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Naming Items

In the Macintosh environment, you can name **files** and **folders** with up to 31 characters using any combination of letters or numbers, spaces, and a variety of punctuation symbols. You can name files at the **desktop** level by **selecting** the name of the file, which **highlights** the name, and typing the new name. You can also name documents when you **save** them in an application.

The advantage of the way the Macintosh enables you to name files and folders is that you can give the file and folders descriptive names that help you locate these files. If, for example, you're using your Macintosh for work-related items, you could have a folder called "customers," and inside that folder you could have a folder for each of your customers. By creating individual customer folders, you can group each customer's files into a central location, making it easy to find a particular file when a customer calls. Naming files is all about organization; there are not steadfast rules for naming files you create, but keep in mind that the easier and more descriptive you name your files, the easier it will be to find them if they get misplaced on your hard disk.

Also, be careful when renaming files that you didn't create. Many applications, for example, have support files that they require, and look for, when launching and running. If you rename files that accompany an application, the application may not be able to locate these files when needed as the application searches for the files by name.

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To name a disk or a **hard disk** , **click** , or select, the current name of the disk. This **highlights** the disk's name, enabling you to type in a new name. You can also select a disk you want to rename and press **Return** . This highlights the disk's name, enabling you to type in a new name.

To name a disk, follow these steps:

1. Click the name of the disk, just below its icon, to highlight the name. You can also highlight the name by selecting the disk and pressing Return.

2. Type a new name for the disk and click outside the disk's icon to make your name change take effect.

Naming a File   To name a file, **click** the name of the file below its icon. This **highlights** the filename, enabling you to type a new name. You can also select the file you want to rename and press the **Return** .

To name a file, follow these steps:

1. Click the name of the file below its icon to highlight the filename. Or highlight the name by selecting the disk and pressing Return.

2. Type a new name for the file and click outside the file icon to make your name change permanent.

Naming a Folder   To name a folder, **click** the name of the folder. This **highlights** the folder's name, enabling you to type a new name. You can also select a folder you want to rename and press **Return** .

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To name a folder follow these steps:

1. Click the name of the folder below the folder's icon to highlight the folder's name. You can also highlight the name by selecting the folder and pressing Return.

2. Type in a new name for the folder and click outside the folder's icon to make your name change permanent.

See Also
Click; Desktop; Files; Folders; Hard Disk; Highlighting; Return Key; Save; Selecting

NASA Virus
See
Scores Virus

Native File Format
If you are working on a document in a word processor like ClarisWorks, you have a host of **file formats** in which to **save** a file, including ASCII, Text Only, Text with Line Breaks, MacWrite, and so on. You can choose to save the file in the application's own format: in this case ClarisWorks. This is the application's native file format. If you know you're going to open your file

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only in the application that created it, it's okay to save your files in a native file format. However, if you're going to import, or place, your file into another application, you may want to choose a format that is supported by the application into which you're importing the file.

If, for example, you create artwork in Adobe Illustrator and save the file in Illustrator's native file format, you will not be able to place the file into a page layout program such as PageMaker or QuarkXPress because neither of these applications can import a native Illustrator file as native files are designed to be opened by the applications that created them. However, if you saved the file as an **EPS** file, rather than a native Illustrator file, you can import the file into **PageMaker** or **QuarkXPress** , as both programs support the importing of EPS files.

More and more applications are being designed to let you open competing products native files. Adobe Illustrator, for example, and Macromedia FreeHand are fighting neck and neck in the graphics program market, and both can save in formats that the other applications can open. But in most other cases, native files still have to opened by the applications that created them.

See Also
EPS files; File Formats; Saving Files

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Native Software

Software recompiled to take advantage of the PowerPC's new reduced instruction set computing (**RISC**) is referred to as native software, because it is native to the **PowerPC processor** (which Power Macs incorporate). Programs originally designed to run on 68000-series Macintosh models, for example, were native to the 68000 series of processors. Much of this software has been recompiled with a new set of reduced instructions that take advantage of the PowerPC chip to run on Power Macs. That software is now native to the Power Macs. Note: The Macintosh Operating System at version 7.5.3 does not contain 100% native code.

If you have a Power Mac and run 68000-series software on your Power Mac, that software is being run in **emulation mode** . This enables the Power Mac to emulate a 68000-series computer, and although this software can operate on a Power Mac, it cannot take advantage of the PowerPC chip's speed.

See Also
Emulation Mode; Power Mac; PowerPC; RISC

Natural-Media Tools

The precise, clean nature of much of the artwork created using computers is one of the reasons for using computers in the first place. But it's not the only game in town. **Paint programs** like Fractal Design **Painter** offer digital

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artists tools that emulate their real-world counterparts: paintbrushes that leave brushstrokes behind, pastels that look dusty, ink that bleeds on the paper. The mathematical algorithms that make these tools work are incredibly complex, but the results are amazing—there are even digital "crayons" that leave extra chunks of "wax" on the page.

See Also
Painter; Paint Programs

Navigator
See
Netscape Navigator, Compuserve

NCAA Championship Basketball
See
Sports Games

NCSA
Acronym for National Center for Supercomputing Applications, a high-performance computing and communications facility and research center at the University of Illinois at Urbana-Champaign.

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NCSA is the birthplace of some of the most widely used **client** software used on the Internet, including **NCSA Telnet. NCSA Mosaic,** the first graphical browser for the **World Wide Web,** was created by **Marc Andreessen** and fellow students working at NCSA.

NCSA's Virtual Environments Laboratory is also known for its work in advanced virtual reality research.

Home page: http://www.ncsa.uiuc.edu/.

See Also
Andreessen, Marc; Internet; NCSA Mosaic; NCSA Telnet; Web Browser; World Wide Web

NCSA Mosaic

The first graphical **client** or **browser** for the **World Wide Web** , developed in 1993 at the University of Illinois by **Marc Andreessen** and the team that went on to create **Netscape Navigator** .

Far from being an antique, NCSA Mosaic is still being upgraded and supported by the National Center for Supercomputing Applications at the University of Illinois. Version 2.0.1, which was current as this was being written, supports many **HTML** 3.0 tags as well as inline **JPEG** images.

In addition, the University of Illinois granted a "master license" to Spyglass, which offers the software to be bundled in other software or hardware in

volumes of 10,000 or more. Mosaic is built into several companies' browsers, including **CompuServe.**

Mosaic has a few features that its more popular rival Netscape lacks, such as the capability for users to construct custom menus with frequently visited URLs and other commands. Some menu items controlling default home pages can be configured quickly without having to scroll through Preferences windows, as in Netscape.

Mosaic's drawback is its lack of speed. Netscape's capability to perform multithreading and to work with cache files makes it run significantly faster even as the Netscape Navigator software gets more complicated.

Home page:

 http://www.ncsa.uiuc.edu/SDG/Software/MacMosaic/MacMosaicHome.html.

