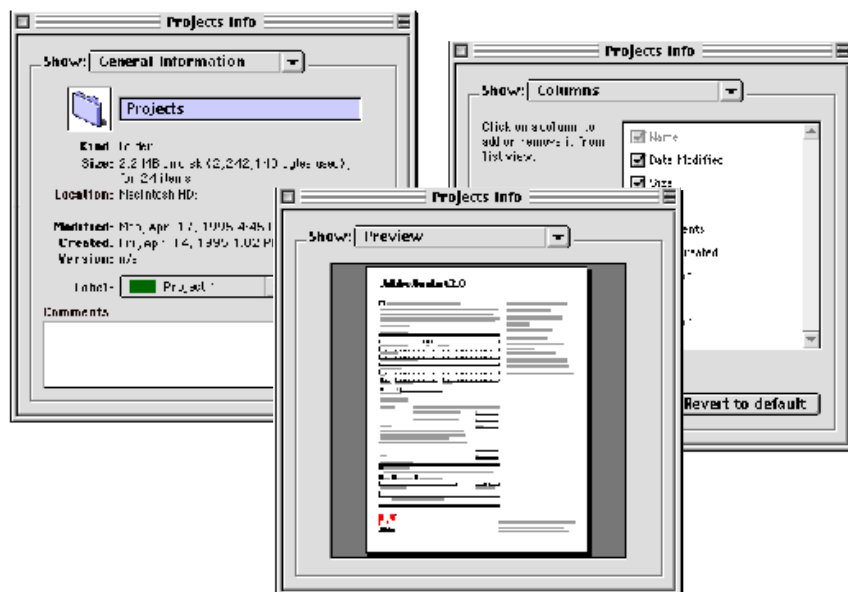
**Find by content.** With its enhanced Find capability, Mac OS 8 will allow users to search the contents of documents without having to learn a complex query language. This way, users can bypass the file system's hierarchical structure and work with multiple levels of files, folders, and applications by attribute—for example, "everything modified yesterday" or all documents containing the words "cooking cuisine in Greece."

Mac OS 8 also will be able to find by example, such as all documents similar to this report on “Greco-Roman Art and Food.” Users can save the results generated by the new Find command for easy access later on. In addition, Mac OS 8 will automatically update the listing as disk contents change.



*With Mac OS 8, a new find capability makes it easy to search the contents of documents without having to learn a complex query language.*

**Improved Get Info.** The new Get Info panels of Mac OS 8 will provide comprehensive information about the contents of volumes, folders, documents, and other Finder items. Within the window, users can now preview a document's contents as well as modify the document name and other file characteristics.



*New Get Info panels allow users to easily obtain information on an item, modify its characteristics, and preview its contents.*

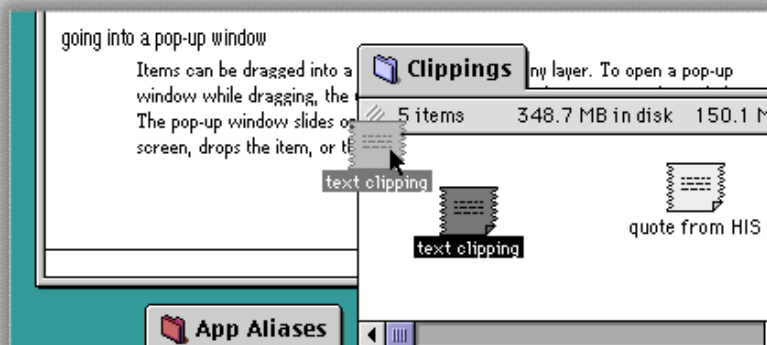
**Improved information management.** Mac OS 8 will streamline information management by giving users multiple ways to organize information. As an extension of the new Find command, Mac OS 8 will allow users to save the results of a Find for easy access later on. These “Saved Finds” provide multiple views of, or windows into, the same information. For example, users can store hundreds of documents in a single folder and create an unlimited number of Saved Finds that can be based on subject, date, contents, or other criteria. Saved Finds will eliminate the need for users to create aliases manually and make much more efficient use of hard disk space.

**Streamlined navigation.** Mac OS 8 will streamline many day-to-day computing tasks by providing task-centric or context-sensitive tools for locating, opening, copying, and saving information—both at the desktop level and from within documents. As a result, users will be able to perform common desktop management operations without interrupting the larger task at hand.

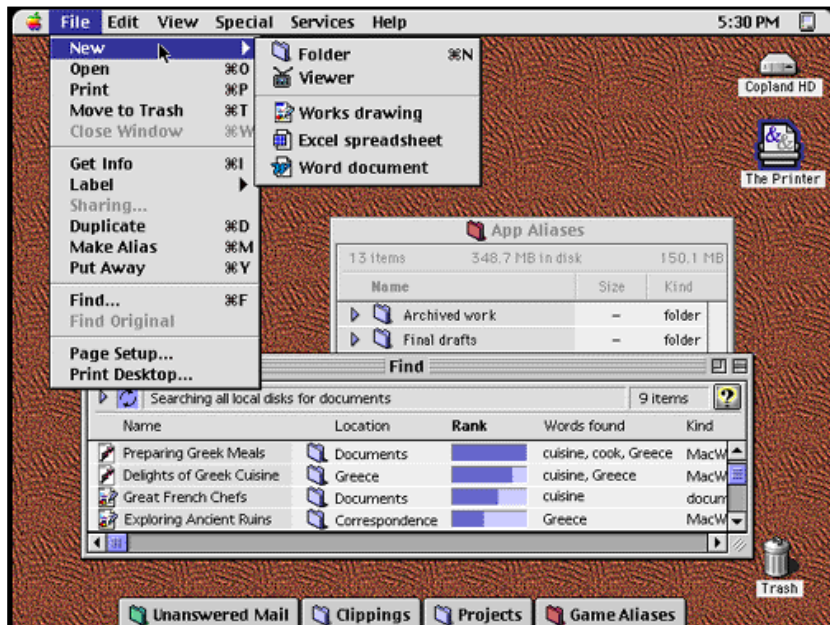
**Automatically-opening folders.** A new Mac OS 8 capability called automatically-opening folders will allow users to quickly and easily navigate the computing environment when they need to copy or move files. For example, when a user drags a file onto a folder icon, the folder will automatically open. By keeping the mouse button depressed, users can quickly “drill down” into the file hierarchy as far as they choose. Once the file’s icon is moved away from the open window, the previously opened windows automatically close. In addition to speeding navigation, automatically-opening folders help users reduce desktop clutter by minimizing the number of open windows required to complete a task.

