Section 1: Rhapsody Resource

How do I receive a copy of the Rhapsody Developer Release?

The Rhapsody Developer Release is available to all members of our
Macintosh Developer Program. To become a member, visit Apple
Devworld's World Wide Programs page. That page contains links to
programs for different regions of the world. Follow the appropriate
link to read about the different levels of program membership which
vary in price/level of service. Joining any of the Macintosh Developer
Programs will allow you to recieve the Rhapsody Developer Release,
which includes Rhapsody Developer Release for Power Macintosh,
Rhapsody Developer Release for PC Compatibles, and Yellow Box for
Windows 95/NT.

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Where do I ask technical and programming level questions about
Rhapsody?

Direct technical and programming level questions to Rhapsody Developer
Support at devsupport@apple.com. This service is available according
to the terms of your Macintosh Developer Program membership.

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How do I report a bug?

Bugs should be reported to Rhapsody Developer Support at
devsupport@apple.com. Although some membership levels of the
Macintosh Developer Program offer technical support on a
"pay-per-question" basis, reporting bugs to devsupport@apple.com is
always free for all program members.

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Where do I send feedback about Rhapsody?

We welcome developer feedback about Rhapsody. Please send feedback
regarding Rhapsody, desired features, API comments, etc, to
rhapsody-dev-feedback@apple.com.

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Where can I share ideas with other developers about Rhapsody?

There are a number of moderated mailing lists on Rhapsody and Rhapsody technologies, as well as newsgroups and other resources. Please visit our list of external resources.

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How do I become a beta tester for Rhapsody?

One of the benefits of Apple Developer Program membership is early access to seed software. We will be seeding Rhapsody to all program members who have signed blanket non-disclosure agreements. If you have not signed one yet, you may get one from your Apple Developer Relations office.

To apply to become an end user test site for Rhapsody, rather than a developer test site, please visit the Apple Customer Quality Feedback page. Read the section "How Customers Participate?" and follow the links to the application form. Then, fill out the form completely, and be sure to mention your interest in Rhapsody in the field "Other products of interest". When the time comes for Rhapsody customer evaluation, CQF will contact some customers whose application forms are complete and on file with Apple.

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Section 2: General/Architecture

What is Rhapsody?

Rhapsody is the code name for Apple's next generation operating system and development platform. Rhapsody is composed of an operating system that will be hosted on PowerPC and Intel (Rhapsody for Power Macintosh and Rhapsody for PC Compatibles), as well as a development platform – the Yellow Box – that is hosted on Rhapsody, Windows (both Windows 95/98 and Windows NT), and eventually Mac OS.

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Will there be any difference between running on Rhapsody and running on NT or Solaris?

Rhapsody for Power Macintosh and Rhapsody for PC Compatibles will have a similar user experience, which Apple refers to as the "Advanced Macintosh Look and Feel".

Software written for the Yellow Box will have the appropriate user
interface, depending on which platform it is running on. On Rhapsody
for Power Macintosh and Rhapsody for PC Compatibles, users will be
presented with the Rhapsody user experience. When running with Yellow
Box for Windows, they will experience the Windows look and feel; with
Yellow Box for the Mac OS, the Mac OS look and feel.

Apple currently has no plans to bring the Yellow Box to Solaris.

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Will any Mac OS technologies be ported to the Yellow Box for
Rhapsody? If so, will these be made available on other platforms that
OPENSTEP runs on?

Apple is in the process of integrating some key Mac OS technologies -
QTML, QuickDraw GX Typography, ColorSync, etc. - into the Yellow Box.
When this integration is completed, these technologies will be
available on all platforms that are supported by the Yellow Box. Apple
does not plan on porting these technologies backwards onto all current
OPENSTEP platforms.
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Are the current built-in services in NextStep/OpenStep (spelling
checker, graphics conversion library, etc.) going to remain in
Rhapsody?

Detailed product features are still being determined, but the basic
services architecture will likely remain in place.

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What has Apple announced regarding the evolution of its operating
system?

Mac OS will continue to be Apple's mainstream operating system.
Rhapsody will initially provide complementary solutions for servers,
workflow, and high-end applications, integrating key Apple
technologies over time.
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Where do developers send feedback about Rhapsody?

If you have comments or concerns related to Rhapsody, please send an e-mail to: rhapsody-dev-feedback@apple.com.

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When will Rhapsody be delivered?

The Rhapsody Developer Release for Power Macintosh, PC Compatibles, and Yellow Box for Windows 95/NT are all shipping! The Rhapsody Premier release, due in early 1998, will offer the new application environment, as well as some degree of backward Mac OS application compatibility via the Mac OS compatibility environment (available on PowerPC only). The Rhapsody Unified release, due in the second half of 1998, will provide further integration of the Mac OS compatibility environment and other key Apple technologies.

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What advantages will Rhapsody have over competing operating systems?

Rhapsody will expand upon Apple's traditional strengths in ease of use, integration, and multimedia by incorporating protected memory, pre-emptive multitasking, UNIX networking, and object-oriented application development. We expect Rhapsody to appeal to customers who need integrated support for PostScript and Internet data types, a high degree of stability, and scalable network administration. In addition, the Yellow Box provides an unparalled environment for rapidly building full-featured Java applications that run on multiple platforms.

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What markets will Rhapsody target?

Initially, we expect that Rhapsody will especially appeal to customers who need high-end solutions in fields such as publishing, multimedia, Internet/Intranet content development and publication (e.g. Web authoring), enterprise corporate application development, higher education and engineering/scientific. In addition to this, we believe that Rhapsody will offer both robust industrial strength server capabilities and unparallel ease of use making it an attractive platform for a number of server-based workflow applications. Over time we expect Rhapsody to appeal to larger sections of Apple's customers.

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Will Rhapsody applications run on existing versions of OPENSTEP?

The Yellow Box, the application development platform for Rhapsody, will consist of a superset of today's OpenStep APIs, so applications written to the OpenStep APIs will port easily to Rhapsody and other Yellow Box environments.

Yellow Box applications will generally not run on today's versions of OPENSTEP, since the APIs supplied are a superset of OpenStep APIs.

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Will existing 68K and PowerPC applications run on Rhapsody?