See Also
Andreessen, Marc; Client; Netscape Navigator; URL, Web Browser; World Wide Web

NEC MultiSync 4FGe 15-Inch Color Display

See
Monitors, Common Models

NEC MultiSync XE21

See
Monitors, Common Models

NEC MultiSync XE17

See
Monitors, Common Models

Negotiation, Modems

Modems can only communicate with other modems when using speed, correction, and compression **protocols** that they share. At the beginning of each new communications session, modems must go through the negotiation process to find a set of matching protocols available to both modems. The process is sometimes incorrectly called handshaking. **Handshaking** more correctly refers to the flow control process that tells one computer to send, or to stop sending, data to another.

Negotiation involves the two computers, host and guest, reviewing the possible speeds each has and mutually agreeing on which to use, and making sure that they also agree on the number of bits in each byte of data exchanged, how the bytes are defined, and what parity checking, if any,

they'll use. It is as if you answered your telephone and said, "Hello." The person calling replies "God dåg."But you don't speak Swedish, so you might try "Bon jour?" She replies, "Hola?" Ah, Spanish, you can recognize that. "Hola!" you say, and the conversation continues.

Just as two people might start with the language they're best at, modems try first to connect at the fastest speeds they have available. If they don't success, they try the next lower rate, and the next, until they find one that works for both. If the line is noisy, or you keep getting disconnected, set the modem to a lower starting speed. For instance, if communicating at 14.4 is unstable, reset your modem so 9600 is its top speed. Slower communications are more stable.

> **TIP** Sometimes the process of negotiation presents so many options that the two modems get confused and fail to find any matching protocols, even though several do exist. If you have trouble getting a connecting between two particular modems, check your modem manuals for ways to disable automatic negotiation so that you can preset a particular speed, correction, and/or compression protocol.

Nested Folder

A **folder** that resides within another folder is referred to as a nested folder. If you view a folder's contents in a **list view** , you can see any nested folders by **clicking** the triangle to the left of the nested folder's name. The contents

of the nested folder are displayed, including any folders nested within it, as shown in the following figure. By viewing nested folders in this fashion, you can move to any item within a folder without having to open the folder. This can be a big time-saver when you're viewing a window with many files and folders.

Although the capability to place one folder inside another folder is of great benefit once you understand how it works, it can be very confusing for new users. It might help if you try to think of it like a traditional file cabinet. In a real file cabinet, you could have a folder in the file drawer, let's name it "customers," and inside that folder you could put a file folder for each customer you have. This way, anytime you need to get to a customer file, you go to your file cabinet and look through the folder marked "customers" to find the file. You can do the exact same thing in the Macintosh environment. Putting folders inside folders helps you stay organized.

Imagine if you had 500 customers and each customer had 5 to 15 files each. If you put them in one big folder, you'd have thousands of files, and it would be really hard, and time consuming, to find which files belong to which customer. To keep yourself organized, you'd need to group these files by customer, so each customer's 5 to 15 files would be in one folder with the client's name on it. And where would that folder be? In your "customers" folder.

See Also
Click; Folders; List View

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Nesting
See
Formula

Net, the
See
Internet

Netiquette

The etiquette of **Usenet** and **Internet** communications in general. The explosive growth of Internet communications has created an entire community with its own notions of what is and is not acceptable to broadcast on the Net.

One of the best ways to get to know the culture of the Internet is to get involved in its interpersonal communication services: Usenet newsgroups, email, Internet Relay Chat, and MUDs. When you begin to participate, be sure to observe the rules of Netiquette, which try to ensure courteous and useful communication between participants.

Commonly observed rules prohibit slander, plagiarism, and **spam** ming (sending unsolicited advertising to readers).

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Netscape HTML Tables

Netscape Navigator

Widely used and innovative **client** software that enables a user to *browse* (locate and examine) information on the **Internet**'s **World Wide Web.** Occasionally referred to as **Mozilla,** the software's original code name.

Netscape was created by **Marc Andreessen** and the team from **NCSA** at the University of Illinois that created the first graphical Internet client, **Mosaic** .

A **Web browser** provides a *graphical user interface* to the Internet in general, and the World Wide Web in particular. Navigator offers the user an interface that includes a variety of buttons, menus, and toolbars.

Here are some of the reasons why Navigator is the most popular program for browsing the World Wide Web:

• Navigator follows the Macintosh interface with menus, buttons, and

drag-and-drop, and is intuitive, like the Mac.

- Navigator processes data more efficiently than other programs and in a way that lets you interact with a page before it has finished loading onscreen by using document **streaming**. Users can also stop the loading process.

- Navigator is fast. Its speed is due to the software's capability to make several simultaneous connections to a single Web site and load multiple documents at the same time, and the way Netscape uses disk **cache**.

- Netscape has come up with a number of extensions that extend **HTML**'s limited design capabilities.

Another feature that distinguishes Netscape Navigator among Web browsers on the Mac (and among Mac programs in general) is Netscape's implementation of Apple's System 7.5 (and later) service called the Thread Manager (although you can add it by dropping the INIT into your System 7 System folder). The Thread Manager enables Navigator to *multithread*, or perform several functions simultaneously, in a way that other browsers cannot mimic.

Navigator also supports the display of images that appear on your computer screen in stages. The kinds of images that do this are called Interlaced **GIF** or Progressive **JPEG** graphics formats.

Navigator 2.0's developed, Netscape Communications Corp., has agreements

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with a number of other software companies, such as Sun Microsystems (which created the **Java** programming language and **HotJava** browser) and Macromedia, Inc., (which produces Macromedia **Director** , a multimedia presentation program, and **Shockwave** , a **plug-in** for Netscape).

Navigator supports secure transactions through its **Secure Sockets Layer** , the use of **encryption** to ensure that sensitive data such as financial information can only be read by the intended recipient(s).

See Also
Andreessen, Marc; Bookmarks; Cache, Client, Director; Email; Encryption; Frames; GIF; HotJava; HTML; Internet, Java, JPEG; Mosaic, Mozilla, NCSA; Plug-In; Secure Sockets Layer; Shockwave; Streaming; Usenet; Web Browser, World Wide Web

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NETWORKS

Microcomputer networking is the interconnection of personal computers to enable pooling of resources and sharing of information. Once considered a luxury, today computer networks are commonplace, if not a requirement for today's business applications. While the large volume of new terminology specific to computer networks can be somewhat confusing, the Macintosh's ease of use certainly carries forward into the area of Networking.

Networking, History In 1984 when the Mac was introduced, networking among personal computers was not very common. Apple, however, in typical industry-leading fashion, decided to include the basic software and hardware needed for networking in every Macintosh. This fundamental commitment to personal computer networking had a profound impact on the growth of network use, and the development of network applications for the Macintosh.

The first appearance of Macintosh networks in large numbers began with the introduction of the LaserWriter. Apple began to push the use of networking with the introduction of the original LaserWriter. The cost savings of having multiple computers connected to one LaserWriter (which then ran nearly $6,000) alone justified the existence of a Macintosh Network.