**Pop-up windows.** Pop-up windows will give users faster access to frequently used files and applications and significantly reduce screen clutter by reducing a window frame to a small title bar displayed at the bottom of the computer screen. To open the window, users will simply click on the title bar or drag a file on top of it; another click closes the window.

*With Mac OS 8, windows can “pop-up” from a small title bar at the bottom of the screen, giving quick access to files, folders, and applications*



**Enhanced desktop operations.** A number of new and enhanced desktop operations will further simplify navigation. They include contextual menus, which provide fast, simple access to help and command options from within a document or the Finder, and Saved Finds, which allow users to specify the type of information presented.



- ▶ Sticky menus provide easier access to options in pull-down menus.
- ▶ Hierarchical New menu streamlines document creation.
- ▶ Customizable Saved Finds let users specify the characteristics they want to see in a window
- ▶ Pop-up windows provide fast access to frequently used files and applications.

#### Easy Access to Information Highways

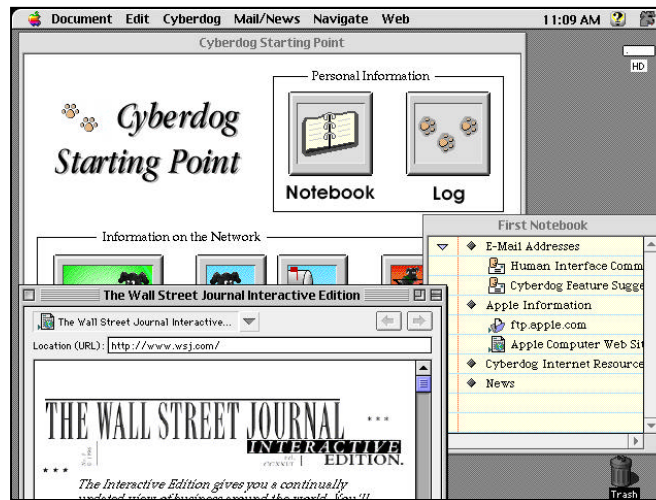
Apple was the first personal computer vendor to recognize that networking was key to helping people and teams work together more effectively. That's why the Macintosh has provided built-in, plug-and-play networking since 1985. AppleTalk® software set the standard for ease of use in networking, and millions of AppleTalk networks are in use today. Apple also led the personal computer industry with its early support for Internet technology. To support the Internet's protocol, TCP/IP, Apple incorporated MacTCP® into Macintosh System 7.5.

With Mac OS 8, users everywhere will be able to communicate more easily with others over internal intranets as well as the worldwide Internet. In addition to offering multimedia-rich e-mail capabilities and network browsing services, Mac OS 8 will deliver the infrastructure users need to connect to virtually any type of network.

**Internet and intranet access.** With Mac OS 8, users will have a single, convenient interface to communicate multimedia information over an intranet or across the Internet. Built-in e-mail and bulletin board services will make it easy to share and manage information. Because intranet/Internet access services will be based on OpenDoc component software, Internet access can be integrated into documents like any other type of data. As a result, users will be able to create and exchange content-rich messages as well as documents that contain live links to any type of information.



*With the Cyberdog Internet capabilities in Mac OS 8, users can include live Web links within memos.*



*“Apple now supports almost every networking protocol through Open Transport (OT). The architecture includes a set of industry-standard application programming interfaces (API) to ensure that networking hardware and software will run under OT. This should result in a broader selection of networking hardware and software choices for Macintosh users and make it easier for them to connect to non-Apple networks.”*

*—Computerworld,  
September 24, 1995*

**Improvements in networking.** Mac OS 8 will offer greater ease in setting up, using, and administering network services. Its modern networking and communications model, Open Transport, shields users and applications from network protocols and integrates local area, wide area, serial modem, and remote dial-up networking. Through Open Transport, Mac OS 8 will provide built-in support for AppleTalk and TCP/IP networks. Open Transport also will provide an open mechanism for vendors to add protocols and is based on three key open standards: X/Open Transport Interface, UNIX System V STREAMS, and Data Link Provider Interface from X/Open Group.

With Open Transport, users will find it easier to collaborate and share documents over multiple networks because they can work with any application that supports the Open Transport architecture without having to deal with the specifics of the network protocol. Open Transport will also let users transparently switch from one network to another without having to reset network connections—a capability that will be especially useful to mobile professionals who need network access from a variety of locations. Open Transport fully exploits the microkernel’s preemptive multitasking and memory-protection services in Mac OS 8, so that network transactions are optimized for performance and overall system stability. System administrators will benefit from Open Transport because it allows them to improve overall network administration by more easily updating, rerouting, or replacing networking systems without disrupting users’ applications.