Yes. Rhapsody is designed to support a full version of the Mac OS, hosted on a modern kernel. We are not simply building an emulator for backward compatibility - it is the same source code as the Mac OS. This compatibility environment is code-named Blue Box. We expect very good compatibility for applications, utilities, fonts, extensions, and software components. Compatibility with networks, printers, monitors, and cards is expected to be very good for products that have the appropriate new drivers.

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Can Mac OS applications running in the Blue Box utilize services provided by the Yellow Box? Can Yellow Box applications utilize services provided by the Blue Box Mac OS?

Mac OS software running in the Blue Box (the Mac OS compatibility environment within Rhapsody) cannot directly access services provided by the Rhapsody Core OS or the Yellow Box. Similarly, software based on the Yellow Box cannot directly access Mac OS services in the Blue Box. However, Rhapsody will support (Interapplication Communication (IAC) between the two environments, making indirect access possible.

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Can I talk about Rhapsody with other developers?

We understand that it is impossible for Apple to be the sole source of Rhapsody answers, tips, techniques, etc. especially with a project as large as Rhapsody. As our previous experiences have shown, developers as a whole are a very creative and resourceful group who have good ideas, tips, and solutions to share with each other. To that end you

may publicly discuss the Rhapsody APIs and documentation that have been posted on Apple's Devworld. Please keep in mind that there are portions of Rhapsody that have not been made public by Apple, such as the Core OS details, and cannot be discussed outside of private discussions with Apple. In any event, the Apple software and coded font programs contained in the Rhapsody Developer Release CD are Apple confidential information and may not be shared with or disclosed to third parties. Also, if you are planning on creating published writings about Rhapsody, such as books or technical articles, please contact James Dempsey for assistance and to ensure that your writings will be accurate and do not violate confidentiality obligations you have with Apple.

> Created: 11/18/97
> Modified: 11/19/97

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We were told that Rhapsody is not a deployment release. What does this mean? Does it mean I can sell my recently-created Rhapsody application?

The Rhapsody Developer Release is pre-release quality and not a customer product. As a result, it is not being distributed outside of the developer community. You are free to create and distribute Yellow Box applications, so long as you do not distribute any portion of Rhapsody or the Yellow Box for Windows runtime. This limits your application's audience to developers that have already received the Rhapsody Developer Release. For further details, please refer to the Rhapsody Prototype License Agreement.

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Section 3: Core OS

What is Rhapsody's Core OS?

The Rhapsody Core OS is based on Mach and BSD, providing a mature and robust foundation that includes full preemptive multitasking, address space protection, and high performance I/O. The Yellow Box Foundation Kit is based on a solid object design that includes support for distributed objects.

> Created: 10/8/97
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Which kernel will Rhapsody use?

Rhapsody is based on the Mach kernel, developed at Carnegie Mellon University and further refined by NeXT Software, Inc. and others. Mach is a well regarded, robust kernel designed to provide the low-level

functionality of an operating system, such as memory management, tasking, synchronization, timing and messaging. These services form the basis of advanced operating system capabilities, including preemptive multitasking, memory protection and symmetric multiprocessing (SMP).

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Which version of Mach is being used?

Apple is currently deploying an enhanced version of Mach 2.5 with enhancements such as loadable device drivers, high performance kernel messaging, a modified I/O subsystem, and others. We intend further enhancements for the Unified release.

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Will Rhapsody support the Mac OS multiprocessing (MP) APIs?

Mac OS applications written to the Apple MP API running in the Blue Box will continue to take advantage of multiple processors. The Yellow Box provides MP services via Foundation Kit threading.

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When will Rhapsody first deliver SMP?

The Unified release is anticipated to provide symmetric multiprocessing (SMP) support.

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Will Rhapsody support file-level security?

Yes. It is anticipated that a future release of Rhapsody will use HFS+, an extension to HFS which includes UNIX-style security information. Rhapsody will also support other file systems which have security support, such as UFS.

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What will be Rhapsody's primary volume format?

Rhapsody will support a wide variety of volume formats, including HFS, HFS+, UFS, and popular network and CD-ROM formats. Each volume format

supports a variety of capabilities. Because HFS+ will be the most
full-featured volume format, it will be the default.

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How does the file system interoperate with existing Mac OS files?

Rhapsody will be able to read and write existing files just as easily
as the Mac OS does today, because it will support the same volume
formats: HFS, DOS FAT, ISO 9660, AFP, and in the future, UDF and HFS+.

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What is HFS+?

HFS+ is a new volume format being developed for Mac OS and Rhapsody.
It has many new features and improvements over HFS, including small
allocation blocks, support for multi-terabyte volumes and files, and
Unicode file names.

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Does the file system in Rhapsody solve the fixed allocation block
size problem?

Yes. HFS+ is a new volume format currently being developed. It has
many new features and improvements over HFS, including small
allocation blocks, support for multi-terabyte volumes and files, and
Unicode file names.

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How does Rhapsody handle case sensitivity in file names?

Rhapsody is primarily a case-insensitive, case-preserving system. It
will ignore case when matching file names on case-insensitive formats.
Case-preserving means that it will return file names using whatever
case the user specified when the file was created. On some inherently
case-sensitive volume formats or file servers (e.g., NFS) it will
allow you to create files in the same directory whose names differ
only in case.

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Will Rhapsody maintain the current OpenStep application packaging structure?

The file system will provide the underlying infrastructure necessary to support either resource forks or directory packages in Rhapsody. Yellow applications will use the NIB architecture that permits application resources (including multiple localizations) to be stored separate from the application code.

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Will resource forks be supported?

Yes, the file system will support resource forks for HFS and HFS+ for Mac OS applications and data, however, we do not plan to provide the Resource Manager API in the Yellow Box since resource forks are not used for storing Yellow resources. The package architecture is used instead.

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How will I back up my files?

As with the Mac OS, Apple will work with third parties to provide backup solutions for Rhapsody.

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How would I write an in-line compression utility or other utility that needs to patch the file system?

We expect the stackable virtual file system support in Rhapsody to provide the functionality needed to write such utilities.

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Will hard drive partitioning be supported?

Yes, Rhapsody will support partitioned hard drives.

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What is the networking environment in Rhapsody?

The Rhapsody networking implementation is designed to maximize use of

network components already working in either the Blue/Mac OS or Yellow
environments, minimize risk to our time-to-market goals for the
Developer, Premier and Unified releases, and minimize impact on
developers with products already working in either area. The Blue
environment will contain Open Transport, the Yellow environment will
utilize BSD networking and offer the sockets API for TCP/IP
developers. The Yellow environment will also contain a complete
AppleTalk stack leveraging Apple's existing expertise with UNIX
servers.