Apple dubbed this combination of multiple computers connecting to a single printer "The Macintosh Office". The computers were connected together using Apple's Locking LocalTalk connectors with shielded Twisted Pair wiring strung from computer to computer. While this was fairly straightforward to set up, the cost of the network ($150/computer) coupled with the cost of installing this shielded twisted pair cabling kept many sites from experimenting with the technology.

Conversation with Don Crabb

Don Crabb, columnist extraordinaire, helped Apple break into the university world way back with the original Apple IIs and has followed Apple's progress through the Apple III, the Lisa, and the Mac. He works in the computer science department at the University of Chicago.

Maclopedia: How did you first get involved with Apple?

Don: At the University of Chicago we started to get interested, that is, three or four of us working for the old computational center, in 1980, with the Apple II. We had just started getting into microcomputers on the campus then; we were the avant-garde bunch. Most of the faculty thought that microcomputers were never going to amount to much. So we started nosing around Apple and developed a relationship. We bought some equipment. We wanted to get a micro presence on campus, and Apple was the only one to go with, then. We flew out to California and met with Steve [Jobs] and Steve [Wozniak] and the relationship grew and grew. We bought some Apple IIs and bought

some more, and in 1981, we bought a few PCs when they came out, but not many. We liked the way Apple did business.

In 1982, before the Apple III came out we saw the Lisa. We told them the Apple III was a piece of crap. We liked everything about the Lisa except the price. It was $10,000, the same price as a departmental computer. This was the same time Xerox was showing off the Star, which had EtherNet and distributed networks, and so we thought Apple was making a mistake on the pricing for the Lisa.

Early in 1983, Apple began showing us the Mac, and they put together the Apple University Consortium because people were realizing that micros were not a fly-by-night thing. Of course, there were still a lot of people who thought that the fad would go away, and people would get back to time sharing and card decks.

But the prototype Mac really sealed it for us, so we signed on to the AUC and managed to convince the administration, which was a non-trivial task, to buy $2 million worth of equipment over five years—even when we were saying that the Apple III was a piece of junk, and we were basing our decision on a circuit board and a prototype steel box and a separate monitor. The first time we saw MacWrite and MacPaint, the light bulb went off, and we said, "This is the Lisa for the rest of us."

In January 1984, when the Mac shipped, we had taken orders for over a thousand of them. For $2,499 you could get a 128KB machine, a coupon for an ImageWriter, and a coupon for the external drive. For

the same money you can buy a pretty good system today. I've still got mine. I babied it. I shrink-wrapped it and put it back in the original box. Maybe somebody will start a computer museum in Chicago and buy it.

The students went nuts. We could not get enough to satisfy the needs. And remember, this was a machine where we had to swap disks like mad because there was so little memory. Printers started coming in April. The first hard drive was the abominable HD20—what a piece of junk! That thing was $1,200 at AUC prices, which were the same as developer prices, but the university had no space to sell computers out of, so we commandeered space in a graduate dorm. The space was where they used to do soup preparation. You pick out your computer, you pull the cart down the loading dock and pay your money, or give your departmental order form, and wheel it out past the vegetable bins. We thought it was appropriate that a company named after a fruit was being wheeled out of the food prep area.

We sold machines like it was going out of style because no one had ever seen a computer you could actually use yourself without having half the computer center staff sitting in your office. The computer science department, which was brand new at the time, had VT 100 terminals hooked to a DEC 20; they bought 24 128KB Macs and 4 printers and 24 external drives, and we started teaching Pascal classes. And ever since then the CS department has been all Mac. We grew the lab to 100 Power Macs today. We replace the equipment every few

years. We were one of the first to do that, along with Reed, Drexel, and Carnegie Mellon. Most places stayed with time sharing on DEC 20s or VMS, but when we got the first Think Pascal, there was no turning back.

Maclopedia: How have things changed since the early years?

Don: Things were rolling pretty good for a long time. We were in the Apple University Consortium. We had a consortium meeting every year, at a site in Santa Cruz way up in the hills—but that place was completely flattened by the earthquake. Back when Bud Colligan was in charge of Apple Higher Education, we were the bunch that saved Apple's butt. If it hadn't been for higher ed, the Mac would have been a bust because they had no solution for the installed IBM base, and their own installed base was Apple IIs, and the Mac had no way to read either one. We were treated like kings, courted, taken care of, and we produced a lot of shareware and freeware and spurred application development in a lot of places. It was an extremely cordial relationship.

But in 1990, we detected a change when Bud Colligan left and Bernie Gilford came in from Berkeley. He did not get the relationship, and Apple completely screwed up the Apple University Consortium. After the 1990 meeting in Monterey, Apple decided not to renew it. They began the cold shoulder period, where Apple Higher Ed got smaller, deals were not very good, and most people had to become developers to get prices better than AUC had, and then the AUC disappeared. If Apple

had brain one, they would try to reconstitute the AUC. In the last year or so, they have put more attention on higher ed; that began with their focus on key markets.

Maclopedia: Gilbert Amelio's just taken over at Apple. What's your sense of the direction in which he'll take the company?

Don: Amelio is the right guy at the right time. At National Semiconductor, he demanded that if you have a plan, you must execute it. And at Apple everyone thinks he is equally important, so he did the right thing; he spent the first day going into every building, popping his head in the door, saying hello, and he's going to bring back the beer bashes. He's got to recreate the enthusiasm because their best products came out of skunkworks, like the LaserWriter, and AppleTalk, that Siddhu wasn't supposed to do. The company ethos was built on hot technology. So they need to combine some of that hot product with good management. They can't overextend themselves and let people run around in a lot of different directions. They have been spending too much on too many product ideas. They ought to look at, say, 100 ideas, and narrow that down to 15, then pick five of them to be products. They've got to productize more of the technology; given a reality check, they would have killed QuickDraw GX, seeing that other industry standards would have superseded it. That way, they could have gotten Copland and Open Doc out a year sooner. Pippin is going to be a good deal; Bandai will start selling it in Japan in the spring. They could have preceded Larry Ellison's announcement of the net computer, but when you have 50

guys working on telephony, hey, come on, they have not strategized what they are doing. When Amelio was at National Semiconductor, he would only approve projects that met their corporate goals. He said, "We are not a company that can fund everyone's science project."

I think he [Amelio] should create a pure skunkworks group, 50 or 100 people, with a fixed budget, and say, "Spend it any way you want, but don't go over budget." The skunkworks group should work like a black box, not having anything to do with what Apple is currently doing. That would be one way to pull back the talent they have been losing. I read the ads, and they are looking for lots and lots of senior engineers, and those are the folks you can't afford to lose. If things got exciting again, with that adrenaline rush, they would come back. They should invent the next generation of personal computers, whatever that means, from the operating system all the way down to the hardware, forgetting about Copland, or Gershwin, or the PowerPC. They should just sit down and blue-sky, imagine what I would have sitting on my desk in 2025, if I have a desk then. They should make some new Apple Fellows, pick some people you really want to work with, and let them go off and invent.

