NeXT™

0.9/1.0 Release Description

The NeXT™ Computer
0.9/1.0 Release Description

Introduction

Software, like any good product, evolves. This paper describes the anticipated evolution of the NeXT™ system software over the coming months. It also explains some of the reasons behind the changes being made. While it doesn't give an in-depth technical description—that will be found in the NeXT technical documentation—it does offer a clear, concise summary of planned features and enhancements.

The phrase "NeXT system software" refers to all software bundled with each NeXT system. This includes (but isn't limited to): the Mach operating system; the UNIX™ BSD 4.3 utilities; the Objective-C® development system; Display PostScript®; NextStep®, which comprises the Window Server, the Application Kit™, Interface Builder™, and Workspace Manager™; and the various bundled applications and utilties, such as WriteNow™, Digital Librarian™, and Mathematica®.

If you have a NeXT Computer, you are currently running Release 0.8 software. NeXT plans two additional software releases during the first half of 1989: Release 0.9 and Release 1.0. We expect to complete Release 0.9 in late Q1, so it should be in your hands no later than April. Release 1.0 will be sent out late in Q2.

If you own a NeXT system, you will receive both of these updates free of charge. To guarantee that you receive these releases, fill out and return the registration card included in the Accessories kit that came with your NeXT system. If you lost your card, call NeXT at 415-424-8500, and we'll send you a new one.

We've divided NeXT software into five areas:

- User Interface
- System Software
- Development Environment
- Applications
- Sound, Music, and Signal Processing

The first part of this document has a summary of planned changes for each of these areas under Release 0.9 and Release 1.0. This is followed by a brief discussion of the purpose and intent of Releases 0.8, 0.9, and 1.0. The rest of the document is a more detailed explanation of the planned changes, following the order given in the summary of changes.

Release 0.9:
Summary of Planned Changes

User Interface

- application icons are highlighted during launch, marked during execution
- double-click behavior is more consistent between browser and summary views
- standard panels (Print, Font, etc.) have been added to the Application Kit
- screen layout has been standardized
- a Preferences application has been added
- you can now define a set of applications to be launched when you log in
- double-clicking on folders in an Icon-view directory window opens a new window

System Software

- the NeXT standard directories for applications and resources have been reorganized
- you can choose between seeing the full UNIX file structure or just the NeXT directories
- optical disks are automatically mounted and unmounted for you
- the first release of NetInfo™, a utility for configuring networks, is included
- the NeXT system software is preconfigured for small networks of NeXT computers
- ability to copy files between optical disks
- blank optical disks are automatically initialized
- a generalized SCSI device driver makes it easier to support various SCSI devices

Development Environment

- a faster, more compact archiving format is used
- Interface Builder is greatly changed in its appearance and uses a new file format
- custom objects can now be linked to Interface Builder for testing
- a terminal-based version of Franz® Allegro CL® common Lisp is included
- the Objective-C compiler compiles faster

Applications

- WriteNow has numerous changes and enhancements, including: a magnify mode; a new ruler; built-in RTF support; EPS file support; the ability to scale graphics; a built-in spelling checker; mail merge capabilities.
- Digital Librarian has numerous changes and enhancements, including: the ability to index and search user-created documents; a "search harder" feature; removal of the Digital Webster™ and Quotations applications; a new index for Shakespeare's works.
- Digital Webster now uses the menu to access help information, and it lets you decide whether or not to print illustrations associated with a given entry
- a beta version of Mathematica has been included
- Jot™ has been removed from the release
- Mail now allows files to be attached to messages, and also automatically renumbers the remaining messages after one or more messages have been deleted.
- Terminal supports fuller VT-100 emulation, and the Terminal window can be resized.
- the Printer application has a new user interface; it now supports printing across networks and printing on non-NeXT printers; it also has expanded error reporting

Sound, Music and Signal Processing

- the Sound Kit™ provides for sampling, storage, and playback of sounds
- the Music Kit™ provides for music synthesis and performance
- Motorola 56001 DSP assembler included
- support for user developed DSP programs

Release 1.0:
Summary of Planned Change

General

- known bugs will be fixed
- overall performance will be improved

System Software

- NetInfo will continue to be enhanced
- BuildDisk will preserve personal files when you do an update
- A beta release of loadable device drivers will be supported

Development Environment

- a Math object will be provided to let you make calls to Mathematica from within Objective C programs

Applications

- a beta release of the Sybase® SQL Database Server will be included.

Sound, Music and Signal Processing

- the Music Kit will support MIDI input and output

Release Versions

Release 0.8: Current

As mentioned, Release 0.8 is the current software release being distributed with NeXT systems. The goal of this release was to provide developers with functional systems so that they could get started with their work as soon as possible. It contains most of the major elements planned for Release 1.0: Mach, Display PostScript, NextStep, and some of the applications.

As you know, many of these elements are still in preliminary form. Some of the applications that will be bundled with Release 1.0 are not yet present, including Sybase, Mathematica, Franz Allegro CL Common Lisp, and the Preferences application. Those that are present lack some features and there are still some bugs and areas where performance can be improved.

Many of the enhancements you'll see in coming releases are the direct result of feedback we've received from our early customers. If you are one of them, many thanks for your suggestions and your patience.

Release 0.9: April 1989

Release 0.9 will include most, if not all, of the features planned for Release 1.0. Many of the existing applications will be modified and improved; some not present, such as Mathematica, will make their appearance. Release 0.9 will also have many bug fixes and performance improvements. However, Release 0.9 is still "preliminary" in the sense that it is not fully debugged or performance tuned. It is aimed at developers and aggressive end users.

