Copland: Q & A (5/96)

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TOPIC ---

This article contains questions about Copland, which is next major release of the Mac OS. This article was originally posted on the Copland web site:

<http://www.macos.apple.com/copland/>

DISCUSSION ---

General Information
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Question: What is Copland?

Answer: Copland is the development name for the next major release of the Mac OS. Apple's goal is to make a person using a personal computer running Copland more productive than is possible with any other system. Copland will lead the way towards the next generation of personal computing by:

• Delivering the highest system performance and stability, by fully exploiting the power of RISC processing;

• Redefining ease of use, with improved methods for organizing, finding and storing information, active assistance, and a scalable, customizable user interface that allows a user or organization to personalize their particular computing environment and level of expertise;

• Enabling new and more productive ways of working, by delivering and refining next-generation graphics, multimedia, and collaboration capabilities.

With the delivery of Copland, Apple will also be extending its licensing strategy, since Copland is being developed to run on the PowerPC Platform, a new reference design for personal computer manufacturers. Consequently, any vendor building computers that meet the common hardware reference platform specification will be able to offer complete Mac OS compatibility. In addition, application developers can expect that an increased number of personal computers will run the Mac OS. It also means that customers will have a wider variety of Mac compatible personal computers and software to choose from.

Question: How does Copland fit into Apple's vision and strategy for the Mac OS?

Answer: Copland fits into Apple's vision for the Mac OS by:

• Making computers easier to learn, use, and support with a customizable interface, new tools for information access, and active assistance;

• Enhancing individual and organizational effectiveness by presenting and communicating information through advanced, yet simple, multimedia, two-dimensional and 3D graphic capabilities;

• Enabling people to put information to productive use by simplifying information access, and delivering new ways to search and manage files and information;

• Raising organizational productivity by facilitating real-time teamwork via document and video conferencing;

• Lowering the flexibility-versus-standarization barrier by leveraging OpenDoc component software.

Copland will provide a new OS foundation for personal computing into the 21st century. It will exploit the performance of the PowerPC RISC processor, and will incorporate the OpenDoc component software architecture. With Copland, customers can expect their computer to be even easier to use, to provide a more dependable computing experience, to deliver more flexibility and choice at a variety of levels, and most importantly, to make them more efficient while accomplishing tasks.

Question: What goals and strategies are driving the development of Copland?

Answer: Apple's goal is to make a person using a personal computer running Copland more productive than is possible with any other PC. Several primary goals will contribute to achieving this overall
goal:

• Enhance the performance of PowerPC-based Macintosh and Mac OS compatible computers;

• Deliver great new ways to create, view, send and share information globally;

• Significantly advance Macintosh ease of use;

• Give customers even more flexibility to customize their Macintosh;

• Make the Mac computing environment even more reliable.

Key Features and Benefits
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Question: What are the key features and benefits of Copland?

Answer: Copland will advance the Mac OS by delivering enhancements in human interface, improving system performance on PowerPC-based personal computers from Apple and MacOS licensees, and delivering technologies that will enable users to work more efficiently.

Copland will redefine ease of use beyond what today's personal computers offer, by simplifying how people use personal computers, providing new ways that a computer helps the user accomplish tasks (in some cases by actually performing them automatically), and by offering unique personalization and customization capabilities, so the computer can be adapted to the needs and style of each particular user.

Copland will deliver the highest system performance and stability by fully exploiting the power of RISC processing. Copland will be written almost fully in native RISC code and will be optimized for performance, concurrency, and robustness-providing the most productive working environment of any personal computer.

Finally, Copland will enable new and more productive ways of working by delivering next-generation versions of Apple's existing industry-leading core technologies in the areas of multimedia authoring and playback (QuickTime), two- and three-dimensional graphics (QuickDraw GX and QuickDraw 3D), component software (OpenDoc), international language support (WorldScript) and communications/collaboration (Open Transport and QuickTime Conferencing).

System Architecture

Question: What architectural changes are being made in Copland?

Answer: Copland is built on a completely new OS foundation. Copland will offer a pre-emptive multitasking microkernel. The microkernel offers many advanced services, like the ability for applications to spin off threads into their own pre-emptively-multitasked and memory-protected address spaces. Additionally, the microkernel, file system, I/O, networking services, system extensions and device drivers are also protected, so the system will be more responsive and more stable.

Question: Is Copland a 32-bit operating system?

Answer: Yes. In fact, the Mac OS has been 32-bit since System 7 was introduced in 1991.

Question: Is Copland a multitasking operating system?

Answer: Yes. Like, System 7, System 7.1, and Macintosh System 7.5, Copland supports multitasking. Additionally, Copland introduces preemptive multitasking for critical system resources like the microkernel, file system, I/O subsystem and any threads that are spun off by applications. This improved model will improve system performance, responsiveness, and stability while insuring a high

degree of compatibility with existing applications.