The true revolution in Mac networking came with the introduction of Farallon's PhoneNET connector. These connectors enabled Macintosh computers to be networked with Apple's LocalTalk protocols, but used unshielded twisted pair (**UTP**) cabling, the same type of writing used by telephone systems. The main advantages of UTP were its low cost to install

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and the fact that many buildings were already wired with this cabling. The Phone net adapters were also significantly less expensive than Apple's LocalTalk connectors ($50 versus Apple's $150). This low cost and capability to use existing wiring let to PhoneNET quickly becoming the standard for LocalTalk connections, even within Apple's corporate offices.

As network applications grew in size and in power, the speed of Apple's original LocalTalk networks became a limiting factor in the continuing growth of Macintosh networks. In response to this need developers began delivering products to support connecting Macintosh computers via **EtherNet** , a faster and more robust networking standard. Initially EtherNet hardware for the Macintosh could cost over $1,000/computer, but as demand and volume grew, prices dropped accordingly. Currently, many Macintosh models include built-in support for EtherNet, requiring only a small external transceiver, similar to the one required for LocalTalk. EtherNet networks also require a hub, a central dedicated file server unless you're using EtherWave adapters.

Currently, there are several options for Mac networking. **LocalTalk** is built into every Macintosh, and is the simplest option. It is, however, not as fast as EtherNet. It uses the printer port and AppleTalk system software. Because you can connect the LocalTalk network with inexpensive connectors and ordinary phone cable, it's the lowest cost network solution. LocalTalk supports a maximum of 32 nodes, or devices (Macs, printers other peripherals) on the network.

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EtherNet is faster than LocalTalk, and supports both local and wide area (**WAN**) networks. It's commonly used in business and educational applications because it's versatile and enables Internet connections. It's also more expensive and requires special cabling and special adapters. EtherNet cards have been available for Macintoshes ever since the Mac II was introduced. Many current Mac models have EtherNet capability built-in, and those that don't can add it on quite easily. Farallon's EtherWave adapters enable you to connect PowerBooks, slotless Macs, printers, and other peripherals to 10Base-T EtherNet. You can also use EtherWave to create a small hub-less network.

Apple's most recent networking innovation is called **Open Transport** . It's networking software which combines the control panels and software drivers of AppleTalk, EtherNet, TCP, and LocalTalk, so you can use whichever of these networking systems is available. It has been accelerated for Power Mac. Among its helpful attributes, it enables you to change your TCP and Internet configuration without re-starting your Mac.

Today, most computers are involved in networks, either internally or through a modem providing a connection to the worldwide Internet. In addition to the basic tools incorporated into every Macs, many new higher performance hardware and software networking connections are now available, enabling the Mac to perform admirably as a networked personal computer.

Networking, Advantages   There are several advantages to networking

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your Macintosh. The most obvious advantage of a network is the ability to share expensive equipment. A single Laser Printer can be used by multiple people, effectively driving its cost down. Other items that only require periodic use, such as data/fax modems, can be used by everyone and centrally managed without needing to purchase and install a dedicated unit for each user.

Another major feature networking provides is the distribution of information between computers. This ability is accomplished through the use of **Servers** . Each server on the network handles the receipt, organization, and retransmission of information between the network's users.

Finally, networking enables the computer administrator to centrally manage and monitor a company's computers. The administrator can make use of the network to distribute software updates, as well as to watch for trouble on individual computers. It is far more efficient for a technician to make a set of changes once and electronically distribute them to each computer than to manually walk from station to station looking for problems and making updates.

For More…
If you want to do this...

> *Go to this entry...*

Find out about modems and how they work

> Modems, Modem types

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Learn about hooking up a modem

Modem, connecting

Learn about online services

Online Services, America Online, CompuServe, Prodigy

Learn about calling your home computer from your PowerBook

Apple Remote Access

Learn about network wiring

Network Topology, Transmission Media

Learn about EtherNet

EtherNet, Network Protocols

Learn about interconnecting networks

Bridges, Hubs, Routers

Learn about managing a network

Network Administration

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NetWare
See
Servers/File Server

Network Administration
The network administrator is the person responsible for insuring that each computer on the network can communicate properly with other network devices. In addition, the network administrator must ensure that sensitive portions of the network remain secured from unauthorized users.

Effective network administration couples the use of well thought out network

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policies with informed choices about the types of hardware and software that should be used. The network administrator is responsible for making policy decisions about how the network will run, and must set guidelines for the network's users to follow.

> **TIP** In a network environment, users typically assume that the administrator will be responsible for *all* elements of computer maintenance. Therefore, when designing your network policies, it's very important to clearly describe which areas of maintenance you will not be performing and that you will expect users to perform on their own. For example if users are responsible for backing up their own data, it is critical that you make this point clear—before they lose important files.

Network Administration, Passwords   Passwords are involved with nearly every step of network usage. As the administrator, you should communicate guidelines to your users to help them in their choice of passwords. Ideally, each user's password is one that they will never forget, but one that other people wouldn't associate with them. Obvious passwords such as social security #'s, birth dates, and children's names are poor choices, as they are probably the *first* guesses an educated intruder would make. After choosing, users should be encouraged to commit their password to memory so that they will *not* need to write them down.

Your password policy should also specify if the users are required, asked, or even enabled to change their password. A network that requires its users to

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frequently change their passwords is the most secure, but also will probably be one where users will more often forget their password. While some security systems enable the network administrator access when a user has forgotten his password, others become completely inaccessible without the user's correctly entered password.

Many software packages designed for use in network environments have features to enable each user's computers to 'remember' that user's password for subsequent usage of that program. These features are popular because upon startup the user's computer automatically log into to file servers and email systems, saving the user time and frustration. The drawback of these features is that they disable login security, enabling unrestricted access as long as the machine in question can be accessed.

> **TIP** Combining Auto-Login features with User station security (See next section) provides a good balance of network security and ease of use.

Network Administration, Backup   It is important to note that each user has access to only a portion of most shared data (such as databases, file servers, or email systems) so the network administrator must take responsibility for backup up of the file server as a whole. However, as mentioned in Network Policies, many network users assume by extension that the Network administrator will also be responsible for backing up individual workstations, so if this is not the case, the users must be made aware of this fact and be instructed on how to perform local backups.

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Network Administration, Software Licenses   One of the most difficult tasks for the network manager is ensuring compliance with software licenses. Each software package purchased has varying rules regarding where and how it may be distributed to the various users on the network. Generally, one copy of the software must be purchased for each person who will use the software.

To insure compliance with all software licenses, the network administrator can either carefully restrict distribution of software, closely monitor each user's station, or develop guidelines for users to follow. The administration tools entry lists some of the software packages available to aid in this task.

Network Administration, Software Updates   One of the most onerous tasks a network manager faces is providing users the most current version of the various software packages. To maintain consistency within an organization, the network manager needs to decide when, and to whom each update will be distributed. When a large number of machines much be updated, simply running install disks on each machine is not an effective means of distribution. Some programs, such as Microsoft Office have a network installer option. The administrator can sit at his or her own Mac and manage the installation on the various machines without walking around to each machine on the network with a fist full of CD-ROMs and disks.