**Document and videoconferencing support.** QuickTime Conferencing will provide easy-to-use, affordable color videoconferencing via local area networks like Ethernet, wide area networks, or the Internet. Quicktime Conferencing will allow users to broadcast video over networks to a large, widely dispersed audience or to watch such broadcasts. Using the integrated “whiteboard” capability, users will also be able to annotate on-screen images of others’ text and graphics, and share sounds and QuickTime movies across networks. Because Quicktime Conferencing is easily extensible, developers will be able to enhance it for special purposes such as video mail, medical imaging, and distance learning.

## Extending Ease of Use to Ease of Doing

Mac OS 8 will provide multiple levels of assistance in the form of help, delegation, and experts. In addition, Mac OS 8 provides both menu options and context-sensitive assistance to help guide users in using their computers. Between multiple levels of help and flexible access, Mac OS 8 embodies the Apple goal of making complex technology easy to use, so people can work more efficiently regardless of their skill level.

**Improving on-screen help.** To strengthen its on-screen help capabilities and improve the industry's best interactive help system, Mac OS 8 will offer, in addition to the Balloons facility and Apple Guide, a new capability called Tips.

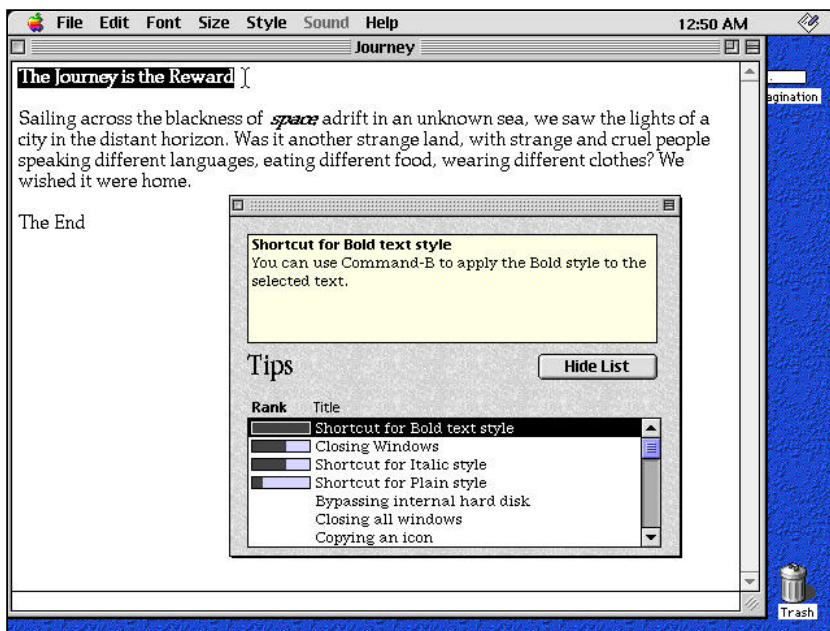
Today, Balloons give users a quick answer to the question, "What is this item?" and Apple Guide provides "How do I do this?" assistance by walking users, step by step, through tasks. Mac OS 8 will give users access to both of these tools from multiple locations rather than from just the menu bar, so it's possible for users to learn about an individual item or task without having to manually turn Balloons or Apple Guide on and off.

Apple Guide enhancements will also include the ability to save and store data entered by the user, context-sensitive help topics; an enhanced search mechanism, and the ability to print summaries of panel sequences.

The new Tips capability of Mac OS 8 will look at a user's past actions and preferences and suggest shortcuts for performing those actions. Tips can thus highlight new features of the OS or applications teaching the user new ways of using their Macintosh. Apple will supply a database of system-level tips as well as a framework for developers to build Tips into their own applications.

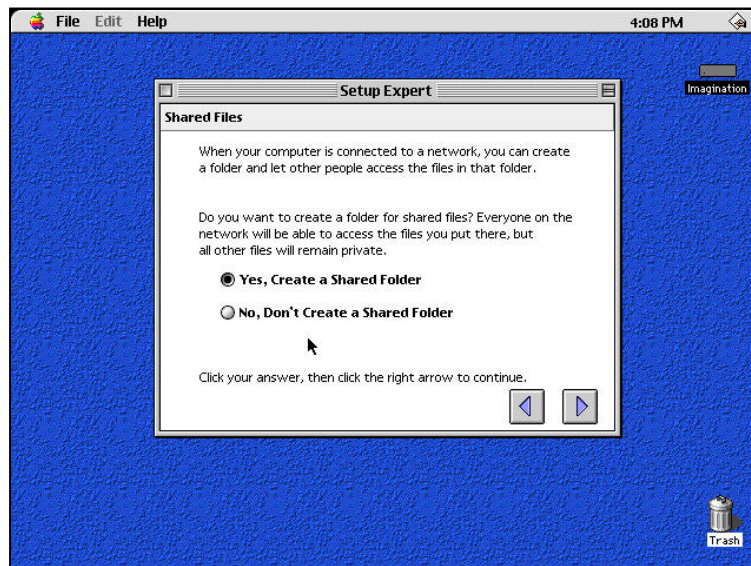
**Delegation.** Delegation capabilities that will be built into Mac OS 8 enable the

*Tips will monitor a user's actions and suggest shortcuts.*



computer to perform a task, even when the user isn't present. Mac OS 8 will implement delegation through two mechanisms: triggers and notification. Once a condition is met—for instance, when an application is launched or e-mail is downloaded, or at a certain point in time—an associated task will be executed. At the same time, users have the option of whether or not to be notified when a delegated task is completed, typically by means of a dialog box, sound, or other mechanism. For example, when a Web page changes, it can trigger the sending of an e-mail to the user. In addition, users can delegate tasks such as automatic back-ups when the computer is shutdown.