Question: the improved productivity goals defined for copland suggest that you will deliver performance improvements. how will you achieve this?

Answer: Performance improvements will be delivered by making as much of the OS as possible native, and by improving the algorithms for software routines to optimize their performance.

Human Interface

Question: How will the new human interface features in Copland make a Macintosh or Mac OS-based system easier to use?

Answer: The enhancements in Copland's human interface will simplify using a computer in the following ways:

• Selectable user level - enabling users to scale the interface to provide the features and functionality appropriate to their skill level and needs;

• Easier access to information - providing new metaphors for searching for files and information on your hard disk or network;

• More consistent applications behavior - more standard interface elements in the operating system allow developers to add new functionality to applications without confusing users with one-of-a-kind menus or options;

• Built-in assistance - the computer does more of the work by automatically performing difficult or tedious tasks for the user.

Question: Won't the changes to the user interface mean a lot of retraining for current users of the Mac OS?

Answer: No. Since Copland builds on the same metaphors and skills that Macintosh customers have been using for years, upgrading to it will be easy and require very little retraining.

Question: What are the most significant improvements in human interface in Copland?

Answer: Copland will include human interface enhancements in three key areas:

• Information access and management: Copland will make it easier for customers to find, use and manage the information that is stored on ever-larger hard drives, and ever-growing heterogeneous networks (including the Internet and the World Wide Web). By providing innovative new ways to access their files, folders, hard drives and networks, Copland will allow users to put their computer to work to help them manage information overload. For example, Copland

will present users with a new way of viewing files, based on the attributes of each document, rather than merely on the place where the item has been stored.

• Personalization and customization: Copland will allow users to customize their Macintosh to an unprecedented degree, by selecting from a number of unique "appearances" that deliver fresh new designs while maintaining the consistency of Apple's highly-regarded user interface metaphor. Copland also will let users minimize the number of menu item selections by "scaling" the user interface to fit each user's particular needs. And Copland will enable users sharing a computer to maintain a personalized computing environment, including system and application preferences, and to protect the privacy of their information from unwanted use or possible loss.

• Active assistance: Copland will build on the capabilities first introduced with Apple Guide (an automated, task-based interactive help system) to allow users to let their computer complete tasks for them, either on a one-time request, or based on specific information provided through an interview process.

Graphics and Multimedia Features

Question: How will Copland's advanced graphics capabilities benefit customers?

Answer: Copland will help customers more easily prepare, view, and print documents that look as good on paper as they do onscreen, and will deliver the capability for them to manipulate three-dimensional data as easily as they work with text and graphics today. Copland delivers these capabilities through the integration of optimized versions of QuickDraw GX and QuickDraw 3D. For more detailed information about these technologies, consult the QuickDraw GX <http://www.info.apple.com/gx/gx.html> and QuickDraw 3D <http://www.info.apple.com/qd3d/QD3D.HTML> web sites.

Question: How will Copland integrate QuickDraw GX?

Answer: QuickDraw GX will be the standard printing and imaging technology for Copland. This means that all Copland users will be able to take advantage of QuickDraw GX printing enhancements, including its desktop printer interface, portable digital document technology, plus Apple's ColorSync color matching technology. In addition, new applications will be able to build on GX to provide next-generation type, graphics, and color capabilities.

Question: What improvements will be made to QuickDraw GX and QuickDraw 3D for Copland?

Answer: Copland will include improvements to both technologies-each will be revised to improve their overall performance and reliability, reduce their RAM footprint, and address requests from both customers and developers for enhancements.

Communication and Collaboration Features

Question: What electronic collaboration capabilities will Copland include?

Answer: Apple was the first to include collaboration services as a part of system software. Copland will provide an upgrade to the collaboration services currently found in System 7.5 of the Mac OS. The new capabilities include:

• Increased performance: The performance of collaboration services and their reliability will be greatly improved in Copland, by taking advantage of the new OS architecture, native RISC Open Transport stacks, and native RISC tasks.

• Improved mail management: With Copland, users will be better able to organize their mail. They will use a single way to manage information, whether it was produced on their local system, on the network, or from the Internet.

Question: Will Internet access be built into Copland?

Answer: Copland will be Internet-ready, whether you dial into a commercial Internet provider or you have access to the Internet via your corporate network over TCP/IP. Copland will provide Internet access via Open Transport networking and Cyberdog technology.

Question: What is Cyberdog?

Answer: Cyberdog is the code name for a set of OpenDoc components that provides one-click access to Internet services. It provides a consistent interface, and brings Macintosh ease-of-use to the Internet. In Cyberdog, an Internet address is an object that can be dropped into mail, an electronic notebook, OpenDoc documents, or into the Finder. If you double-click on an Internet address, it opens the object, whether it's a web page, a picture (Cyberdog will do any necessary translation or decompression), or a file. And Cyberdog provides you with powerful mail that's integrated with the other Internet components. For the most current information about Cyberdog, visit the Cyberdog web site <http://www.cyberdog.apple.com/>.