Network Administration, Security   In the simplest sense, network security schemes are designed to hide data and resources from users who are not authorized to access them. While it would seem one couldn't have too

much security, this situation bears closer inspection. As you further protect your data, the chance of it becoming unrecoverable increases. Each form of computer security has a different compromise between security and accessibility so you must weigh your need for security with the potential for data loss.

> **TIP** The best way to maintain a high assurance of data accessibility while continuing to provide a high level of security is thorough and frequent backup of all system information.

User Station Security   At the individual user's computer, your security concerns are twofold: you must protect that user's data, as well as make sure that user's computer has access to only the information and resources it is permitted to use.

Inactive User Security   Inactive user security protects the system from unauthorized entry when a user temporarily leaves their computer. This type of security is most commonly a part of a "Screen Saver" package that clears the display on the monitor after a set period of inactivity. The downside of this type of security is that by restarting the computer, the password "lock" is reset, leaving the computer vulnerable to entry. Fortunately, this hole is easily plugged by adding the next class of software: Startup User Security.

> **TIP** Although screen savers that are application-based (Such as Dark Side of the Mac) use less memory and suffer few compatibility troubles, they are less secure than applications that are installed as

Extensions or Control Panels (such as After Dark).

Startup User Security   Startup user security is designed to prevent unauthorized users from starting up a computer from a resting state. As with idle user security, startup security depends upon the use of a password to identify the proper owner of the equipment. Startup security is generally implemented through special features of a hard disk or utility software (such as Norton DiskLock by Symantec).

Startup security protects the system at a low level of the computer's operations, the hard disk driver. Because these changes are so basic to the system's operation, if a user forgets his or her password or if the protection software itself becomes damaged, it can become impossible to recover the information stored on the computer!

Server Security   The computer serving as a file, mail, database or other type of servers holds the data that all users share. While each individual's computers can only access the data that the server allows, the server itself must have has access to all the data. Therefore, *all data* is accessible to anyone who can gain physical access to the server. Accordingly, it is important to make use of the previously mentioned 'user' security types on a sever, as well as using good physical security, such as locked doors or even an alarm system, on the room which contains the server.

See Also
Network Communications; Network Maintenance; Networking, Why and How; Wireless Networks

Network Communications

Computers communicate on networks by following a set of rules known as **protocols** . The protocols specify the types of communication that are allowed and provide details about exactly how this communication will take place.

The process of network communication can be most easily understood by thinking of the process in terms of a human conversation. For two computers to communicate, they must have many things in common. First, a common language (protocol) is chosen. Based upon the rules of the chosen language, a name, known as the **node number** or node **address** , is assigned to each computer participating in the conversation. Multiple computers in each location are joined into communities, which are assigned a **network number** . Finally, when communication is desired, each individual computer sends messages by breaking transmissions into units of redefined size, known as **packets** , and labeling each packet with the addresses of the sender and recipient.

Network Protocols Networked communication between computers is accomplished through a set of rules known as **network protocols** . Each individual task within these protocol is also assigned a name, making for a very large body of standards to manage. To assist in the understanding and management of these individual protocols, the Organization for Standardization (**ISO**), an international standardization body, designed a schema known as the Open Systems Interconnection Reference Model, or the

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OSI.

The OSI simplifies the sea of protocols by creating a model for the evaluation of networks. This model groups the individual processes performed by computer networks into a "stack" composed of seven "Layers" of functionality. The seven layers specified by the ISO are shown in the table below. Each of the most common network protocols in use on Macintosh Networks, **AppleTalk**, **TCP/IP**, and **IPX**, have their own stack. To enable interoperability, networking vendors design their products to fit into the appropriate layer of the stacks they wish to support.

Layer 7	Application
Layer 6	Presentation
Layer 5	Session
Layer 4	Transport
Layer 3	Network
Layer 2	Data Link
Layer 1	Physical

The use of the OSI model has proved vital in the expansion of microcomputer networking. The existence of this common framework has greatly simplified the interconnection of products from various vendors and platforms. However, it is important to understand that the OSI Reference model itself is

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only a framework to explain the theoretical design of network protocols.

None of the real-world protocol stacks actually follows the OSI model all the time. Instead, each vendor's protocols try to match the model as closely as possible, with certain protocols overlapping layers and not all layers behaving exactly as specified.

AppleTalk is the protocols stack designed by Apple Computer to provide network communication between Macintosh computers. Note that AppleTalk is **not** specific to any type of cabling or computer: it is simply a series of rules for network communication designed by Apple. So while AppleTalk is included in every Macintosh, it could also be spoken by other computers with the appropriate software. For example, Farallon's PhoneNET PC and Novell's Netware for Mac enable DOS compatible computers to speak AppleTalk.

Just as non-MacOS compatible computers can speak AppleTalk, it is also quite common for MacOS computers to speak protocols outside of AppleTalk. For example, Macintosh computers connected to the Internet commonly speak TCP/IP. In addition, through the use of the Mac IPX control panel, Macintosh computers can speak IPX, Novell's networking protocol stack, directly with Netware servers.

See Also
Network Administration; Network Maintenance; Networking, Why and How; Wireless Networks

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Network, Connecting to UNIX and Other Operating Systems

Connections between any two computers depend upon both a physical connection and a common language to be spoken once the communication path is established. Networking a Mac to a UNIX system or a mainframe is feasible, but there are issues to consider regarding cross-platform connectivity. Connecting to these two platforms is fairly similar conceptually, but each type of connection requires a specific configuration of hardware and software.

The UNIX and mainframe environments have their own unique technical languages, and thus the terms involved with connecting to these platforms will be unfamiliar to most Macintosh users. To review briefly:

UNIX is a universal operating system designed in the early 1970s at AT&T. Because this operating system is available for nearly every computer platform, it is known as the universal computer language.

A/UX is Apple's version of UNIX is known as A/UX. Note that A/UX has fairly powerful hardware requirements: See the A/UX entry for details about which Macs can run A/UX.

SNA, System Network Architecture, is IBM's mainframe network protocol. Conceptually, this is similar to AppleTalk, Apple's network protocol for Macintosh computers.

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3270 Terminal , These are the computer terminals which IBM originally designed to access its mainframe series.

Gateway A gateway is a language translator, also called a bridge. It sits between two types of computer networks, such as AppleTalk and IPX, and passes messages between two computers that speak different languages.

SNAps Gateway SNAps is Apple's IBM mainframe to Macintosh gateway. This product runs on a Macintosh that is connected to both a Macintosh network and to an IBM mainframe, translating messages between the two sides — between AppleTalk and SNA.

TCP/IP is the network protocol most commonly used by UNIX computer systems. This is similar to the AppleTalk protocol used by Macintosh computers and the SNA protocol used by IBM mainframes.