Some of the changes in Release 0.9 will mean that programs you've developed are no longer binary compatible. If you're developing programs, or you're using programs someone else developed, they'll have to be recompiled. In some cases, you may have to change your source code.

Release 1.0: Q2 1989

Release 1.0 is the first release designed to be used by the general public. It will look and act pretty much like Release 0.9. The changes will be in how well the software performs. Most of our work for Release 1.0 will focus on improving performance and fixing bugs, though there will be significant changes in some applications, such as Mathematica and Franz Common Lisp. Release 1.0 will also include the first release of Sybase.

As with 0.9, Release 1.0 may require source code changes and recompilation. After 1.0, however, we will maintain binary compatibility with future releases so you won't have to recompile your programs.
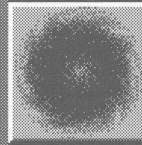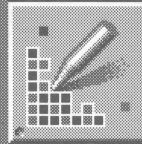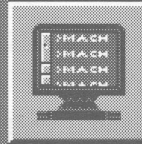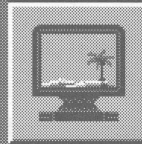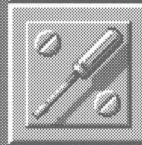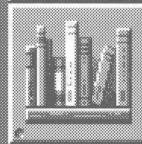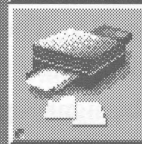
User Interface

Application Feedback

In Release 0.8, when you double-clicked an application icon in the dock, there was no way to tell whether the application was actually launching until it appeared. In Release 0.9, when an application is launched from the dock, its icon remains highlighted until the application has completed launching.

The Release 0.8 user interface did not distingush between running applications that are hidden, and those that are not running. In Release 0.9, when an application icon is in the dock, a mark in its lower left hand corner indicates it is not running. If an application is running and its icon is not in the dock, the icon appears somewhere on the screen, usually towards the bottom of the display, just as it does now. It remains there until the application is terminated, at which time it will disappear.

Consistent Double-Click

One area of confusion for users of Release 0.8 has been when to single-click and when to double-click, especially when presented with lists of files. Release 0.9 increases the consistency between **browser views** (such as those in the Directory Browser and Interface Builder) and **summary views** (such as those in Mail or Digital Librarian).

Browser Views: You select an item in a browser view with a single mouse click. Once an item is selected, you can operate on it by clicking a button or selecting a menu item. Where appropriate, you can also double-click the icon in the Browser window to open or launch. As a shortcut, you can directly double-click Browser items that contain no subentries, such as documents or applications. Double-clicking an item with subentries (e.g., directories) has the same effect as a single-click. Note that this will not open a directory window, as it did in Release 0.8.

Mark in lower left hand corner indicates an application is not running

Summary View: In Release 0.9, you will use a single-click to select an item in a summary view. Once you've selected it, you can operate on that item using buttons or menus. A double-click on an item in a summary view has the same effect as a single click.

Standardized and Enhanced Panel Layouts

In Release 0.8, each application used its own panels for printing, font selection, file selection, and other common functions. In Release 0.9, these commonly-used panels have been standardized and added to the Application Kit library. That way, most applications will present identical panels for identical functions. Likewise, developers can use these predefined panels without having to design and lay out their own.

This list includes Info and Error panels, Open and Save panels using a Browser-like view, Print and Page Layout panels, and a Font panel for selecting PostScript fonts. Most of these panels have been enhanced over the Release 0.8 versions.

Standardized Screen Layout

The screen layout for each application has been standardized to a greater degree than in Release 0.8. Applications will consistently position menus in the upper left portion of the screen and position the document window to the right of the menus. Attention panels will appear in the middle of the screen, and control panels will appear to the right of the document window when possible. Developers should follow this same layout.

Open

Panels

panels1.nib
panels2.nib
panels3.nib
panels4.nib
more panels
panels5.nib
panels6.nib

Panels II

panels1.nib
panels2.nib
panels3.nib
panels4.nib
more panels
panels5.nib
panels6.nib
still more panels

Name: somepanel.nib

Cancel   OK

Page Layout

Width: Height:

Portrait   Landscape

Paper Size
A4

Layout
Two Up

Units
Inches

Scale
100   %

Cancel   OK

Print

Name: *Quicksilver*
Type: *NeXT Laser Printer*
Status: *idle*

Choose

Copies
1

Pages
☑ All   1   to   1

Paper Feed
Auto Manual

Resolution
300 dpi

Save   Preview   Cancel   Print

Font Panel

Helvetica-BoldOblique

Family	Typeface	Size
AvanteGarde	Light	12.0
Benguait	Light Italic	8
Bodoni	Roman	9
Carta	Italic	10
Helvetica	Bold	12
New Century School	Bold Italic	14
Times		18
Zapf Chancery		