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What is NetInfo?

NetInfo is a database system for information about computer and
network configuration. It stores all kinds of information, including
computer names and network addresses, e-mail system configuration
settings, printer and fax modem names and locations, file server and
client configuration settings, user account records, and so on.
NetInfo doesn't provide those resources itself--it just describes how
things are set up on your network. Processes that need that
information can look it up in NetInfo. It's designed to be flexible
and extensible, so that new kinds of information can be added at any
time.

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What Internet services or APIs will be available in Rhapsody?

It is Apple's intention to provide a number of standard Internet APIs
in Rhapsody, such as FTP, HTTP and others. This is being investigated
at this time and more details will follow. We are also investigating
including support for SMTP, POP, IMAP, LDAP, NNTP and others.

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How will Plug and Play work in Rhapsody?

Rhapsody plans no changes to the AppleTalk protocol family, so
Rhapsody systems using AppleTalk will Plug and Play just like Mac OS.
If you plug a Rhapsody system into your AppleTalk network, it will
"just work".

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How will Open Transport work in Rhapsody?

Open Transport is the networking architecture for Mac OS and is fully
supported by the Blue Box. It will communicate with network interfaces
through a multiplexer which provides access to physical network
interfaces for both the Blue Box and Yellow Box network stacks.

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Is there a firewall in Rhapsody?

Apple has no announced plans to deliver firewall technology with
Rhapsody. Rhapsody, however, utilizes well-known TCP/IP networking
standards, so we expect that third parties with firewall technology
will see this as an opportunity and deliver firewall products.

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What is Rhapsody's I/O driver model?

Rhapsody utilizes a driver model that is based upon the OpenStep Mach
model with additions from advanced Apple I/O technologies to ensure
that Plug and Play and dynamic configuration are fully supported.

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Can a Rhapsody driver work in the Blue Box?

Rhapsody drivers that need to have Blue Box-specific control or
functionality will have to provide an additional driver stub or shell
that resides in the Blue Box world. The stub would consist of just the
upper level read/write/control/status handlers and would package and
forward the calls down to the Rhapsody driver for actual handling. Any
responses would be passed back up from the Rhapsody driver to the Blue
Box driver shell.
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Will Rhapsody support the Mac OS PowerPC driver model (ndrv)?

Rhapsody will provide limited compatibility with native (ndrv) display
drivers to provide basic display functionality. Display cards that
provide additional functionality such as QuickTime support, display
acceleration, display magnification, etc., will need to provide a
native Rhapsody driver in order to take advantage of those features.

Rhapsody will not support native drivers for other types of devices.

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Section 4: Blue Box

What is the Blue Box?

The Blue Box is a part of Rhapsody's architecture (on PowerPC hardware
only) designed to support a full version of the Mac OS, hosted on a
modern kernel. It is not an emulator for backward compatibility - it
is the same source code as the Mac OS. We expect very good
compatibility for applications, utilities, fonts, extensions, and
software components. Compatibility with networks, printers, monitors,
and cards is expected to be very good for products that have the
appropriate new drivers.

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Will Rhapsody support networking in the Blue Box?

Rhapsody will fully support Open Transport within the Blue Box. This
includes the "classic" networking services through the Open Transport
compatibility libraries.

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Are there any advantages to running applications in the Rhapsody Blue
Box versus running them on the Mac OS?

Potentially. Improvements expected include: improved I/O performance
for large I/O requests, improved robustness, Blue applications cannot
crash Yellow Applications or the Core OS, and faster (re-)booting.
Sparse Virtual Memory gives customers the ability to run a large
number of applications simultaneously, and the addition of guard pages
between Blue applications' heaps is expected to improve stability
within the Blue Box. Many of these improvements can be added to future
Mac OS releases.

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Will Mac OS applications running in the Blue Box have to map to
Display PostScript?

No. Mac OS applications running in the Blue Box use standard QuickDraw

routines and will have the same direct access to frame buffers that
they have in the traditional Mac OS.

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What are the essential differences between the Blue Box and MAE?

MAE runs on Solaris and HP-UX systems, only supports 68K applications,
and it is based on emulation technology. The Blue Box is the Mac OS
compatibility environment of Rhapsody and will run on any Power
Macintosh system that will be supported by Rhapsody. It will alow
users to run not only 68K applications but also PowerPC native
applications. As with the Mac OS on PowerPC, the 68K applications run
emulated, while the PowerPC applications run native without any form
of emulation.

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What about the database access manager in the Blue Box?

The database access manager will be supported along with the
networking services that are provided by Open Transport.

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How modal is the Blue Box? Can you Drag and Drop between the Blue Box
and the Yellow Box?

No. You cannot use Drag and Drop between the Blue Box and Yellow Box.
However, you can use Copy and Paste to easily transfer data back and
forth. In general, Yellow and Blue are separate environments. Notable
exceptions include Copy and Paste, shared file systems, shared screen
access, and AppleEvents.

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What happens to the memory partition model in the Blue Box? Does it
remain the same?

Yes and no. For compatibility, the Blue Box supports the existing
memory partition model where each application will have a fixed
partition size. However, to provide added customer value, the Blue Box
will also provide a new memory partition model called "Sparse Virtual
Memory". When sparse VM is enabled, applications will be launched
using the powerful Core OS Virtual Memory system, allowing you to run
a large number of applications simultaneously with greater robustness.

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What can we expect to work or not work in the Blue Box in the Premier release?

With respect to Mac OS services, you can expect most to be available for the Premier release. The features that will not be implemented are related to the available driver support from the Core OS. Software that touches hardware or modifies or relies on the internals of system services that are shared with the Yellow Box or the Core OS (e.g., the file system) will not be supported.

The following Mac OS technologies are working on early versions of the Blue Box: QuickTime, QuickTime VR, QuickDraw GX, QuickDraw 3D, OpenDoc, Mac OS Runtime for Java, Sound Manager, Serial DMA, Multiple Monitors, Display Manager, ADB Dongles, Language Kits, WorldScript, Drag & Drop, MacsBug, MPW, and of course, SimpleText.

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Is the multi-finder temporary memory available in Blue Box?

Yes.

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Is it Apple's goal to phase out the Blue Box in future releases of Rhapsody?