While Macs and mainframes have co-existed in corporate environments since the Mac's debut in 1984, IBM did not officially acknowledge the Mac as an appropriate method of connection to its mainframes until 1991. Mainframe communication occurs through IBM's System Network Architecture (SNA) protocol set, which is roughly analogous to Apple's AppleTalk network protocol set. As with other types of network connections, both a physical and a software connection are necessary.

Physical connection to an IBM mainframe can be done either through a direct connection to the mainframe or through a network connection. The direct connection is the original method used to connect IBM's 3270

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terminals to a mainframe. This method requires modems or coaxial cable to connect the remote computer directly to one of the mainframe's cluster controller ports. While this method provides good speed and quick setup, it is quite expensive to implement. Because of the high cost, this method is useful only when a small number of Macs need to be connected to an existing network with available connections. To use the direct connection method, a card must be added to the Macintosh to support either a serial connection or a coaxial cable connection. Note that the coaxial cable connection used for mainframe connectivity is not the same as the coaxial cable connection used with thin Ethernet (ThinNet) and the serial connection is not the same as standard Macintosh modem/printer serial port connections. The Coax/Twinax Card and Apple Serial NB Card can be purchased directly from Apple.

A versatile method of connecting Macs to a mainframe is to use a LAN connection. In this scenario, a group of Macs are already connected together into a network, so only one connection between the Mac network and the mainframe is necessary to give all the Macs access to the mainframe's services. If the Macintosh network is using a data link that is supported by the mainframe, most commonly TokenRing, then simply adding the Macintosh network to the mainframe's network connections provides the necessary physical connection. Of course, after the physical connection is made, software that speaks SNA must be added. The necessary card to join a Mac to the TokenRing LAN is also available from Apple. Ask for a TokenRing 4/16 NB Card

If the Macs that need to be connected to the mainframe aren't running on a

network data link that is supported by the mainframe, a gateway can be used. The gateway sits between the two networks, acting as a translator between the two data-links and network protocols. One such product is WallData's SNA•ps gateway software (previously sold by Apple). This product is installed on a Macintosh that has both a connection to the Mac network (LocalTalk or Ethernet) and a direct connection to the mainframe. This Mac then becomes the physical gateway with its software serving as a translator, intercepting messages between the two incompatible networks, and converting them to usable form.

IBM originally designed its mainframes to communicate with users via the text-based 3270 "dumb" terminals. While the Macintosh provides several methods for communicating with the mainframe, each method must essentially convince the mainframe that it is talking to one of its 3270 terminals. Therefore, each mainframe connectivity solution differs in how the mainframe's messages are displayed on the Macintosh. The most common method Macs use to communicate with mainframes is to emulate the 3270 terminals which the mainframe expects to be dealing with. With 3270 terminal emulation software, such as WallData's SNAps 3270, a Macintosh user is presented with a window which simulates the display of a 3270 terminal. Fortunately, emulation software enables the use of some of the typical Mac interface features such as definition of keyboard macros and reassigning of keystrokes, but gives a predominately text-based interface.

If a developer wishes to maintain the standard Mac interface yet communicate with a mainframe, custom software must be written. Front end

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software is specifically written to present a Macintosh interface on the Mac side, while invisibly converting these actions and the mainframe's responses to and from the equivalents of 3720 terminal actions.

Connecting to UNIX UNIX is an operating system supported on nearly every computer platform from mainframes to personal computers. It was developed in the 1970s at AT&T's Bell Labs as a development environment for telecommunication systems. Since then, it has had major additions made by UC Berkeley, the Department of Defense, and most recently Sun. Today, UNIX based workstations are commonly used in engineering and other scientific applications.

As with most Macintosh and PC computer networks, Ethernet is the most common method of physical connection between UNIX computers. If the UNIX network you need to connect to is running over Ethernet, you need only add your Mac to the network to connect to the UNIX network. But, of course, that's only half of the connection. You also need to connect the software.

The main role of the software connection is to resolve the fact that the two computers are speaking different languages. (The Mac speaks AppleTalk and the UNIX machine, TCP/IP). This translation need not be performed at both ends of the communication as long as one computer can speak in a language the other can understand, communication can proceed. Obviously, this could be accomplished in either of two ways. You could teach the UNIX computer to speak to the Mac. By adding software to the UNIX computer so that it can speak in the Mac's native network language (AppleTalk), an unmodified

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Macintosh can speak to a UNIX machine (assuming the physical connection is in place). Generally, this type of setup is used to enable a UNIX file or print server to become available to the Macintosh. Because the UNIX server will be using native Macintosh protocols, the file or printer server will appear in the Macintosh Chooser as would any other Macintosh file or print server. Products that perform this task are K-Ashare/K-spool by Xinet and PacerShare by Pacer Software. K-Ashare runs on a Sun or HP UNIX host, while PacerShare runs on Sun, HP, DEC Ultrix (DEC's version of UNIX). The software to do this is quite expensive, however. PacerShare lists for about $5000. Per host, and K-Ashare is only a little bit less.

A less expensive answer is teaching the Mac to speak TCP/IP. MacTCP, part of Apple's TCP/IP Connection for Macintosh, enables Macintosh programs to speak using the TCP/IP protocol language. This, used in combination with a program written specifically to make use of the MacTCP additions, enables Mac users to interact with an unmodified UNIX-TCP/IP network service. Note that to use MacTCP, you need software that was specifically written to take advantage of it: mainstream Macintosh applications completely ignore the added language capability of MacTCP.

As a third alternative, you could teach the Mac to run UNIX directly. Apple's add-on A/UX software enables the Mac to run UNIX software directly. This is accomplished by replacing the standard Macintosh operating system with a hybrid of both Apple's System 7 and the UNIX operating systems. Because the resulting Macintosh has both the UNIX and System 7 operating systems, the computer can run both Macintosh and UNIX software. Once A/UX is running,

the Mac speaks TCP/IP internally and it can successfully communicate with other UNIX machines.

TIP TCP/IP is rapidly becoming part of every Mac's vocabulary, since it's included in System 7.5. Even if you're not tied into a local network with Sun workstations, IBM mainframes, and Cray supercomputers (all of which can talk to the Mac with TCP/IP); you're effectively tied into a Wide Area Network every time you sign on to your Internet Provider.

Network Control Panel

Note: If OpenTransport is installed, this is replaced by the AppleTalk Control Panel, which has a different interface.

This control panel enables the user to specify a network connection and switch between different kinds of networks (such as AppleTalk or Ethernet networks). When you access this control panel, a window displays the available network connections. To select an available network to connect to, click the **icon** of the network.

To select an individual zone, double-click your network icon to display a window where you can choose the **AppleTalk zone** you want from the list of available zones. Click OK to confirm your zone choice.

To use the Network Control Panel, follow these steps:

1. Open the Network Control Panel from the Control Panels submenu on

the Apple Menu (or System Folder).

2. Choose the network you want to connect to by clicking its icon. Double-click the same icon to select a particular zone from the list of available zones. Select the name of the zone and click OK to make your choice complete.