Custom   Preview   Set

Preferences Application

In Release 0.8, you had no means of customizing the user–interface settings, such as key repeat rates, mouse scaling, button usage, and so on. In Release 0.9, there is a Preferences application for setting such user preferences. When you launch Preferences, you are presented with the Preferences panel, which displays the current settings. You can then use the mouse to change the settings to your liking. These settings are then saved and used each time you log in. Each user on a NeXT system can have his or her own settings.
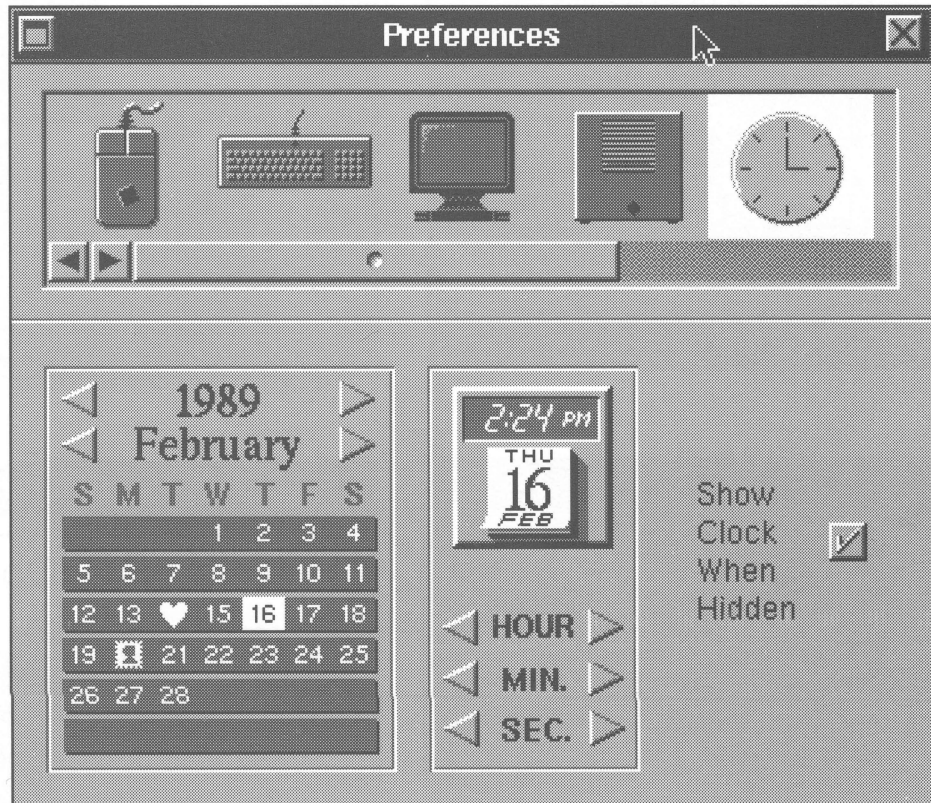
Preferences Panel

Differentiation of Mouse Buttons

In Release 0.8, pressing the right mouse button always made the main menu of the current application pop up under the cursor. In Release 0.9, the default mouse setting in the Preferences application will simulate a single-button mouse by making both buttons have the same effect. Advanced users may enable the menu-pop-up behavior using the Preferences application.

Automatic Program Launch

In Release 0.8, you had to manually launch each application that you wanted to have up and running after logging in. In Release 0.9, you can define a set of applications to start up automatically when you log in. That way, commonly used applications (such as WriteNow, Edit, Digital Librarian) will be loaded and running when you need them.

Enhanced Icon View

Under Workspace Manager, you can open a directory window with the Icon view. In Release 0.8, if you then double-clicked on a directory (folder) icon in that window, the current contents of that window would vanish and be replaced with the contents of the selected directory.

In Release 0.9, the same action (double-clicking on a directory icon) will open a new window, displaying that directory's contents. The original window will be left alone. This allows you to see the original directory window while examining the newly opened one.

System Software

File System Reorganization

Structured Directory Conventions: In Release 0.8, the system software used a standard UNIX file structure with some specific directories for holding applications and other resources (fonts, images, sounds). In Release 0.9, these NeXT-specific directories have been expanded and reorganized. This has been done to allow greater flexibility and support of multi-user and networked systems, and also to make it easier to perform system upgrades without destroying existing user files.

The Release 0.9 file system includes three sets of directories that have special functions. The first set of directories is the reserved system directories: NextApps, NextDeveloper, and NextLibrary. They hold the standard applications, resources, and utilities bundled with the NeXT system. These directories are reserved by NeXT. You should not store personal files there; otherwise, they'll be overwritten in future system updates.

The second set is the reserved public directories: LocalApps, LocalDeveloper, and LocalLibrary. These directories are for storing applications and other resources (fonts, sounds, images, etc.) specific to the local machine or network.

The third set are two reserved personal directories, Apps and Library, found in each user's home directory. These directories are for your personal applications and resources.

Workspace Manager uses the structured directory conventions to locate applications and resources as needed. For example, when you double-click a document to open it, Workspace Manager will look sequentially through these special directories to find and launch the required application. If the application isn't found in one of these directories, it will not be launched automatically. Instead, you will have to find the application and explicitly launch it before you can open the document.

Standard UNIX File System Presentation: Release 0.9 supports a more logical UNIX file system layout and presentation. Most of the symbolic links that were used in Release 0.8 to simplify the file system view have been removed. Instead, the Workspace Manager provides a full representation of the standard Berkeley 4.3 file system for UNIX experts while providing a greatly simplified view for the typical user. These two views—simplified and expert—are reflected in the Directory Browser; you can select which view you want. Note that the full UNIX file system (with NeXT

enhancements) is always there; the selection of simplified or expert views merely affects which files and directories you actually see.