**Experts: from “show me” to “do it for me.”** Mac OS 8 also will provide a new level of assistance: Experts. Experts are small applications that help in the execution of high-level goals first by interviewing users and then executing tasks based on their responses. The Setup Expert that will be included with Mac OS 8, for example, will help users perform all the tasks needed to properly set up a new Mac OS computer. Based on the user's responses to the interview, for example, the Setup Expert will establish local network and Internet connections, the computer's owner name and password, time and date, default printer, and other preferences. Experts can be created to help users with discrete tasks such as system setup as well as routine and hard-to-remember tasks. Experts will insulate users from having to know the individual steps needed to achieve a larger goal.



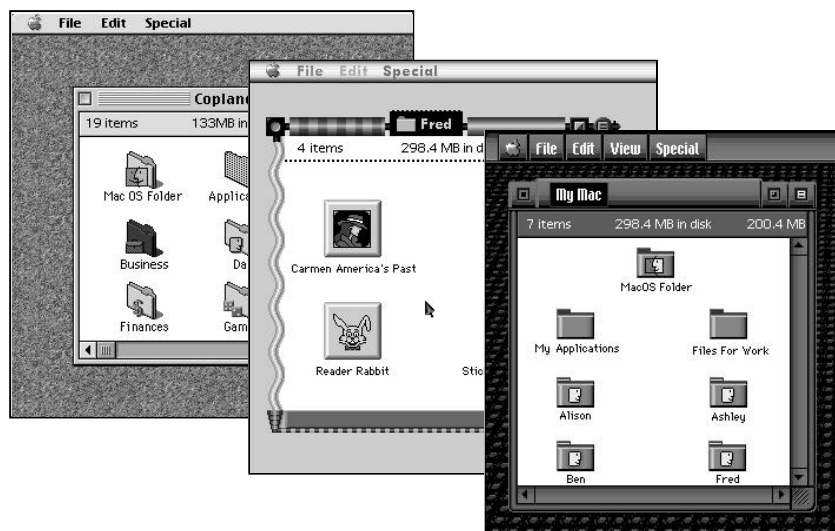
The impact of experts will extend beyond the enhanced efficiencies provided any individual user. For organizations supporting large numbers of people, the benefits of Mac OS 8 can multiply. Mac OS 8 can reduce training time and support costs and enable the development of custom training-on-demand help. Individuals will be able to receive assistance as they need it, while learning new capabilities or delegating tasks and routine functions.

## Customizing the Work Environment

To meet the needs of users who have different levels of computer experience—and who may share a single computer—Mac OS 8 will provide a scalable, fully customizable interface.

**A scalable environment.** Mac OS 8 will let users scale the interface to fit their particular needs. For example, the interface for novice users can be made as simple as a single button on the computer screen; clicking that button launches a favorite application. This interface will be simple, direct, understandable, and usable by anyone—but it also will be limited in functionality.

The interface configured for an advanced user, on the other hand, may provide an environment or work space—or even multiple work spaces—that deliver advanced computing capabilities. Users will be able to start with basic features and add functionality without having to learn new interface metaphors.



*The industry's only scalable, fully customizable interface will let users with diverse requirements easily share the same machine.*

**A custom desktop.** In addition to providing a scalable interface, Mac OS 8 will give users unparalleled control over how their machine looks, sounds, and acts—while retaining, at its core, the Macintosh experience. With Mac OS 8, for example, a business person might choose the standard Macintosh look—conservative and classic. A student, on the other hand, might choose a dramatic interface that includes sounds, bright colors, and animated menus. An industrial designer might want a more contemporary look.

Regardless of its appearance, the basic interface elements will work the same and will be located in the same place. Users can choose an appearance, known as a theme, in the same way they choose how to decorate an office, or what kind of music to listen to. And, no matter what the appearance of the interface, users will always know how to scroll a page, resize or close a window, or make a menu selection.

*“From the colors and shapes of windows, menus, and buttons to desktop animations, Finder sounds, and screen savers, the Mac experience will adapt to match the user’s personality.”*

—MacWEEK, May 15, 1995

**One computer, many users.** Mac OS 8 also will enable users sharing a computer to maintain a personalized computing environment. For example, the owners of a home-based business might set up a password-protected working environment containing business documents, applications, and system preferences. On the same machine, the children might have their own homework—or, as the case may be, play—environment. Each child can have access to appropriate features for their skill level and a stylized interface, but no access to system contents, including parents’ business files.

#### Working Worldwide: The Multilingual Computer

Personal computers have contributed greatly towards bringing organizations worldwide closer together and making them more competitive in their own markets or internationally. Multinational organizations with employees, customers, and affiliates across the globe want consistent, easily supportable solutions that work wherever they do business and that provide consistency among shared documents and files. Apple has long recognized these needs. In fact, Apple offers localized versions of the Mac OS in more than 140 countries worldwide today and provides superior support for the languages of the world.

In 1991, when Apple introduced WorldScript® software, an enabling technology for processing of multiple international writing systems on a single computer, the Mac OS became the first world-ready operating system. In Mac OS 8, Apple will extend its leadership in international computing even further. Mac OS 8 will support the features of any of the world’s modern writing systems—those that use vertical writing, such as Chinese; languages that read from right to left, such as Arabic; as well as complex contextual languages, such as the writing systems of India. In addition to supporting all major world writing systems, Mac OS 8 will enable customers with multiple language needs to seamlessly mix and print different writing systems within a single document or application, with any combination of supported languages—for instance, a multilingual warranty or owner’s guide.