3. Close the Network Control Panel.

See Also
AppleTalk Zone; EtherTalk; Icon; TokenTalk

Network Gaming

Network gaming essentially means that you can play a game against another person, not just a computer opponent, over a modem and phone line, a network server or the Internet.

After you get more than three people playing a game like **Chaos Overlords** or **Hexen**, the odds are upped and a new dimension is added. The main problem many critics have with computer games is that they are antisocial.

Some games just work better on a board or bridge table than with three or four people jammed around a single keyboard and screen. Still, games like Havoc from Reality Bytes are proving that gaming can go across platform and across town or continent successfully. Havoc supports network play across platforms, meaning that you can play against your friend on a PC with

your Macintosh and there is nothing lost in the translation. The interface is the same on both ends.

If all games continue to bridge the gap between platforms, Mac gamers may finally see and end to the shelf space problem and the decision to go Mac may no longer be influenced by whether or not you can get a good array of games for it.

See Also
Multi-User Dungeons; Online Live Games; Shareware

Network Maintenance

Network maintenance is the ongoing support of users and computers on your network. It is the task of the network administrator, either to perform all of the required tasks or to designate, and possibly to train others to do them. This task will be made much easier if you've established and discussed a through network policy statement with your users. While the physical wiring and configuration of the network will require occasional maintenance, much of your work will involve maintaining the network software that you install.

File Server Maintenance Because a non-functioning file server separates users from their data, it is important to keep the file servers running. The main task of file server maintenance is changing the server's internal list of users to match the changing physical and employee

configurations of the company. When an employee or workstation is added, or dropped, the file server list needs to be updated accordingly. This is especially urgent if the employee did not leave voluntarily. There are too many stories told in the computer world about disgruntled employees who erased important files or planted viruses on servers after being dismissed.

 In addition, you'll want to make sure that the server is continuing to operate efficiently and that it has sufficient storage resources. This means periodic defragmenting of the hard drive(s) and checking to be sure that only what's needed is installed.

Email Maintenance Email maintenance is similar to file server maintenance. Your main task is to keep the email server's listing of users current. In addition, you'll probably need to perform periodic diagnostics and "Cleanups" of the mail files, as required by the software you're using.

Backup Maintenance If you're using a network-wide backup scheme, you'll need to periodically check on this machine to insure that it's actually backing up the items it thinks it is, and that it always has sufficient backup medium to perform the backups as scheduled.

If you choose not to centrally perform backup, you'll want to periodically check to insure that users are performing their own backup—because you'll be the first one they'll come screaming to when they loose their data.

Wiring Maintenance Network wiring doesn't require frequent maintenance. While wiring is often the first source of blame for network, if

properly installed, it is rarely the actually cause of problems. It's a good idea to check the validity of the wiring periodically when it is working to spot intermittent connections and so you'll recognize any differences once things stop working properly.

Testing of network wiring is done with software that sends short messages ("pings") to different spots on the network, and times the amount of time a reply takes. Periodic quick checks around the network to look for inappropriately long response times will give you a good idea of the overall status of your network, and can help rule out wiring conditions as the source of network troubles. Pinging won't necessarily define a wiring problem, but will tell you what area may have a problem. From there, a visual inspection, beginning with the gateway and router, and checking the indicators on the hub, will help you track down the problem. Only after you have ruled out loose connectors and problems with the gateway or router should you begin to consider a bad wire. These are easily tested with a volt meter. If there really is a wiring problem, the chances are excellent that it will be in whatever run of wiring is most difficult to reach.

> **TIP** Because network wiring can be one of the most difficult and most frustrating things to troubleshoot after it's installed, it makes a great deal of sense to carefully plan, and use high quality network wiring.

Network Maintenance Tools At the onset, maintaining a Macintosh network of tens or even hundreds of nodes might seem insurmountable.

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Fortunately, there are many tools available to the administrator to ease the tasks of network maintenance.

File Server Maintenance   Several tools are available to provide file server maintenance. The most obvious ones included with your file server package. AppleShare, for example, makes use of the "AppleShare Admin" software to perform updates to user lists and access privileges. Third party software tools such as Santorini's Server Manager or Sonic System's Server Sentry enable you to perform similar task, but add the ability to perform these tasks from any computer on the network: thus enabling you to configure multiple file servers from one physical location.

Network Inspection Tools   Software to test network integrity are quite helpful when major network failures occur. Typical examples Data Watch's NetOctopus, Sonic System's Radar, and Apple's Inter•Poll. These tools use test signals to show you how quickly and accurately each computer on the network can send and receive messages. In addition, these packages can give you information about the hardware in use at each network station.

Software Update Tools   When many users need updates of common software packages, programs such as FileWave or NetOctopus can be immensely helpful. These packages enable the network administrator to prepare and perform updates to all stations from one central location.

Network Administration, Remote Access   Apple's Remote Access (ARA) isn't a network management tool itself: it is software that uses modems to 'trick' your computer and a remote network into thinking you're physically

connected and proves invaluable during network emergencies when you're off site. Combining ARA with any of the above tools enable you to perform your normal network administration tasks from virtually anywhere you can attach to a phone line. Don't use Apple Remote Access connections to perform network configuration changes that could affect the network status of the machine controlling the ARA connection...or you could be rudely disconnected in the middle of your changes, and unable to reconnect!

See Also
Network Administration; Network Communications; Networking, Why and How

Network News Transfer Protocol
See
NNTP

Network Number
The network number is a 16-bit number used to identify the AppleTalk network to which a **node** is assigned. Nodes choose their network number from an AppleTalk **router**. When no router is present on the network, they choose a number from a pre-defined range known as the startup range. The network number range is a range of network numbers that has been

established within the router for use on extended network segments. Non-extended networks, such as LocalTalk are restricted to single network numbers.

See Also
Network Administration; Network Maintenance; Networking, Why and How

Network Rendering

Using a **network** of computers to render a single **3D** scene. This is also called a rendering farm. Several software packages support network rendering, including Specular **Infini**-**D** (using an add-on package called **BackBurner**) and Hash's **Animation Master**.

Network rendering requires a central control program running on one computer and processing programs that run on other computers on the network. The central program takes a 3D scene and delegates the scene information (including models and texture information) to the processing programs. Each program is assigned to render one part of the image—the image usually is divided into a grid of squares—and the central program receives the rendered parts and assembles them.

One advantage of this process is that the processing programs operate in the background and can be configured so that they work only during certain times. Correctly configuring them eliminates any performance degradation.

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The more computers available, the faster each image is rendered. There are trade-offs, however. The network's speed and the size of the models will impact performance. If the rendering process is running over a LocalTalk network, it may take so long to send the data back and forth that performance improvements are negated except for small jobs. Also, it is not worth adding significantly slower computers to the rendering farm. As an extreme example, if you had a PowerPC 604-based Power Mac and a slower 68020-based Macintosh II, it would make no sense to network them together. The rendering time contribution of the Macintosh II would be insignificant when compared to the performance of the Power Mac.