No. We expect the Mac OS to be a long-lived platform that will continue to be supported on Rhapsody-based PowerPC systems for many years to come.

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Will Mac OS applications in the Blue Box be able to recognize that VM is turned on?

The Blue Box will indicate to applications that Virtual Memory is disabled. However, the Blue Box will take advantage of the Virtual Memory provided by the Core OS. There will also be an option to run the Blue Box with all memory locked. This feature is ideal for real-time applications.

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Can a Blue Box application spawn and/or communicate with the Yellow
process?

Blue Box application can communicate with Yellow applications using
AppleEvents and should be able to launch applications as well.

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Does the Blue Box use the Macintosh ROM?

The Blue Box comes fully equipped with its own customized ROM image
that is loaded from the boot volume.

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What will be the performance of existing applications in the Blue
Box?

Our goal is for Blue Box application performance to meet or exceed
then-current Mac OS performance--greater than 90% for raw CPU tasks
and improved I/O performance for large requests.

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How does the Blue Box work? Is it emulated?

It's magic! Really, the Blue Box simply runs unmodified 68K and
PowerPC Mac OS. Think of the Blue Box as just another Mac OS hardware
platform. It is not emulated. As such, it contains the real Mac OS 68K
emulator to run 68K applications.

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Section 5: Yellow Box

What about Help support in the Yellow Box?

Rhapsody will provide a new, HTML-based help system. Developers will
be able to use the wide array of HTML authoring tools available to
produce help files. Users will be able to browse help, navigate links,
and search the help files for solutions.

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What text services are available as part of the Yellow Box?

The Yellow Box provides a very rich collection of text services
including the NSTextView object, which can be used for
high-performance text-intensive applications. These services are very
rich and include support for text larger than 32K, kerning and
ligatures, tab formatting, HTML viewing, and other capabilities.

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Is threading supported in the Yellow Box?

Yes, Yellow applications will be able to create multiple threads.
Initially, most Application Kit services should be called from a
program's main thread.

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Will AppleScript be available for Rhapsody development?

Scripting is a critical technology for Apple in the areas of
publishing, web authoring, and workflow automation. The Blue Box (Mac
OS compatibility environment) will offer AppleScript. We are committed
to providing scriptability as an integral part of the Yellow Box APIs,
as well as a high-fidelity implementation of AppleScript.

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When will IPC between the Blue Box and Yellow Box be available?

Our goal is to provide Apple event support for Yellow Box as soon as
possible.

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Can developers patch the Yellow Box?

No, Rhapsody will not present a patching mechanism. However, many
solutions which today require patching will find that Rhapsody allows
for cleaner implementation using object technology. For other
questions regarding the runtime, see Section 9: Java.

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What imaging model will Rhapsody use?

Apple intends to adopt the PostScript imaging model for Rhapsody and
migrate the best of our existing graphics technologies to that model,
including ColorSync and GX Typography. This will provide publishing
developers and customers front-to-back PostScript support, as well as
the benefits of Apple's existing imaging technology. GX Typography
fits naturally into the existing AppKit model, so we are planning to
support the typographical capabilities of QuickDraw GX through
equivalent Yellow Box APIs. Line Layout tables in GX fonts will be
fully supported.

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What are the performance characteristics of Display PostScript?

Performance and responsiveness of the user interface is excellent. In
addition to the performace of the imaging model, application
developers can access the frame buffer directly using the Interceptor
APIs.

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Will Rhapsody provide an imaging API similar to QuickDraw on Mac OS?

The Yellow Box features a collection of classes that provide basic
drawing primitives that abstract the underlying imaging model.

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Does Apple have plans to move Display PostScript forward?

Yes. We plan to optimize the Display PostScript server to take maximum
advantage of available processors by utilizing threading. The window
server is an asynchronous service.

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What kind of font support will Rhapsody provide?

The Developer release will support Type 1 and Type 42 PostScript fonts in OpenStep format. In future releases, we plan to support all the font formats needed to preserve our customers' and developers' investment in fonts, including Type 1 PostScript fonts (in both suitcase and LWFN formats), Type 3 PostScript fonts, and TrueType fonts, including the typographic capabilities of TrueType GX fonts. The timetable for which font formats will be supported when is still under investigation.

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What is a Type 42 font?

A Type 42 font is basically a TrueType font wrapped up to look like a PostScript font. It is limited to 256 glyphs. Type 42 fonts were developed to provide a mechanism for downloading TrueType fonts to PostScript printers. They will be supported in Rhapsody.

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Will Rhapsody support OpenType?

OpenType enables PostScript font support for Windows applications. Apple has had PostScript support for Mac OS applications for a long time and will offer even better PostScript support with Rhapsody. Our goal is to have an open font architecture that makes it easy for customers to work with any font format that they desire, including Type 1, TrueType, and OpenType. The timetable for specific font format support is still under investigation.

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Modified: 11/18/97

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Will printing continue to be Plug and Play?

Plug and Play has always been a key feature of the Mac OS. We will ensure that this experience continues for all devices connected to Rhapsody systems, including printers.

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How do I localize a Yellow Box application?

All Yellow Box applications are architected for easy localization. User interface elements are isolated from the executable, so a single code base can be developed and qualified for multiple localizations. In addition to the architecture of Yellow Box applications being very

condusive to easy localization, Interface Builder has a number of
facilities that support localization.

                                        Created: 10/8/97
                                        Modified: 11/18/97

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How are various localizations of an application packaged?

The architecture of Yellow Box applications allows for more than one
localization bundle to be included with a single application.
Furthermore, localization bundles can easily be added to or deleted
from an existing application. This opens up a number of interesting
possibilities for developers to combine multiple localizations in a
single product, with a greatly reduced overall footprint, as well as
release new localizations to existing customers by way of updaters.

                                        Created: 10/8/97
                                        Modified: 11/18/97

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Into what languages will Rhapsody be localized?

The Rhapsody Developer Release is available in English. This release
also supports the development of applications localized into English
and Japanese. We plan for the Premier release to be partially
localized into Japanese and French and for the Unified release to be
localized into Japanese, French, German, Spanish, Italian, and
Swedish. Rhapsody will be localized into other languages in later
releases.
                                        Created: 10/8/97
                                        Modified: 11/18/97

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Will Rhapsody use language kits?