Mac OS 8 also will offer Unicode support. This international encoding standard will ensure improved cross-platform compatibility, including across client/server applications. Users will be able to exchange international documents with confidence that they will properly display, edit, and print on other computer platforms.

Mac OS 8 will also provide enhanced support for market-specific features, including advanced support for Asian language input methods, user-defined character support, and an open font architecture that enables multiple font formats to easily coexist. This means that individuals and organizations can rely on one world-ready version of the operating system that supports their writing systems and addresses their local needs.

Finally, by providing multinational organizations with a unified international operating system, Mac OS 8 can reduce support costs and facilitate global document compatibility among diverse users.

#### Summary

Improved methods for organizing, finding, and navigating information. Fast, easy intranet/Internet browsing and mail. A richer help system that includes interactive, task-based assistance. The industry's only scalable, customizable, multiuser interface. A unified international operating system. These are just five ways in which Mac OS 8 will help users work more effectively in an increasingly complex world. With Mac OS 8, users also will be able to count on consistent ease of use, even as their systems grow in functionality.



*Mac OS 8 will support  
the needs of the world's  
writing systems, including  
Chinese, Japanese, Arabic,  
and many more.*



## The Freedom to Create

Paper. The Internet. A CD-ROM. No matter what the delivery vehicle, Mac OS provides the industry's richest platform for creating compelling content and distributing it to an audience of 40 million—or just one. That's because the Mac OS enables users to work easily with information in all its forms: text, color graphics, 3-D graphics, animation, live-motion video, and virtual reality images.

Mac OS 8 will extend Apple's leadership in graphics and multimedia by delivering new functionality in the areas of type and graphics, professional color management, multimedia, and 3-D visualization and simulation. By giving people the freedom to create content in a variety of ways, Mac OS 8 will provide new ways of working for publishers of all kinds of material, from traditional ink-on-paper publications to electronic documents delivered on disk or online.

### Professional Quality Publishing at the Desktop

The original Macintosh computer did something that no other computer could do—it integrated high-quality formatted text and graphics in a single document and printed the results with uncanny accuracy on a wide variety of output devices. Desktop publishing was born.

Today, the Macintosh computer remains the preferred platform for publishers who aim to achieve the highest possible standards for output quality, color, and type. For business communications users, the Macintosh platform assures highest productivity, thanks to integrated font management, print capabilities, color integrity, and an intuitive and consistent interface shared among popular word-processing, page-layout, and presentation applications.

With Mac OS 8, professional-quality publishing capabilities will be accessible to anyone, thanks to core technologies that include:

***A refined imaging model.*** The graphics and imaging model of Mac OS 8 will provide next-generation type, graphics, color, and printing capabilities.

It will allow users to work in multiple languages within a single document; provide fonts that can automatically typeset themselves, including complex character combinations (such as fractions, ligatures, and special swash characters); and incorporate graphics editing that will let users work in real time in any color model (and mimic the real-world behaviors of ink and light).

**Easy-to-use, high-quality color matching.** Mac OS 8 will provide consistent and predictable color input, display, and output through ColorSync® software, Apple's industry-standard color-matching technology. Everyone will be able to create graphics, illustrations, presentations, and publications to precise color specifications, quickly and confidently, without having to know anything about color matching.

**Multimedia: Author Once, Play Back Anywhere**

Multimedia is difficult to produce—but Macintosh makes it easy. According to Dataquest estimates, 63 percent of all multimedia applications are developed on the Macintosh. In addition, Dataquest research indicates that Apple sold more CD-ROM units than any other vendor in 1994 to become the leading multimedia vendor worldwide. No other computing platform offers multimedia capabilities that are as affordable and easy to use, and that offer so wide a range of software tools and plug-and-play peripherals.

With Mac OS 8, Apple will extend its lead in this rapidly growing area with its performance-enhanced operating system foundation and the continuing evolution of technologies such as QuickTime software.

**QuickTime: The industry-wide multimedia platform.** QuickTime is the open industry standard for editing, storing, and playing back synchronized video, audio, MIDI, animation, and 3-D images for CD-ROM and intranet/Internet-based content. Because nearly all multimedia content creation tools are compatible with QuickTime, the QuickTime movie file format makes the concept of “author once, play back anywhere” a reality. Developers can use QuickTime to create custom compressors/decompressors and custom music instruments as well as to synchronize different media types. QuickTime also provides a consistent playback experience across hardware and software platforms, including Windows 95, Windows NT, Windows 3.1, and the Mac OS. In the future, QuickTime also will be supported on IBM OS/2 Warp.

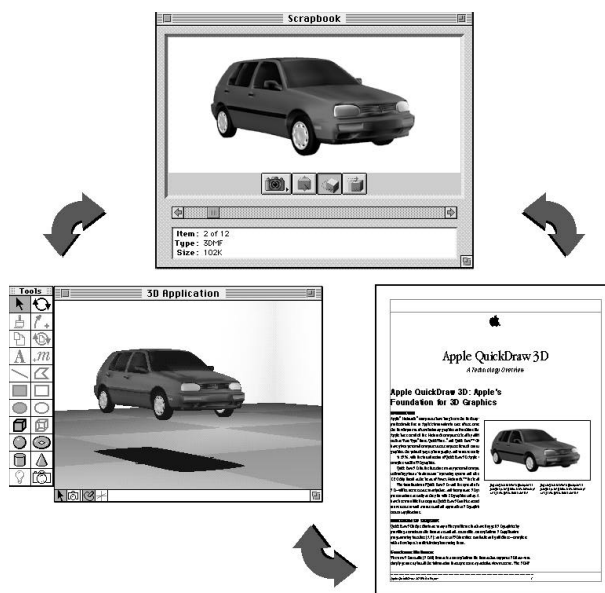
**Music made easy.** Through the QuickTime music architecture (QTMA), Mac OS 8 will make it easy for title developers to enhance their work with MIDI music. QTMA provides support for a software synthesizer and library of musical instrument that developers can use to create their own custom software synthesizers, instruments, and libraries of musical instruments.