The simplified view displays only those files and directories that you need to start working: NeXT directories, local directories, and home (user) directories. These are all presented at the root (beginning) level of the file system, so that you don't have to search in several levels to find the files that you need. You also don't have to see (and wade through) UNIX system files. The expert view displays the complete UNIX file system, including all the standard UNIX directories.
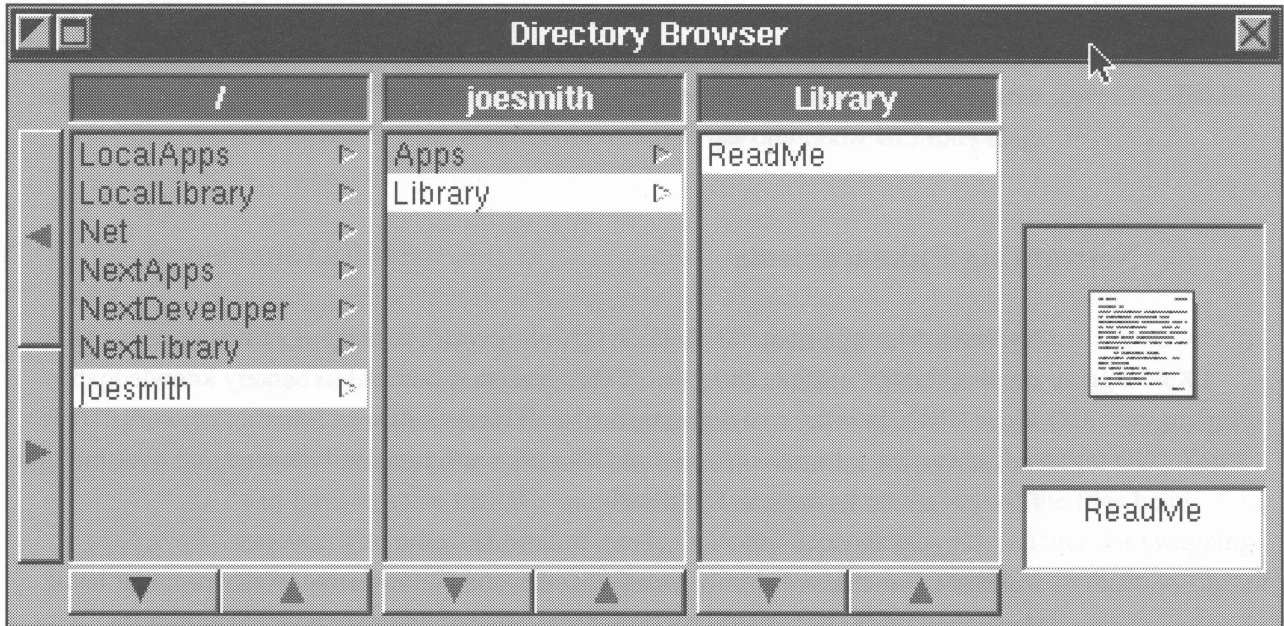
Simplified file system view (default)
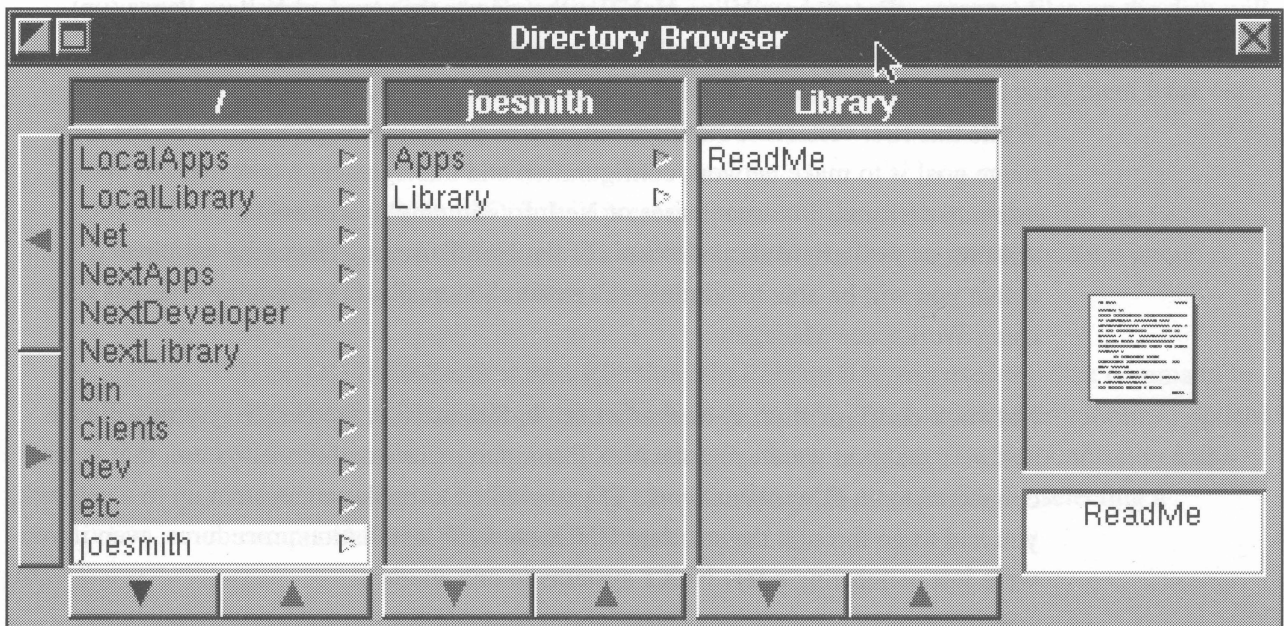
Browser with expert view enabled

Automatic optical disk mounting: In Release 0.8, you had to know a fair amount about UNIX in order to mount, unmount, and eject optical disks. Typically, you had to create a directory on your hard disk, get into the Shell or Terminal application, log in as a "superuser," create a mount point, and use the `mount` command to do the actual mounting. Likewise, you had to use the `umount` and `disk` commands to unmount and eject the optical disk.