Question: What are Apple's goals for the advanced networking architecture in Copland?

Answer: Apple believes that communications and collaboration technologies are integral and fundamental to personal and workgroup computing. Open Transport provides the Mac OS with a cross-platform standards basis for collaboration applications. With Copland, Apple will continue to enhance Open Transport to make the Mac OS the best desktop OS for multiprotocol networking anywhere.

Question: What is Open Transport?

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

Question: How can Open Transport benefit users?

Answer: Open Transport provides individual computer users with many benefits. Two of the most immediately visible and important benefits relate to making networking more accessible.

First, Open Transport makes it easy to switch from one network configuration to another. A computer user "on the go" might want to hook up to the Internet in various locations, each requiring a different network configuration. With Open Transport, settings for each network location can be stored for easy access and use. Changed settings are available immediately - no reboot of the computer is required to use the new configuration.

Second, Open Transport integrates on-line help, based on Apple Guide technology, to make it easier for an individual to hook up to an network, with fewer demands on network manager and support resources.

Question: How can Open Transport benefit network managers and organizations?

Answer: Open Transport provides significant new flexibility in setting up network configurations; with Open Transport, the network manager can recommend or require configuration settings for users on the network, or allow users to determine their own settings.

Open Transport also improves support for centralized configuration management. For example, Open Transport/TCP supports the Dynamic Host Configuration Protocol (DHCP), allowing network managers to administer addressing and other TCP/IP configuration information from a central server.

Question: Will Open Transport for Copland offer any new capabilities?

Answer: Yes. Open Transport v2.0 is being designed to take full advantage of the new microkernel services available in the Copland OS. As a result, Open Transport networking on Copland is planned as a set of multi-threaded, pre-emptively scheduled tasks running in protected memory.

To a user, this will mean that networking will be even more robust. To a developer, this will mean that an errant application running in another memory space will not be able to corrupt system level networking tasks.

Open Transport 2.0 is also planned to include integrated support for NetWare/IPX, X.25, ATM, and ISDN, in addition to AppleTalk and TCP/IP.

Question: Will Copland be interoperable with installed AppleTalk and TCP/IP networks?

Answer: Yes. Open Transport is compatible with existing AppleTalk and TCP/IP LocalTalk and ethernet network at the "packets on the wire" level. Organizations can introduce one, a few, or hundreds of new Macintosh and Mac compatible systems running Open Transport into their environment without worrying about interoperability with existing networking services.

Multilingual Language Support Features

Question: How will Copland support international languages and standards?

Answer: Apple's goal with Copland is that any user, anywhere, will be able to run software using their preferred language, input methods and fonts. Correspondingly, we want any developer to be able to easily write software that meets this goal. In this way, more applications will be available for Macintosh worldwide, with built-in support for many languages. Today, with WorldScript (Apple's integrated technology which supports all modern non-Roman writing systems, including Japanese, Chinese, Arabic, Hebrew, and many others) and QuickDraw GX, we provide the most world-ready software support of any computing platform. With Copland's new capabilities, we will extend our lead by adding support for Unicode, the international standard for character sets; by improving date, time, calendar and sorting functions; and by expanding support for an open font architecture which will provide new flexibility for future font development.

Question: What is WorldScript?

Answer: WorldScript is Apple's integrated technology which supports all modern non-Roman writing systems, including Japanese, Chinese, Arabic, Hebrew, and many others. WorldScript has been a part of the Mac OS since System 7.1.

Question: What is Unicode?

Answer: Unicode is an international character encoding standard which includes characters for all modern languages. Unicode is especially easy to process because every character is 16-bits. Unicode defines semantics for many characters, for example right-to-left characters used in writing systems such as Arabic and Hebrew. Apple has been an active member in the Unicode Consortium since its founding several years ago.

Question: What are Apple's plans to support Unicode?

Answer: We will be integrating Unicode support into Copland. This means that we will include the Unicode libraries which handle things like display, input, and sorting. Also, the Mac OS will provide a comprehensive co-existence strategy

with Unicode vs. non-Unicode data. It will enable Unicode text to be converted to Macintosh encodings, and visa versa.

OpenDoc Features

Question: What is OpenDoc?

Answer: OpenDoc is based on the concept of component software: self-contained, reusable software modules. Since all components use a single open standard-the OpenDoc standard, users can add or remove a component by just dragging and dropping.