Apple remains committed to providing an excellent multilingual
computing experience in Rhapsody. The existing Mac OS language kits
will continue to work in the Blue Box. We plan to produce Yellow Box
language kits, though they may not be available before the Unified
release.

Apple remains committed to providing an excellent multilingual
computing experience in Rhapsody. The existing Mac OS language kits
will work in the Blue Box. We plan to produce Yellow Box language kits
in the Unified release.
                                        Created: 10/8/97
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What kind of support will be provided for Yellow Box input methods?

The Canna Japanese input method, originally a public-domain input method developed for OPENSTEP-J, is fully supported in the Developer release. We are currently working to extend the input method API to enable a user experience comparable to that provided with the Mac OS input methods, and we plan to communicate the input method API specifications to developers before the Premier release. The Japanese Kotoeri input method in use on the Mac OS will be ported to Rhapsody before the Unified release. Input methods for Chinese and Korean will be provided after the Unified release.

Created: 10/8/97
Modified: 11/18/97

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How does Rhapsody use Unicode? What support does it provide for other character sets?

The Yellow Box uses the Unicode 2.0 character set, an emerging worldwide standard, as its native character set. This, together with international support APIs, enables applications to easily handle any of the world's languages. The use of Unicode frees developers from having to worry about many character encoding issues. In addition, Yellow APIs allow for easy translation between Unicode and all major character sets in use today, across multiple platforms and on the Internet. Apple will be adding technology from the Mac OS Text Encoding Converter to the existing character set conversion APIs in the Yellow Box.

Created: 10/8/97
Modified: 11/18/97

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Section 6: User Experience

Rhapsody User Experience

Is the User Experience Apple promised for Rhapsody more like the Mac OS user experience or the OpenStep user experience?

Mac OS represents the flagship of Apple human interface, and Apple will continue to aggressively invest in it to ensure that it continues to deliver the best user experience in the industry. Rhapsody will offer some interesting new options, and over time we expect the user experiences to converge.

Created: 10/8/97
Modified: 11/18/97

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How are menus going to work in Rhapsody?

Menus are in a menu bar at the top of the screen, as they are on the Mac OS.

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Is the Mac OS window layer model being implemented in Rhapsody?

No. Rhapsody's window model allows users to bring individual windows
to the front, yet also allows users to bring all of an application's
windows forward together, as well. Rhapsody's window model also
supports floating and backdrop windows and never needs to send Mac
OS-style notifications before putting up a modal dialog.

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Are we going to have the familiar Finder experience for Rhapsody?

Yes. You'll get a desktop, folder windows, and familiar icons and
appearance.

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I love the OpenStep file browser. Can we use that on Rhapsody, or is
the Rhapsody Finder an exact copy of the Mac OS Finder?

Yes. Rhapsody is providing both an OpenStep-style browser and the more
familiar Mac OS Finder features.

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Is the OpenStep Dock going to be available in Rhapsody?

No, the OpenStep dock is not available in the Rhapsody Developer
Release.

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Are my windows and dialogs going to look and act the same under
Rhapsody?

The Blue Box is the native Mac OS, and so windows and dialogs are Mac
OS windows and dialogs. In the Yellow Box, windows and controls look
and act the way they do on the Mac OS except where there is a clear
improvement to be made by adopting OpenStep ideas. In windows, the
window close box, zoom box, and windowshade box are all exactly like
their Mac OS equivalents. However, slight interface changes, such as
adding proportional thumb boxes to scroll bars, and implementing live

scrolling, have been made.

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Can I drag to the desktop on Rhapsody?

Yes. For the Rhapsody Developer Release, dragging to the desktop
produces an alias, it does not move the file. This will likely be
changed for the Premier release and beyond.

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Is the Finder going to be extensible in future releases Rhapsody?

Yes. We explect that third parties will be able to integrate new
displays and applications into the Finder for Rhapsody in a very clean
and robust way. The specification is not ready yet, but we expect that
this will be an area of opportunity for Rhapsody developers.

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File types and creators are an important part of the Mac OS
experience. Will these work in Rhapsody, or will we be forced to use
filename extensions?

Rhapsody will give you the best of both worlds. Where file types and
creators can be stored in the file system, Rhapsody will use them. On
volumes that cannot store them, or for files that don't have a file
type or creator, Rhapsody will use any filename extensions it can find
as a fallback. It should be an even better experience than that which
the Mac OS provides today.

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What about AppleGuide? Is it a part of Rhapsody?

Rhapsody is moving to provide a new, HTML-based help system.
Developers will be able to use the wide array of HTML authoring tools
available to produce help files. Users will be able to browse help,
navigate links, and search the help files for solutions. Over time, we
plan to add new HTML tags which will bring some of AppleGuide's
features to Rhapsody. If you author in HTML today, you can
incrementally add features as they become available.

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What will the installer be like in Rhapsody?

Rhapsody has an installer system which is relatively similar to the
Mac OS installer. It has an uninstall feature as well, which lets
users open a receipt and uninstall a package they have added to their
computer.

                                        Created: 10/8/97
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Is Rhapsody a multi-user system? Will I have to log in to my
computer?

Rhapsody is a multi-user system, but a single user machine which isn't
on a network will probably not require a login from the user. On
networks, though, Rhapsody will allow a user to access his own desktop
from any computer on the net, with a simple login.

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Will I be able to customize my Rhapsody machine with background
pictures, startup sounds, etc. as I can now on my Mac OS computer?

To some extent. Rhapsody has different capabilities than Mac OS, so
some of these features may be different, but most of them will be
there.

                                        Created: 10/8/97
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Will I have to use a Command Line Interface to run programs or
configure system preferences?

No. You will not be required to use the Command Line to run programs
or configure system preferences, although it will be available for
users who are comfortable with using the command line to perform such
tasks.

                                        Created: 10/8/97
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What about the new Mac OS 8 Appearance Manager and the switchable
Themes that will follow later? Will there be a Themes capability in
Rhapsody outside of the Blue Box? Will Themes be transportable between
the Blue Box and the Yellow Box?

Mac OS is the flagship of Apple's human interface, and Apple will

continue to agressively invest in Mac OS, to ensure that it continues to provide the industry's best user experience. Rhapsody will offer some interesting new options, and over time, we expect the user experiences to converge.

Created: 10/8/97
Modified: 11/18/97

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What will Java applets look like when they run on Rhapsody?

This depends on how they are written. If they use AWT widgets, then they will look like the native platform. If they are written to another set of widgets, they will have the look and feel defined by that library.