In Release 0.9, this is all done for you by the system. If you insert an optical disk while logged in, the disk is automatically mounted, and the contents of the disk will appear as a new entry in your home directory with the same name as the disk label. You will then be able to access its files just as if they were stored on the disk you booted from. In addition, multiple OD's may be accessed by a single optical drive; the system indicates when a specific disk should be swapped. The system will automatically unmount and eject your OD when you log out.

Networking Enhancements

Network Management: In Release 0.8, all network management was done using standard UNIX utilities and files. This meant that you had to be very knowledgable about UNIX in order to integrate your NeXT system into an Ethernet network. It also meant that the information about the network configuration was scattered over multiple files in various formats and locations.

Release 0.9 includes NetInfo, an advanced system administration environment being developed by NeXT. NetInfo is a uniform, easily administered architecture for managing users, peripherals, and networks of NeXT computers. If you develop software, a Netinfo library interface lets you access NetInfo services directly from your programs. (For compatibility, NeXT still supports the standard Yellow Pages (yp) service so you can integrate NeXT computers into many existing networks.)

While this first version of NetInfo will be a help for system administrators, the long-range goal is to make network configuration and management a task that any NeXT user can perform. Future releases of NetInfo will employ automatic configuration utilities, as well as standard elements of the NeXT user interface; the anticipated result is that you will be able to administer a network as easily as you can now access files using Workspace Manager.

Network configuration enhancements: In Release 0.8, the NeXT system software assumed that you were using the NeXT computer as a stand-alone system, that is, not connected to an Ethernet network. If you wanted to hook your system up to a network, you had to go through the standard UNIX network installation procedures, even if you were just connecting a few NeXT systems to one another.

In Release 0.9, the NeXT system software comes preconfigured to operate either in a standalone or a departmental network configuration. The departmental network configuration consists of ten or fewer NeXT systems connected by a common Ethernet. The network is set up to allow these NeXT computers to share files, mail and other commonly accessed network services. This approach allows system administrators to quickly and easily set up homogeneous networks of NeXT Computers.

More elaborate network configurations are also possible for expert installations, using the NetInfo utility metioned above.

Netboot: In Release 0.8, there were no provisions for allowing non-NeXT systems to boot over the network from a NeXT computer. Release 0.9 supports the NFS netboot protocol. The netboot protocol lets your NeXT system act as a boot server for diskless workstations from a variety of vendors who support that protocol.

Important Utilities

Single Optical Disk Copying: Release 0.9, provides a copy utility that allows you to copy files from one optical disk cartridge to another, even if you are using a NeXT Computer with no hard disk or connection to a network. The single OD copy program moves files from the source OD into system memory, then onto the target OD. You will have to swap the ODs multiple times depending on the size of the files being moved. The practical limit of single OD copy depends on your patience for swapping disk cartridges. This method is intended to be used occasionally for application files or small documents, not for major backups or file transfers.

BuildDisk: In Release 0.8 and 0.9, BuildDisk rebuilds your entire disk from the current boot disk. In Release 0.9 you are alerted that any personal files on the disk will be lost. You must manually backup any personal files you want to save, either onto an optical disk or over the network to another system. You can then copy them back onto your NeXT computer after updating with BuildDisk.

In Release 1.0, BuildDisk will preserve personal files as long as they are not stored in reserved system directories. This allows you to perform a system update without having to back up and restore files.

User OD Initialization and Ejection: In Release 0.8, you used the disk command to explicitly initialize an optical disk. In Release 0.9, if you insert an uninitialized optical disk, the system automatically initializes it after prompting you for permission and a name to assign to it. Release 0.9 also allows you to eject an OD by selecting a command in the Workspace Manager menu.

Generalized SCSI Device Driver

Release 0.9 includes general purpose SCSI device driver support. The driver allows a program to send any arbitrary command data block sequence to an attached SCSI device. No kernel programming is required to support a variety of SCSI hardware like optical scanners and tape units.

Note, the SCSI disk driver supporting the Common Command Set (CCS) will continue to be supported.

Loadable Device Drivers

Along with Release 1.0 NeXT will release a beta version of loadable device drivers. Support for loadable device drivers will allow developers to create custom device drivers for the NeXT Computer. Loadable drivers can be dynamically loaded into the system so no memory is used until the driver is actually needed. A final release of loadable device drivers will be included in a future release.

Development Environment

Archiving enhancements

Release 0.8 uses a technique called **archiving** to save data files to disk. This technique allows object-oriented data structures to be written to disk, then later read back into memory, without losing the information about relationships between the various objects.

Release 0.9 introduces a new format for archived objects. This format is more compact and increases archiving speed. In addition, it includes more information on the data structures being archived, such as their types, which allows data to be more easily used by another application. This additional information also provides greater future compatibility and a higher level of machine independence.

Interface Builder enhancements

User interface: In Release 0.8, Interface Builder used a large assortment of windows and panels, including a couple of "palettes" of objects, a connect panel, different inspector panels for each type of object, and so on. In Release 0.9, the user interface has been streamlined. All the objects used to build interfaces are now placed in one palette window. A single inspector panel is used; its contents change according to the object currently being examined. The connection panel has been replaced by a more direct method: you draw lines between the objects you wish to connect. The project browser window is still present, but may be replaced in future versions.