**Cost-effective virtual reality.** Mac OS 8 also will support the award-winning QuickTime VR (short for virtual reality), Apple's multiplatform software for creating a new class of multimedia imagery for the World Wide Web and CD-ROM titles. QuickTime VR lets a user view real or imagined spaces and feel as if he or she were actually there. The software offers two kinds of experiences: a panoramic technology that enables users to explore 360-degree scenes, and an interaction technology that allows users to interact with objects. QuickTime VR provides a cost-effective alternative to dedicated VR systems and offers unlimited opportunities to create interactive Web sites, titles, kiosks, games, educational materials, and more.

*A 1995 study by Griffin Dix Research Associates finds that in five industries—advertising, graphic design, printing, publishing and prepress services—80 percent of all computers used for color publishing are Macintosh. Macintosh computers also dominate the color prepress market (73 percent) and the commercial publishing market (47 percent) and represent 26 percent of the corporate publishing market.*



*QuickDraw 3D allows you to create, manipulate, and incorporate 3-D graphics into your documents as easily as you use 2-D graphics today—with real-time performance and workstation-class quality.*



**Real-time three-dimensional graphics.** Mac OS 8 will also support QuickDraw 3D, which lets people work as easily with three-dimensional objects as it has been for them to work with two-dimensional objects. QuickDraw 3D provides a consistent, multiplatform file format that allows users to incorporate 3-D graphics into documents and simulations. It provides a comprehensive foundation for developers to integrate 3-D graphics into desktop applications, media titles, games, and even the Internet.

#### Summary

The implications of Mac OS 8 leadership in desktop publishing, graphics, and multimedia are far-reaching and are reflected in the myriad ways these technologies are put to work today. By advancing the multimedia, type, graphics, and output capabilities of the system, Mac OS 8 will give creative designers, producers, educators, and business communications professionals the freedom to create projects ranging from traditional printed materials to interactive multimedia for the World Wide Web.

## Compatibility—Forward and Backward

Revolutionary product transitions sometimes call for dramatic changes in hardware and software design.

With the introduction of the Power Macintosh family of computers, Apple did a masterful job of shifting to a new hardware foundation—in a way that allowed customers to enjoy PowerPC hardware benefits without sacrificing their investments in existing software or peripherals.

Mac OS 8 represents an even greater revolutionary change, because it will allow users to take full advantage of the performance benefits inherent in PowerPC hardware as well as a range of new capabilities. To make sure that the transition to Mac OS 8 will be as smooth as possible for customers, Apple once again will identify and resolve potential issues throughout the development of Mac OS 8.

### Assuring a Smooth Transition

Mac OS 8 will support not only new applications designed specifically for the Power Macintosh and Macintosh compatibles, but also most existing Macintosh applications and peripherals. Advances of this magnitude inevitably lead to the need for software upgrades. In cases where software updates or new device drivers are required, Apple is working with individuals, developers, and organizations to make the transition as easy as possible.

**Compatibility.** Mac OS 8, like current Macintosh operating systems, has as its goal the ability to run the majority of current applications without modification. In addition, Mac OS 8 will assure compatibility with mixed networks, so network access remains transparent.

**Interoperability.** Mac OS 8 will provide the same level of interoperability as current Macintosh computers. The ability to read and translate different files will be part of the Mac OS 8 foundation, so it will be easy for a home user with a PC at the office to save a WordPerfect document on a PC disk, take it home, open it up on an Apple Macintosh Performa® computer using the ClarisWorks® program (without losing formatting), and save the modified document in WordPerfect format for the office.

**DOS/Windows support.** Mac OS 8-based computers will continue to run applications written for DOS and Windows through hardware products from Apple and third parties that add an Intel-compatible microprocessor and the associated circuitry needed to run DOS and Windows. A software emulator from Insignia Solutions also lets PowerPC-based computers run most software written for the Intel X86 family of processors.

These products let people buy the most advanced personal computer—a Power Macintosh—while providing access to DOS and Windows applications and files. In fact, these products make it possible for a Macintosh to run more software than any other personal computer.

#### System Requirements

Mac OS 8 is designed for Apple Power Macintosh and PowerPC-based Performa and Powerbook computers; PowerPC-based Macintosh-compatible computers from Apple and other vendors, and a new class of computers based on the PowerPC Platform (PPCP) standard, scheduled for introduction in 1996. The target configuration for Mac OS 8 is a computer with at least 8 megabytes of RAM and a hard drive with at least 50 megabytes of free space.

#### Mac OS 8 Developer Release Strategy

Apple has adopted a new developer-focused release strategy that moves away from the traditional alpha, beta, golden master quality milestones to a developer release cycle—a new method that Apple successfully used during the development of OpenDoc. The goal of this new method is to deliver a series of progressively more complete developer releases until Mac OS 8 meets Apple's stringent quality, compatibility, stability, and performance goals—at which point it can be commercially released.