Created: 10/8/97
Modified: 11/18/97

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Will there be an Apple menu in Rhapsody?

Yes, although its exact functionality has not yet been determined.

Created: 10/8/97
Modified: 11/18/97

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Will Rhapsody have Setup Assistants?

This is not yet decided. There will probably be a similar feature.

Created: 10/8/97
Modified: 11/18/97

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Will Rhapsody support Apple Data Detectors?

We are interested in making this technology available in the Yellow Box; we are investigating the most appropriate way to do so.

Created: 10/8/97
Modified: 11/18/97

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Will Rhapsody support the Apple Information Access Toolkit (formerly known as V-Twin)?

Yes, we intend to bring the Apple Information Access Toolkit (AIAT) to Rhapsody, although we haven't yet finalized all the details.

Created: 10/8/97
Modified: 11/18/97

How is the Blue Box going to interact with the rest of Rhapsody?

The Mac OS compatibility environment is mostly a separate environment,
with its own view of the disks and its own Finder. We chose to keep it
separate for two reasons: compatibility and understandability. By
preserving the existing Mac OS Finder and window system, we ensure
much better compatibility for customers. Since the two systems are
going to end up being noticeably different in a number of ways,
research indicated that customers would understand a separated system
much more easily.

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Will I have to configure my system twice--once for the Mac OS and
once for Rhapsody?

The answer is mostly yes. Because the two systems have different
capabilities there are a lot of configuration settings that don't make
sense to apply to both operating systems. We have decided to help
users understand the system by keeping the configuration information
mostly separate. Some key exceptions are things like TCP/IP addresses
and clock settings. However, we are still investigating methods to
allow a user to selectively synchronize Yellow and Blue system
settings.

                                        Created: 10/8/97
                                        Modified: 11/18/97
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What about fonts? Are they going to be shared between the Yellow Box
and the Mac OS compatibility environment?

Yes. We haven't finalized all of the details yet, but we understand
how important this is to our publishing customers.

                                        Created: 10/8/97
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Can we copy and paste between Rhapsody and the Mac OS compatibility
environment?

Yes.

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Will the Rhapsody file system be shared between the Blue Box and the
Yellow Box?

There will eventually be some sharing, but the default experience will
try to segregate Rhapsody files from Mac OS files, to minimize user
confusion. A setup utility will let users choose which parts of their
file system are shared. This same mechanism will let users store Mac
OS files in disk images as well as dedicated file system partitions,
for greater compatibility.

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Section 7: Media/QTML

Will the QuickTime Media Layer (QTML) technologies be available in
the Yellow Box?

QTML technologies are strategic to Apple's mission with Rhapsody and
are planned to be available as an integrated set of services in the
Yellow Box. They are available for existing Mac OS applications in the
Blue Box.

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Will Rhapsody support VRML and OpenGL?

We are currently investigating Rhapsody's Graphics and Imaging
architecture and we will communicate with you again as soon as more
information is available.

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Section 8: Transitional Technologies

Will QuickDraw GX applications run in Rhapsody? What will be
preserved of QuickDraw GX?

In Rhapsody, QuickDraw GX applications will continue to work under the
Blue Box environment. The Mac OS GX APIs per se will not be part of
the Yellow Box. GX Typography fits naturally into the existing AppKit
model, so we are planning to support the typographical capabilities of
QuickDraw GX through equivalent Yellow Box APIs. Line Layout tables in
GX fonts will be fully supported.

                                        Created: 10/8/97
                                        Modified: 11/18/97

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Will Game Sprockets be supported in Rhapsody?

Game Sprockets will continue to be supported in the Blue Box. For the Yellow Box and Core OS, we will be adding equivalent functionality, though not through the same APIs.

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Section 9: Java

What is Apple's component strategy?

Apple believes that JavaBeans provides the level of component support developers need, and will be working with JavaSoft to help define how document-centered computing will be implemented.

                                        Created: 10/8/97
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Will Rhapsody support JavaBeans?

JavaBeans are a part of the core JDK 1.1 specification and as such will be supported in Rhapsody in the Premier release, along with the rest of JDK 1.1(+) support. JavaBeans will also be supported in MRJ 2.0, expected to ship near the end of the third quarter, and thus will be supported in the Blue Box also. JavaBeans will also be tightly integrated into the Yellow runtime, along with all of Java, and will be transparently integrated into Interface Builder.

                                        Created: 10/8/97
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When can we expect Java in the Blue Box?

Java is already part of the Blue Box. We are currently shipping MRJ 1.0, and it is part of the Mac OS. MRJ 2.0, which implements JDK 1.1, will be available before the Premier release ships. Thus, when Rhapsody Premier ships, MRJ 2.0 will be available in the Blue Box as a matter of course.

                                        Created: 10/8/97
                                        Modified: 11/18/97

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Will Apple continue to support Java VM on all releases?

Apple is making a significant investment in Java. This is clear in our commitment to enhance and advance Java on Mac OS and the Blue Box, as well as our integration of Java and the Yellow Box. Java is a central

part of our strategy.

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If I have a pure Java application, should I run it under the Blue Box
or under the Yellow Box?

We will provide world-class Java support in both environments. No
performance comparisons are available at this time, and we do not
suspect that one would necessarily be faster than the other.

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How will Java work in the Yellow Box? Will OpenStep be available in
Java?

Yellow Box frameworks will all be subclassable from Java, and
developers will be able to seamlessly mix and match Java and Yellow
frameworks in their code.

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Will Java be in the Rhapsody Developer Release?

The Rhapsody Developer Release provides alpha versions of the Java
wrappers for Yellow APIs. Our bridge technology for communicating
between the Objective-C and Java runtimes are also provided. However,
Interface Builder integration of Java and a full JDK implementation
will not be available until a future release.

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Do Java applications run in their own process?

Each application, whether Java byte-code or native object code, will
run in its own process.

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How will Java work on Rhapsody?

Essentially, pure Java applications will run in Rhapsody's Java VM
much like any other platform. Java calls to Yellow APIs will cross an
object bridge that enables proper garbage collection and inheritance
across runtimes.

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What Java support can we expect in the Premier release?

Beta versions of the Java wrappers for Yellow APIs, the
Objective-C/Java runtimes bridge, AWT, and full integration of Java
and JavaBeans in the Interface Builder are expected for the Premiere
release.