File formats: In Release 0.8, Interface Builder saved out interface information for a given project into a `.nib` file. Release 0.9 uses an improved format for `.nib` files. The 0.9 version of Interface Builder will read both 0.8 and 0.9 Interface Builder file formats, but will always write files in the new 0.9 format, providing a convenient upgrade path to the new Interface Builder format. Note that you should open any `.nib` files created with the 0.8 version of Interface Builder and then write them out again to ensure that they've been converted to the 0.9 format.

Linking custom objects: In Release 0.8, you could create custom objects in Interface Builder using the Classes panel and use them in your project. However, their behavior wasn't defined; you would then have to implement them using Objective C. Having done so, you had no way of testing that behavior within Interface Builder.

In Release 0.9, you can link custom objects written by you (or someone else) into Interface Builder. These custom objects will appear in an Interface Builder palette, and may be used just like any standard Interface Builder object. Currently, the `ld` command is used to link custom objects into Interface Builder. The eventual goal is to eliminate this step with a dynamic linking process.

Allegro Common Lisp

Release 0.9 will include Allegro Common Lisp, a Lisp implementation developed by Franz, Inc. Lisp is a programming language widely used in artificial intelligence and expert systems research and development. Allegro CL is a Lisp implementation available on a variety of computer systems; it implements the Common Lisp standard and supports both Flavors and the Common Lisp Object System.

The 0.9 version of Allegro CL is a command-line version that can be run from the Terminal program. In a future version, Allegro CL will be enhanced to take advantage of the NextStep user interface, including linking Application Kit objects into Lisp programs and creating interfaces to Lisp programs using Interface Builder.

Faster Objective-C Compilation

In Release 0.8, compilation of Objective-C included a separate pass for the Objective-C preprocessor. In Release 0.9, this functionality has been integrated with the C compiler, eliminating one pass. This native compiler technology provides for greater source level debugging ability.
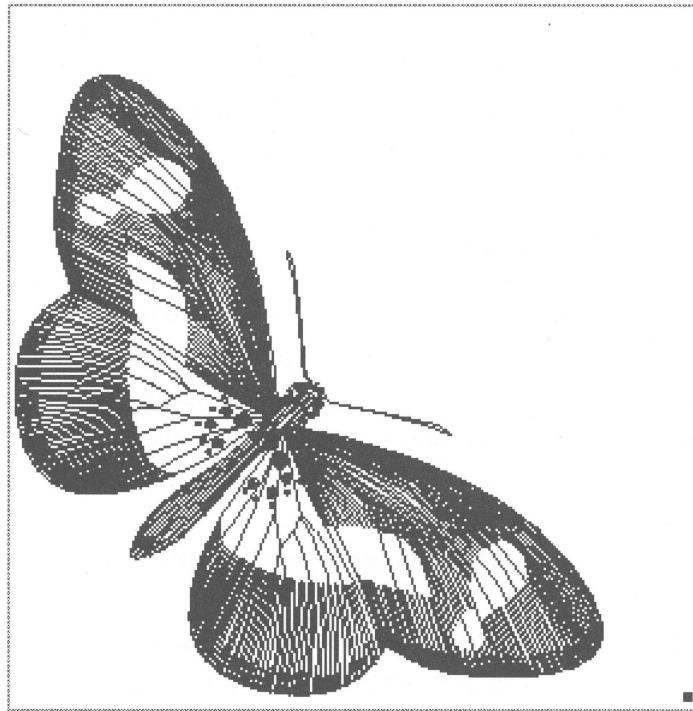
PHYLOGENY OF THE INSECTA

The fossil record for precambrian time is quite scanty, but by the Cambrian period marine arthropods were present, consisting of trilobites, crustaceans, and xiphosurans. The first terrestrial arthropods--scorpions and millipedes--appeared later, in the Silurian period, and the first insects appeared in the Devonian. Relatively few insects fossils are known from the Devonian, but many are known from the Carboniferous and later periods.

The insects are believed to have arisen from a myriapod ancestor that had paired leglike appendages on each body segment. The change to the insect condition involved a specialization of the

Applications

WriteNow

Magnify: In Release 0.9, a magnify function has been added to WriteNow to make small point sizes easier to read on the screen. This function allows documents to be displayed on the screen in a larger point size without affecting the actual point size or format of the document when stored or printed.

New Ruler: In Release 0.8, the "ruler" was actually a separate panel in which you entered the various settings as numbers. In Release 0.9, the ruler is actually a ruler, that is, a graphical representation of the tab, margin, and justification settings. It appears at the top of the document window and is adjusted using the mouse.

Built-in RTF Support: Rich Text Format (RTF) is a standard document interchange format specified by Microsoft Corp. In addition to opening and saving documents in its own internal format, the 0.9 version of WriteNow supports opening and saving documents in RTF format. Using this format, WriteNow on the NeXT Computer can exchange documents with Macintosh or IBM PC programs like WriteNow or Microsoft Word. RTF documents retain most of their font and formatting information.

EPS file support: In Release 0.8, WriteNow had no provisions for incorporating graphics into documents. In Release 0.9, WriteNow now has cut-and-paste support for Encapsulated PostScript (EPS) graphics. Also, you will be able to scale graphics pasted into a WriteNow document; in other words, you can change the width and height of an embedded graphic directly within WriteNow.