By releasing Mac OS 8 in its early stages, Apple can provide developers with an early understanding of how Mac OS 8 works so they can determine the changes they'll need to make and to begin their own process of development.

In November 1995, Apple shipped the first Mac OS 8 release to software tools developers, so they can begin to develop the compilers and other software development tools that application developers will need to be productive with Mac OS 8 developer releases. This approach will help ensure that development tools are available by the time Mac OS 8 is seeded to Apple's wider developer community in mid-1996.

*"The technical edge is there. The user experience edge is there. The ease-of-use edge is there."*

—MacUser, July 1995

### Getting Ready

Organizations can take two important steps to prepare for Mac OS 8. First, they can evaluate purchase and upgrade strategies, especially in terms of providing a foundation of PowerPC-based computers for which Mac OS 8 is targeted. Second, organizations can explore the resources currently available from Apple and on the World Wide Web (<http://www.mac.os.apple.com/macos8>).

### Summary

Apple's goal is that, when Mac OS 8 becomes commercially available, the transition to the new operating system will be as smooth as the transition from early Mac platforms to Power Macintosh and Mac-compatible computers. With Mac OS 8 installed, customers will have fuller access to its revolutionary computer power and capabilities.

## In Conclusion

In the end, what distinguishes Mac OS 8 from other operating systems is what distinguished the first version of the Mac OS from its competitors: People who use the Mac OS accomplish tasks easier, quicker, and better. And thanks to the work of many different independent research groups, there's proof:

For instance, a 1994 Arthur D. Little study demonstrated that people who use Mac OS are twice as productive as those who use Windows<sup>1</sup>. The study concluded: "The Macintosh computer represents a more productive platform than comparable Windows-based systems." With Mac OS 8, Apple will further enhance users' productivity.

Not only have the Macintosh computer and Mac OS been rated as the most productive system to use, but the Macintosh has also been rated the computer people prefer to use. An Evans Research study found that people who use both Macintosh computers and Windows prefer the Macintosh computers two to one.

And according to a study completed by Competitive Assessment Services,<sup>2</sup> the newest Power Macintosh systems outperformed Windows-based computers using equivalent clock-speed Pentium processors by up to 44 percent overall.

But the most convincing proof of the success of the Macintosh and the Mac OS are the millions of customers who use Apple's systems every day and the way the rest of the computer industry has recognized the Macintosh computer as the model of how personal computer systems should look, feel, interconnect, and operate. With Mac OS 8, our commitment is not simply to do everything that's now technically possible, our commitment is to transform what is technically possible into real-world solutions that work together to give customers the best-of-class tools they need to be competitive and productive.

This commitment is reflected in the fact that the Macintosh was the first personal computer to offer a graphical user interface. The first to set the industry standard for ease of use, the first to establish true plug-and-play connectivity to networks and peripherals, the first to bring publishing to the desktop. And now, with MAC OS 8, Apple will deliver the highest system performance and stability; provide powerful new tools for managing information on local drives, intranets, and the Internet; and provide the platform that offers unparalleled freedom to create.

<sup>1</sup>A detailed Arthur D. Little study on user productivity found that people using Macintosh computers are 44 percent more productive than people using Windows 3.1. Not only did the Macintosh users complete tasks faster than Windows users, but they also performed tasks more accurately.

<sup>2</sup>The application-level testing was conducted by Competitive Assessment Services (CAS) on equivalently configured Power Macintosh and x86 processor-based PCs running Windows 3.1. The tests consisted of measuring the actual elapsed time required to perform various tasks. Unlike processor-only or low-level benchmarks, the test results reflect application-level performance running real applications on actual systems. The tasks involved a mix of integer, floating-point, disk, and graphics activities. CAS found that the overall performance of the new Power Macintosh systems on the applications that were tested was much higher than the performance of Pentium-based computers running at the same clock speed.

## Tech Terms Explained

**Apple Guide** An on-screen help system that explains concepts or guides users, step by step, through a new or hard-to-remember task.

**Automatically-opening folders** A new Mac OS 8 capability that lets users open a folder and its contents by merely holding down their cursor at the folder's location. Also known as spring-loaded folders, this new auto-open capability makes it easy for users to navigate the contents of a hard drive when they want to copy or move files.

**Balloons** A form of user help that displays, in small windows called balloons, information about the item to which the cursor points. Balloons look like the dialog bubbles in comic strips.

**Central processing unit (CPU)** The microprocessor that executes instructions and transfers information to and from other devices (such as physical memory) over the computer's main bus.

**Component software** Self-contained, reusable software modules. When components use a single, open standard like OpenDoc, users can add or remove a feature—for example, a text editor component, on-line network component, or multimedia service component—just by dragging it into a document or workspace.

**Common Hardware Reference Platform (CHRP)**—See *PowerPC Platform*

**Cooperative multitasking** A policy for sharing the CPU and other system resources among multiple applications. In a cooperative multitasking environment, such as Macintosh System 7.5, applications cooperate by yielding control of the CPU to one another. Compare with preemptive multitasking.

**Cyberdog** Internet access technologies that are part of the Mac OS 8. Based on OpenDoc component software, Cyberdog gives users a familiar way to integrate the Internet into their documents.

**Driver** An operating system service that allows the microprocessor to direct the operation of a peripheral device, such as a keyboard, monitor, printer, or scanner.

**Experts** On-screen help that interacts with the user to perform an operation. The Expert solicits information only the user can provide and then uses the computer to automate as much of the operation as possible.

**Find by content** A capability in Mac OS 8 that will let users search the contents of documents—for instance, all documents containing the words “cooking cuisine in Greece”—and get results ranked in order of relevance to the user’s search criteria.