Created: 10/8/97
Modified: 11/18/97

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Will Yellow Box for Mac OS also feature Java integration?

Yes, it will. Our bridging technology works for nearly all Java VMs,
including MRJ. Details of the implementation are still being
investigated.

Created: 10/8/97
Modified: 11/18/97

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Will JavaScript be implemented as Rhapsody's scripting engine?

Scripting remains a very important technology for Apple in the areas
of publishing and Web authoring. We expect to create a
language-neutral scripting engine for Rhapsody, and will explore
support for additional languages after AppleScript.

Created: 10/8/97
Modified: 11/18/97

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Can a developer write an all-Yellow application in Java?

Yes. Java the language can be used to seamlessly access the full power
of the Yellow APIs. Moreover, an application compiled to Java
byte-code will be executable cross-platform, as long as the Yellow Box
is present.

Created: 10/8/97
Modified: 11/18/97

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Does Apple support JFC, AFC, IFC, and other Java libraries?

Yes. All pure Java classes will run under Rhapsody.

Created: 10/8/97
Modified: 11/18/97

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Section 10: Tools/Development

How will the relative size of applications in Rhapsody compare to Mac
OS or Win32 applications?

A Rhapsody application has the potential of being smaller than a
traditional application because the Yellow Box provides such a rich
collection of services that applications rely on it for more
functionality than what the Mac OS or Windows can provide.

                                        Created: 10/8/97
                                        Modified: 11/18/97

Will I have to transition to the Yellow Box APIs to be compatible?

Rhapsody for Power Macintosh will support existing 68K and
PowerPC-based Mac OS applications as well as most system extensions
via the Blue Box. Because your current investment is preserved with
Rhapsody, you can evaluate how your product can take advantage of the
Yellow Box APIs and choose a transition strategy based on your
business needs. There are many compelling aspects of the new API, and
it will allow you to quickly build applications that exploit
preemptive multitasking, symmetric multiprocessing (SMP), and memory
protection in a rich, fully object-oriented programming environment.

                                        Created: 10/8/97
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Can developers produce cross-platform Rhapsody applications?

Yes, developer will be able to create Yellow Box applications that
will run on Rhapsody for Power Macintosh, Rhapsody for PC Compatibles,
Windows using the Yellow Box for Windows, and the Mac OS using the
Yellow Box for Mac OS.
                                        Created: 10/8/97
                                        Modified: 11/18/97

Will Rhapsody applications run on existing versions of OPENSTEP?

The Yellow Box is a strict superset of today's OpenStep API's.
Therefore, today's OpenStep applications will port easily to Rhapsody
for Power Macintosh, Rhapsody for PC Compatibles, Windows via the
Yellow Box for Windows, and the Mac OS via the Yellow Box for Mac OS.
Applications written using the Yellow Box will not be able to run on
existing versions of OPENSTEP.
                                        Created: 10/8/97

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Will Apple continue to develop Mac OS APIs and encourage developers
to adopt them?

Yes. Apple expects the Mac OS to be our volume platform for years to
come and will continue to aggressively invest in it. Apple has
currently announced three Mac OS reference releases: Mac OS 8 which
has been shipping since July 1997; Allegro, which is due in mid-1998;
and Sonata, which is due in mid-1999.

Created: 10/8/97
Modified: 11/18/97

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Will existing OpenStep applications run unmodified (only recompiled)
on Rhapsody or via the Yellow Box on Windows and the Yellow Box on Mac
OS?

The Yellow Box is a superset of the OpenStep API. Today's OpenStep
applications will generally only need to be recompiled to run on
Rhapsody for Power Macintosh, Rhapsody for PC Compatibles, Windows via
the Yellow Box for Windows, and the Mac OS via the Yellow Box for Mac
OS. NeXTStep applications will have to be ported first to the Yellow
Box API.

Created: 10/8/97
Modified: 11/18/97

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Will MacApp evolve into the Yellow Box?

MacApp-based applications will certainly be compatible in Rhapsody for
Power Macintosh's Blue Box. Metrowerks has also indicated that their
CodeWarrior Latitude product will be capable of compiling MacApp and
PowerPlant solutions to the Yellow Box.

Created: 10/8/97
Modified: 11/18/97

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If I am about to start a new project, what programming language
should I use? Objective-C? C++? Java?

That depends on your product and schedules. With the Yellow Box, we
will deliver a tightly integrated Java VM as well as native Java
support that will be able to utilize the Yellow Box frameworks. We
expect that many applications will use a variety of programming
languages. Many will stick with C++ and both Apple and Metrowerks are
working to ensure that C++ is a viable language for Rhapsody
development. Objective-C is the standard language used by OpenStep
developers today but over the long term, we expect more and more
products to be written in Java for this platform. There certainly will

be a variety of options for programming languages, and the choice will
largely rest in your hands.

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Are Yellow Box applications vulnerable to the "fragile base class
problem"?

In general, no. The Yellow Box is based on the Objective-C language,
which implements a dynamic object model and runtime system. Yellow Box
applications run using the Objective-C Runtime, and this solves most
of the fragile base class problem. This is true in the following
sense: Methods can be added to or deleted from a class without forcing
the recompilation of subclasses. Yellow Box programmers are exposed to
the fragile base class problem if they need to add instance variables.
However, experience has shown that the need to add an instance
variable (as opposed to a method) occurs much less often, especially
in mature frameworks such as Yellow Box. With some planning,
programmers can prevent the need for an extra instance variable from
breaking subclasses. The most common method for doing this is by
adding extra instance variables when creating a class and leaving them
unused; the programmer can later use one of these instance variables
without causing subclasses to break.

                                        Created: 10/8/97
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What debugging services will be available, and when?

The Rhapsody Developer Release will provide a graphical interface to
gdb. For tools developers, the Mach kernel provides a set of standard
services for managing and controlling processes. Yellow Box for
Windows and Yellow Box for Mac OS will take advantage of the debugging
services provided by the underlying operating system (Windows 95,
Windows NT, and Mac OS, as appropriate).

                                        Created: 10/8/97
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Do developers need to learn Objective-C to create applications using
the Yellow Box? Will Apple's technology APIs be rewritten in
Objective-C?

We intend to allow developers to use the programming languages of
their choice for new application development in Rhapsody. Objective-C
is the native language and will offer some advantages over other
languages, but with partners like Metrowerks we expect to offer Java,
C, and C++ as viable development languages. Over time, we expect a
greater focus on Java as a development platform.