Spelling Checker: A spelling checker is added to the Release 0.9 version of WriteNow. The spelling checker will search through your document, flagging any words it doesn't find in its dictionary, and offering suggestions for the correct spelling. You can choose to correct the word's spelling, add the word to the dictionary, or simply skip to the next misspelled word.

Mail Merge: In Release 0.9, WriteNow supports mail merge. Mail merge makes it easy to create personalized form letters or mailing labels from a mailing list. It takes a template document (for example, a form letter) and a data document (for example, list of names and addresses) and prints multiple copies of the template document, substituting successive sets of data items for each copy.

Example of new ruler in WriteNow. Document also shows graphic selected for scaling.

Digital Librarian

User-indexed documents: In Release 0.8, you could only use the Digital Librarian to search pre-indexed documents supplied by NeXT (the NeXT and UNIX manuals, and the complete works of Shakespeare). In Release 0.9, you can index and search any WriteNow or ASCII document. Just drag the icon of the directory containing those documents to the target panel; the indexing is then done automatically for you. Once indexed, your files can be searched just like Shakespeare's works or the NeXT technical documentation. The automatic indexer will index all text in the document with the exception of common words such as *or, and, but*, etc.

You can also use a more advanced index command from within Terminal or Shell. This will let you choose how thorough the indexing will be; less complete indexing will reduce the storage consumed by the index, but it will also mean that some words will not be found in a search.

Search Harder feature: In Release 0.8, Digital Librarian could only find those words indexed when the document indices were originally created. In other words, if the index routines didn't include a particular word (or a given instance of that word) in the index files, you couldn't find it. In Release 0.9, Digital Librarian has a "Search Harder" command. This will do a full text search that guarantees any occurrence of a word will be found (including common words), even if it's not indexed. Search Harder may take substantially longer than an indexed search since it does a direct linear search of the entire text.

Removal of Webster and Quotations from the Digital Librarian Target Area: The Release 0.8 version of the Digital Librarian includes two applications in the Library target area: Webster and Quotations. In Release 0.9, both are removed from the target panel. You can still use these applications in their regular stand-alone format.

New Shakespeare Index: The on-line version of Shakespeare's works in the Digital Library has been reindexed. The new index is more thorough than the Release 0.8 version and includes all words except common words such as *or, and, but*, etc.

Digital Webster

Help: In Release 0.8, Quick Help for Digital Webster is accessed from a window brought up by the Contents menu selection. In Release 0.9, Help will be a command in the main menu.

New print option: In Release 0.8, Digital Webster allows you to print dictionary entries, but not any accompanying illustrations. In Release 0.9, a new print option will let you choose to print definitions with or without illustrations.

Mathematica

Release 0.9 includes a beta release of Mathematica. Mathematica is an advanced, interactive program that lets you perform integration (symbolic and numeric), differentiation, symbolic manipulation, calculations with unlimited precision, and other complex mathematics. You can also have Mathematica generate 2-D and 3-D plots and graphs based on the data generated by calculations. The Release 0.9 version of Mathematica will include a preliminary user interface that does not fully comply with the NextStep user interface definition. For example, fonts are changed through menu selections in a Style menu, rather than through a font panel.

Release 1.0 will include an enhanced Mathematica user interface that is consistent with NextStep conventions. Release 1.0 will also include a Mathematica Math Object. The Math Object will allow you to write programs in Objective-C that directly call Mathematica functions. This means that your program can have Mathematica perform complex calculations and return the answer to it.

NeXT SQL Database Server

Release 1.0 will include a beta release of the NeXT SQL Server™ from Sybase, Inc. Also included will be DB-Library™, a C-language programming interface to the server. The initial release of Sybase is aimed at developers, who can use the NextStep development environment and DB-Library to create applications built upon the Sybase server. The NeXT SQLServer will support access by up to 5 simultaneous NeXT Computer clients. Sybase, Inc. will offer an upgrade to support a larger number of users and non-NeXT clients.

Jot

Release 0.8 included Jot, a "personal database" application. Because of several limitations in Jot, it is not included in Release 0.9. NeXT has not yet determined whether Jot will be enhanced and included in future releases. Exisiting Jot files can still be searched by putting them in a directory within the Digital Librarian target area.

Mail

Attachments: In Release 0.8, you could include a voice attachment with your mail message. In Release 0.9, you can now attach files: documents, data files, programs, and so on. A mail message can include a single attachment: either a voice message or a file. Mail messages that include voice will not be able to include a file attachment, and vice versa.