**Finder** An application that displays the Mac OS 8 desktop. It allows users to browse files and folders and launch applications.

**Information highway** A metaphor for thousands of private networks (intranets) that are interconnected into the Internet.

**Intranet** A private network that has the same look and feel of the Internet’s World Wide Web—it supports graphics, audio, video, and other media—but is accessible only by an organization’s employees and partners.

**Internet** The worldwide collection of thousands of computer networks linked together. Because these networks use the transmission control protocol/internet protocol (TCP/IP) standard to communicate with each other, they can function as a single network. Also known as the Information Superhighway, or simply the Net.

**I/O (Input/Output)** The transmitting and receiving of data to and from the computer or peripheral devices. Frequently used to describe computer peripherals, for example the keyboard or mouse as input devices; and the screen, disk drive, printer, or modem as output devices.

**Memory Model** An important new approach to minimizing memory requirements. Mac OS 8 loads into RAM just the parts of system software and applications that a user needs, when they’re needed.

**Microkernel** The microkernel manages a small but critical subset of the operating services necessary to control a computer. The Mac OS 8 microkernel manages processes, their attendant tasks, and other operating system resources associated with tasks, such as memory, synchronization, timing, and messaging. Other operating system services, such as the file system, the I/O system, and the human interface toolbox, are implemented separately from the microkernel.

**Microprocessor** The “brain” of the computer that controls the different components of the computer system, and executes the individual instructions in a program. Also known as the central processing unit (CPU). Usually, a single-chip computer element that contains the control unit, central processing circuitry, and arithmetic and logic functions of a computer. The PowerPC microprocessor is used in Power Macintosh computers, as well as PowerPC-based Performa and Powerbook computers.

**Multitasking** Multitasking is the ability of Mac OS to handle several tasks simultaneously—such as writing and reading files, or sending and receiving information over networks. It gives programs efficient access to computer resources.



**Native software** Software that's designed for a particular microprocessor, thus boosting its performance. For example, Mac OS 8 is specifically designed for the PowerPC processor, and thus fully harnesses its system power.

**OpenDoc** The industry-standard component software architecture supported in Mac OS 8. Allows developers to deploy small, standalone components ("called parts") that users can mix and match to customize and extend the functionality of their applications. Cyberdog (see Cyberdog definition) is a suite of replaceable OpenDoc components that can be used to integrate the Internet into a user's documents.

**Open Transport** The modern networking and communications subsystem for Mac OS 8. Based on industry standards—including STREAMS, the X/Open Transport Interface (XTI), and the Data Link Provider Interface (DLPI)—Open Transport will provide a single programming interface to every networking protocol available on Mac OS 8-compatible computers.

**Operating System** The underlying software that controls and coordinates computer hardware so that programs installed or controlled by users can run efficiently and conveniently.

**PowerPC** Based on reduced instruction set computing (RISC) microprocessor design, PowerPC lets you run your favorite software today, plus all of the hot new applications coming soon, including 3-D animations, virtual reality, and data-intensive business applications.

**PowerPC Platform** The foundation for the world's most advanced personal computers. Developed by Apple, IBM, and Motorola, the PowerPC platform is an open computing architecture that's based on the PowerPC RISC microprocessor. Allows vendors to create systems that run multiple operating systems, including those from Apple, IBM, Microsoft, Novell, and SunSoft. Previously known as the Common Hardware Reference Platform.

**Preemptive multitasking** An underlying process for allocating access to the CPU and other operating system services among multiple tasks. The preemptive multitasking environment of Mac OS 8 uses a set of well-defined rules to determine which task should execute. Following these rules, the microkernel can suspend the execution of a task at any time and resume the execution of another. Compare with cooperative multitasking.

**QuickDraw GX** The next-generation version of Apple's QuickDraw graphics technology. Integrated into Mac OS 8, QuickDraw GX supports personal computing's most advanced capabilities for type, graphics, color, and printing.

**QuickDraw 3D** Apple's cross-platform application programming interface (API) for creating and rendering real-time, workstation-class 3D graphics.

**QuickTime** The industry standard for editing, storage, and playback of many different multimedia formats, including video, audio, animation, and music.

**QuickTime Conferencing** Apple's easy-to-use, color videoconferencing and collaboration solution. Its whiteboard technology lets users annotate on-screen images of others' text and graphics, and share sounds and QuickTime movies across local networks and the Internet.

**QuickTime VR** Apple's multiplatform software that lets users view real and imagined spaces—and feel as if they were actually there.

**RISC** Short for reduced instruction set computing, RISC is a microprocessor architecture that's much more efficient and faster than conventional chips because it uses fewer and simpler processing instructions. A RISC processor, the PowerPC runs current Macintosh software and is the foundation for the world's most advanced personal computers: those based on the PowerPC Platform (PPCP).

**Scalable user interface** The ability in Mac OS 8 to control the extent of a user's access to system and application features.

**Themes** A set of predefined appearances for the Macintosh interface. Though each theme gives the interface a different appearance, underlying interface elements such as scroll bars, menu items, and close boxes work in the same, consistent manner.

**Tips** A suggestion for making more efficient use of application features. Tips are automatically displayed to users so they can benefit from this information.

**Workspace** One of several separate, custom user environments on a single computer.

**World Wide Web** The more friendly, graphically-rich segment of the Internet that makes it possible for users to share information that contains attractive fonts, photos, graphics, animation, music, and live point-and-click hyperlinks to other Internet resources.



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For more information on Mac OS 8, visit the Mac OS 8 Internet home page at <http://www.macos.apple.com/macos8/>

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