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How long does it take to learn Objective-C? How will Apple help
developers acquire new skills?

Learning to use Objective-C takes a C++ experienced developer no more
than a day or two. For those developers without any object-oriented
programming experience, it might take a bit longer. The real hurdle to
learning how to develop for the Yellow Box will be in learning the
frameworks supplied by the Yellow Box. The former NeXT training
organization has a strong track record of bringing programmer without
any object-oriented programming experience up to speed in
approximately two weeks of leader-lead training. We are currently
leveraging these existing materials into self-paced training that will
be available via the Internet. We believe that these materials, along
with the experience that many developers have with frameworks like
MFC, PowerPlant, and MacApp, will allow existing developers for both
Windows and the Mac OS to quickly come up to speed on developing for
the Yellow Box. In addition to using Objective-C to write to the
Yellow Box frameworks, Apple will be supplying Java bindings that will
allow programmers experienced in Java to write to the Yellow Box using
Java without touching any other programming language.

                                        Created: 10/8/97
                                       Modified: 11/18/97

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Can you currently code in C++ for OpenStep?

Currently you can code in C++, but subclassing of the Yellow Box's
frameworks objects must use the Objective-C syntax or Java.

                                        Created: 10/8/97
                                       Modified: 11/18/97

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Will you be adding "modern syntax" for Objective-C?

At WWDC, we discussed an investigation into a modern syntax. It became
clear that Objective-C developers prefer the current syntax, and that
programmers of other languages were eager to use Java as their
language of choice. As a result we will focus our efforts on moving
Objective-C forward and deliver a complete Java solution. The modern
syntax effort will not continue

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Section 11: Product Details

Which computer systems are supported by the Rhapsody Developer
Release for Power Macintosh?

The Rhapsody Developer Release for Power Macintosh supports Power
Macintosh 8500 and 8600 systems as well as Power Macintosh 9500 and
9600 systems which use an Apple supplied display video card.

The systems which are officially supported, include Power Macintosh:
8500/120,8500/132,8500/150,8500/180 8600/200, 8600/300,
9500/120,9500/132,9500/150,9500/180,9500/180MP*,9500/200
9600/200,9600/200MP*,9600/233, 9600/300, 9600/350 *This multiprocessor
model will support the Rhapsody Developer Release but will make use of
only one processor. (Some unqualified systems may run Rhapsody
Developer Release for Power Macintosh)

                                        Created: 10/8/97
                                        Modified: 11/19/97

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Will Rhapsody run on Intel processors?

Yes, we have released Rhapsody for PC Compatibles, as well as Rhapsody
for Power Macintosh, the primary Rhapsody target platform. In addition
to this, due to the cross-platform capabilities provided by the Yellow
Box for Windows 95/NT, applications developed for the Yellow Box will
be able to run on Rhapsody for PowerPC, Rhapsody for PC Compatibles,
Microsoft Windows NT/95 using the Yellow Box for Windows runtime, and
future versions of the Mac OS using the Yellow Box for Mac OS runtime.

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What computer systems are supported by the Rhapsody Developer Release
for PC Compatibles?

A full list of supported PC Compatible hardware and drivers for the
Rhapsody Developer Release is located in the Rhapsody Developer
Release for PC Compatibles Installtion Guide (PDF format).

                                        Created: 11/18/97
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When will Rhapsody support Power Macintosh G3 Systems?

We expect that all three G3 systems introduced by Apple on November
10th - desktop, minitower, and portable - will be supported in the
next release of Rhapsody. Note that support for PowerBook-specific
features such as power management will not be available until a future
release.

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Will the Rhapsody Developer Release support PowerBooks?

The Rhapsody Developer Release for Power Macintosh will only be
supported on a few select systems in order to meet our time-to-market
goals. These configurations include 8500, 8600, 9500 (with
Apple-supplied video cards only), and 9600 Power Macs. We will not be
supporting PowerBooks as part of that early release.

Created: 10/8/97
Modified: 11/18/97

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How will Rhapsody support PowerBooks, and when?

Future releases of Rhapsody are expected to run on some models of
PowerBooks. However, it will not be fully tuned to service the special
power conservation requirements of battery-powered computers in its
initial release. Apple intends to support these capabilities over
time.

Created: 10/8/97
Modified: 11/18/97

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Will the first customer release of Rhapsody be installed on CPUs
shipping at that time?

We have not yet made any bundling decisions.

Created: 10/8/97
Modified: 11/18/97

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What are the memory requirements for a computer running Rhapsody?

At this time we are suggesting a minimum of 32 MB of RAM, 48 MB for
development or other high-demand applications.

Created: 10/8/97
Modified: 11/18/97

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Is there any synchronization between Mac OS releases and Rhapsody
releases?

No. We are not developing the two programs with any interdependencies.
This gives us greater flexibility and faster time-to-market.

Created: 10/8/97
Modified: 11/18/97

What about software compatibility and protecting our investment?

Apple is working hard to protect as much of your investment as
possible and we believe the Blue Box is an excellent solution, if you
choose to migrate fully to Rhapsody.

                                        Created: 10/8/97
                                        Modified: 11/18/97

UNIX machines can be difficult to administer. How will Rhapsody
improve the administration experience?

Rhapsody will provide a superior user experience and network model
that will give users and administrators the advantages of the
underlying UNIX facilities without having to deal directly with the
UNIX-based portions of the system. This allows - but does not require
- virtual desktops and remote administration of machines by a central
administrator. The UNIX command line will not be necessary, but will
be available for those who wish to take advantage of it.

                                        Created: 10/8/97
                                        Modified: 11/18/97

Will there be support for multiple-button mice?

Yes, for Yellow Box; no, from Apple for Blue Box (consistent with what
we provide today for the Mac OS). Blue Box support of third party Mac
OS products which provide multi-button mouse support is to be
investigated. These products may require driver changes, depending on
their implementation.

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                                        Modified: 11/18/97

Section 12: Current OPENSTEP Implementations

Is the distributed object support in OPENSTEP CORBA-compliant?

Yes. At the WWDC in May 97, Apple announced version 4.2 of OPENSTEP
Enterprise. In addition to increasing the overall ease of use and
robustness of the system, OPENSTEP Enterprise 4.2 now includes support
for CORBA 2.0 through IONA's Software ORBIX product.

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