Automatic compaction: In Release 0.8, mail messages were numbered as they were received; each message retained its original number even when preceding messages had been deleted. In Release 0.9, the mail message list is automatically renumbered when the mailbox window is closed or the mail application is quit. The next time the window is opened, all remaining messages are numbered consecutively, starting at "1."
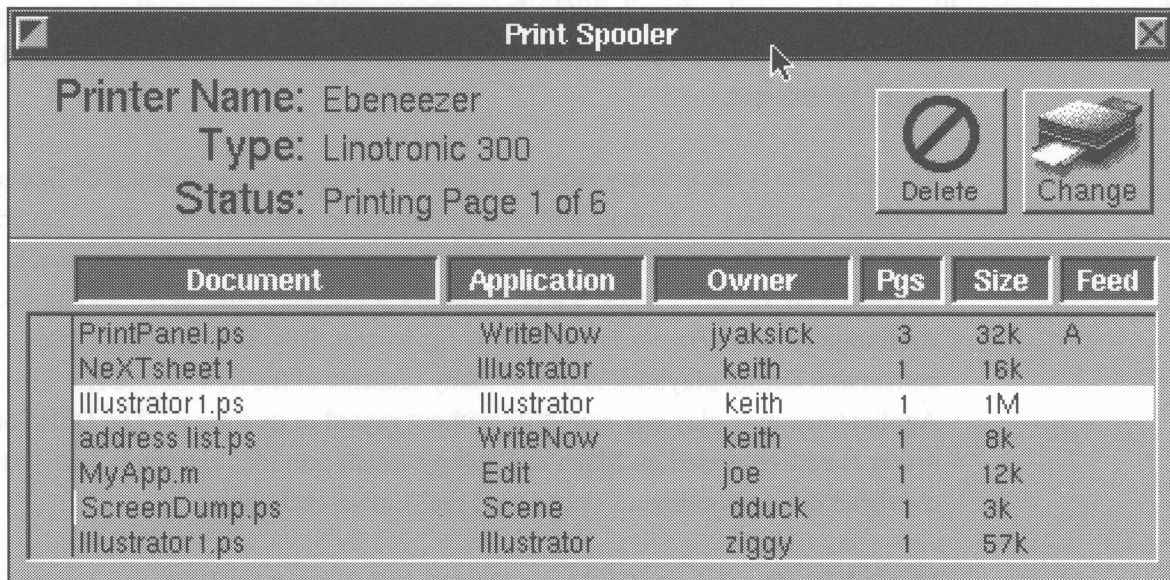
Terminal

In Release 0.8, the Terminal application had a fixed size (80 characters x 24 rows) and had only limited VT-100 emulation. In Release 0.9, Terminal supports fuller VT-100 emulation. Also, the Terminal window is resizable, so that you can have larger displays while still supporting the direct-cursor addressing capabilities of a VT-100.

Printer

New user interface: In Release 0.9, the Printer application has a newly designed panel that provides more complete information about print status in a more understandable format.

Network printing: In Release 0.9, the Printer application supports printing across the network. It will allow you to view a list of network printers, select a target printer, and view and manage your print queue on various printers across the network. Printer also makes it easy to configure a printer on your system and to make it available or prevent its use by other users on your network.

Printer errors (out of paper, paper jam, etc) will be reported directly back to your display even if you sent the print job to another NeXT computer on the network. You can choose whether errors are reported through an alert panel, a voice message, or both.

		Print Spooler				

Printer Name: Ebeneezer
Type: Linotronic 300
Status: Printing Page 1 of 6

Delete   Change

Document	Application	Owner	Pgs	Size	Feed
PrintPanel.ps	WriteNow	jyaksick	3	32k	A
NeXTsheet1	Illustrator	keith	1	16k	
Illustrator1.ps	Illustrator	keith	1	1M	
address list.ps	WriteNow	keith	1	8k	
MyApp.m	Edit	joe	1	12k	
ScreenDump.ps	Scene	dduck	1	3k	
Illustrator1.ps	Illustrator	ziggy	1	57k	

Print Spooler panel showing enhanced network printing.

Non-NeXT printer support: In Release 0.8, you could only print to a NeXT laser printer connect to the Printer port. In Release 0.9, Printer now supports printing to non-NeXT printers. Most PostScript® printers should work. NeXT has tested the Apple® LaserWriter® II and LaserWriter NTX and the Linotronic® 300 typesetter with Raster Image Processor (RIP). These printers will typically be connected to one of the serial ports.

Sound, Music, and Signal Processing

Sound and Music Kits

Release 0.8 provided minimal support for sound and music, via some UNIX utilities and a small set of C functions. Release 0.9 includes full support for sound, music, and signal processing development using the DSP chip as well as the CODEC and D-to-A chips in the MegaPixel Display. The Sound Kit and Music Kit will allow developers to access and integrate sound and music into their applications.

Sound Kit: The 0.9 Sound Kit provides developers support for recording, editing and playing back sound. The Sound Kit consists of an object library that provides a clean, straightforward programmatic interface. The SoundView object supports graphic display of sampled sound data as well as cut and paste between applications using the NeXT pasteboard.

The soundfile is the primary storage medium for sound in the Sound Kit. Soundfiles appear in a variety of formats and are represented as special binary files. Several soundfile formats are supported in the 0.9 release, including combinations of 8, 22.05, and 44.1 kHz sampling rates, 8 and 16 bit linear encoding and stereo and mono. Additionally an 8 kHz mu-law format is supported. Real-time sampling rate conversion during playback is one of many features of the new Sound Kit. Applications may play any soundfile without regard to its format. The DSP/Sound driver is entirely based on Mach technology which provides extremely low system overhead during continuous (sustained) real-time sound output.

Music Kit: The Release 0.9 Music Kit provides support for DSP sound synthesis and performance control. The Music Kit is a library of music synthesis and music performance objects.

Frequency modulation (FM), wave-table, and physical modeling synthesis is provided in the 0.9 release. These synthesis models are created from DSP subprograms represented as Unit Generator objects. Unit Generators are configured to create a SynthPatch, an object roughly equivalent to an analog or digital synthesizer voice patch. Many SynthPatches may be used together to create polyphonic arrangements.

SynthPatches receive messages from the SynthInstrument object which processes the Score. The SynthInstrument object may receive notes created "on the fly," or the application can read them from an existing scorefile. In addition, MIDI input and output will be supported in the 1.0 release.

DSP Development

Release 0.9 includes a Motorola 56001 DSP assembler. Support for downloading and running user developed DSP software is also provided. These tools are intended for those who would like to access the DSP directly. Future releases will include enhanced support for DSP program development.