You can think of component software in the same way you think of components for a home stereo. When you assemble a home stereo system, you can buy different companies' stereo parts-cassette deck, receiver, CD player, or speakers-because you know that they all have a standard interface and will work together. Components in an OpenDoc software application-for example, database, on-line access, text editors, or multimedia service components-all have a standard interface, and will work together, too. For more information about OpenDoc, go to Apple Computer's OpenDoc Web Site <http://www.opendoc.apple.com/> or the CILabs Web Site.

System Requirements

Question: What will be the minimum system requirements for Macintosh and Mac OS-based systems using Copland?

Answer: One of the key design goals for Copland is to run on 8 MB systems. Copland also is expected to require 50 MB of available hard disk space.

Question: What will the performance be like on an 8 MB system?

Answer: Our goal is to match the performance of an equivalent 8 MB system running System 7.5. We expect that performance will improve when additional RAM is installed.

Question: Will Copland work on all types of Macintosh systems?

Answer: Copland is being designed to be an uncompromised PowerPC operating system, that will fully exploit the advanced capabilities of this acclaimed RISC architecture. Apple is currently targeting current and future PowerPC-based Macintosh and Mac compatible computers. Also, Copland will run on computers based on the PowerPC Platform standard, which are expected to be available in 1996.

Question: Will Copland run on older 680x0-based Macintosh systems that have been

upgraded with PowerPC processors?

Answer: Copland is being developed to run on PowerPC-based Macintosh computers, Mac compatibles using a PowerPC processor, and new computers based on the PowerPC Platform (PPCP) design standard.

PowerPC-based Macintosh computers are architecturally different from Macintosh systems with a Motorola 680x0 processor. Apple has made PowerPC upgrades available for several Mac models, like the PowerBook 500 series, Quadra 700, and certain Performa configurations. The addition of these upgrades does not change the system's inherent design.

For these customers (as well as the installed base of 680x0-based Macintosh computers), we intend to continue to maintain and enhance System 7.x releases of the Mac OS.

Availability and Distribution

Question: When will Copland be available for purchase?

Answer: Our goal is to deliver Copland in the second half of 1996. We will release the product only when it meets Apple's objectives for improved performance, overall compatibility and high quality. The actual date will depend on the feedback we receive from our hardware and software partners as they use and test prerelease versions of Copland.

Question: When will developers receive prerelease versions of Copland?

Answer: The "Copland Developer Release:Tools Edition" was delivered to select tools developers in November 1995. We will seed a wider audience of developers in the Spring of 1996.

Applications Compatibility

Question: What will be the compatibility of Copland with existing applications?

Answer: Apple's goal is to ensure a high degree of compatibility with existing applications, so that customers' investment in software and hardware is preserved. We are working closely with developers to ensure that the transition to Copland will occur with a minimum of disruption, and will make more detailed information available so organizations can prepare for Copland.

Question: Will existing applications run faster with Copland?

Answer: We expect that existing applications will run as fast as they do today with Macintosh System 7.5-and given the improvements in I/O and memory management, our goal is that many applications will run faster. Specific details

will be made available as further testing and development takes place.

Question: What will be the compatibility of Copland with existing drivers and extensions?

Answer: Two of the primary goals of Copland are to increase the Mac's performance, and to improve the stability of the Macintosh. One way Copland will offer increased performance is through an improved I/O model. This high performance I/O model will require that some device drivers be rewritten.

In terms of stability, Apple recognizes that today's extensions model for patching and extending the OS could be improved, so Copland will provide developers with a robust and clearly defined API [applications programming interface]. We expect that this will result in fewer system conflicts, and make programming easier and more predictable on a wider range of Macintosh and Mac compatible computers. An outcome of this approach is that system extensions will have to be rewritten to work with Copland.

We are working closely with developers to ensure that the necessary drivers and extensions will be updated in a timely fashion.

Developer Adoption

Question: When will developers receive prerelease versions of Copland?

Answer: The "Copland Developer Release:Tools Edition" was delivered to select tools developers in November 1995. We will seed a wider audience of developers in the Spring of 1996 with the "Copland Developer Release:Compatibility Edition."

For More Information

Question: How can interested customers receive prerelease copies of Copland for implementation testing?

Answer: Copland is currently under development, and is not being seeded to customers at this time. Customers can obtain information on Apple's customer seeding programs on the Customer Quality Feedback web site <http://support.info.apple.com/cqf/cqfdatasheet.html>.

Question: How can interested developers apply to receive pre-release copies of Copland for development and testing?

Answer: Interested developers can obtain information on Copland through the developer programs available through Apple's Developer Relations group. Apple Developer Support services have engineering specialists trained on Copland development and debugging. Access to these engineers is one of many benefits of

the Apple Development Partners programs. Apple Developer Services has detailed information about developer services and products, including details on how to register as an Apple Developer Partner.

The discussion of Copland herein does not represent a commitment on the part of Apple Computer, Inc. for providing or shipping the features and functionality discussed. Information is subject to change without notice.

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