See Also
3D; Network Gaming

Network Topology
The method by which a computer network is physically laid out is known as the network topology. The various network topologies are technically independent of data links and transmission media, but each transmission medium only supports specific topologies in specific fashions.

Network Topology, Bus   The **Bus** is the simplest type of network, and the type network Mac users are most familiar with as it is used for LocalTalk/PhoneNet networks. It consists of computers being "chained" together, with wires starting on one computer, meeting the next, and so on

until the end. (see the following figure). This configuration is also frequently called the "daisy-chain".

The bus topology is used with **LocalTalk** , in both Locking LocalTalk (Shielded Twisted Pair) and PhoneNet (Unshielded Twisted Pair) configurations. In addition, thin **EtherNet** (Thinnet) makes use of this topology.

The principal advantage of the bus topology is ease of setup. Because each computer simply connects to the next, cabling is fairly straightforward, particularly in a room with multiple computers (such as a computer lab). The primary disadvantage of this type of setup is that, much like a string of Christmas lights, if the chain is broken at any point, every computer on the network will become disconnected. In addition, it is very difficult to locate cabling faults without physically going from station to station.

Overall, bus topologies are very practical only with a small number of computers, or when most of the computers are concentrated in a single area. Beyond this, the difficulty in maintaining and troubleshooting this type of installation make a Star topology preferable.

STAR The alternative to the BUS topology is the STAR configuration. In this type of setup, each computer is connected by a network cable to a single central location. This topology can be more expensive to install, because each computer must have a wire running all the way back to the center of the network, as opposed to the bus network where each cable need only run to the next closest workstation.

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The primary advantages of this topology are in the areas of manageability. Because each workstation has a dedicated cable run to a central location, problems on any single cable will be isolated to that workstation.

There are two types of star networks, Passive Star and Active Star:

- The active star network uses a device known as a hub to act as a central manager of all data traffic.

- The Passive Star takes the cabling schema of the active star but works without the central hub by simply cross-connecting each workstation's cabling.

A passive star is formed when each of the star's cables are directly connected together at the center. You can do this fairly easily, using a patch panel or a telephone-style punchdown block. This creates a network that is electronically similar to the bus topology. Unfortunately, a passive star usually uses a great deal more cable than a bus because each workstation has the full cable run to the central location.

The passive star topology is only supported by a LocalTalk/PhoneNet network. The benefits of this topology are the cost savings of not using a central hub, the familiarity of cable installers with the star topology, and the fact that cabling for a passive star prepares you to move to an Active Star network. The drawbacks of using a passive star are significant.

This type of network is notoriously unreliable when expanded beyond four "arms". Perhaps most importantly, by cross-connecting each cable run and

by not using a hub, you lose the isolation advantages of the star network.

An active star network makes use of a central unit known as a hub or repeater at the center of the network (see the previous figure). The hub is responsible for isolating, amplifying, retiming and then transmitting network signals that come from each workstation, enableing for the use of many more computers over longer distances. Because it makes use of a hub, active star networks provide for very advanced monitoring and management of networks. Therefore while they are more expensive to install initially, active star networks are by far a better investment for the growing network. The active star topology can be used with 10Base-T, EtherNet, and PhoneNet.

> **TIP** For trouble-shooting purposes, keep a diagram of your network topology, including the model and serial numbers of computers and other devices on the network, and the applications (and *their* serial numbers) of software installed on the server and on its clients.

See Also
Network Administration; Network Maintenance; Networking, Why and How; Network Wiring Strategies; Wireless Networks

Network Wiring Strategies
The Macintosh supports a number of network cabling systems, from LocalTalk to FDDI (fiber-optic). Each system has its pros and cons, based on

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cost, reliability, and upward compatibility. There are many issues involved with the design and implementation of any wiring system. Although it's hard to generalize and cover all possible networking situations, here are a few things to keep in mind.

1. Don't get locked into a specific vendor's proprietary components or cabling scheme. Stay with the accepted industry standards.

   TIP One exception to this rule is Apple's EtherNet system. It uses a special connector to link the device with the external attachment unit. Because the network side of the attachment unit (either 10Base-5, 10Base-2, or 10Base-T) still conforms to industry standards, it's less important that the device side is somewhat non-standard. To their credit, Apple has published and made this standard available for any vendor to use. The Apple Ethernet system has been adopted by virtually all of the Macintosh networking vendors, and is becoming a standard of its own.

2. Don't limit your network and wiring plans just to data. Consider integrating your networking plans with other forms of data, such as voice and video. You may be able to save money by installing these different cabling systems at the same time. In many cases, the different systems can use the same faceplate.

3. Plan for the future. You may be planning to use only Local-Talk and EtherNet, but you should seriously consider the installation of twisted-pair wiring and fiber-optic backbones that are capable of supporting

current and future high-end cabling systems. Consider also the likelihood of upgrading phone service to ISDN.

One such standard for "now and later" wiring involves the installation of four pairs of UTP (Unshielded Twisted-Pair) wiring. Because 10Base-T EtherNet requires only two pairs, you have more wire than you need right away, but as 100Base-T becomes available and affordable, you're already wired for it. The most encompassing standard for UTP is published by the Electronic Industries Association and the Telecommunications Industry Association (EIA/TIA). The standard is commonly referred to EIA/TIA 568 and TSB-36, which sets a standard for "Category 5" UTP media. Category 5 UTP anticipates the standards that will support bandwidths of 100 Mbps (Category 4 UTP supports the conventional EtherNet bandwidth of 10 Mbps). These standards include copper versions of the FDDI standard (CDDI) and 100 Mbps (100Base-T) implementations of EtherNet. This cabling is also sometimes referred to as "Level 5" cabling.

Another example of planning for the future is the choice of fiber-optic cabling. Fiber-optic cabling is becoming more commonplace as a medium for EtherNet backbones. In fact, an EtherNet fiber standard, IEEE 802.3 — 10Base-F — has been published. Fiber can be run over great distances and is immune from most forms of electromagnetic interference. (Try to avoid wrapping it around a lightning rod.). Fiber optic cabling is also the basis for the FDDI standard. Fortunately, the two standards overlap somewhat and it's desirable to implement fiber networks that conform to the FDDI standard (ANSI X3T9.5: FDDI) as well as the current and planned EtherNet fiber standards. The moral

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of this story is to plan for FDDI even though you're only going to use lowly EtherNet. You'll appreciate this approach in the not-so-distant future when FDDI cards sell at CompUSA for $129.

- If it appears that your LAN will need to support more than 50 users, plan on implementing a **structured wiring** approach to your network design. It's money well spent. By implementing such a system, the ongoing costs involved in support, troubleshooting, expansion, and equipment relocation will be minimized.

- In accordance with your budget, plan on running multiple cable runs to each office or cubicle. The incremental cost of the additional cabling is relatively small when compared to the minor increase in labor cost. Also, don't scrimp on the number of jacks provided to an office or cubicle. You can choose faceplates that have a single, double, or quadruple complement of connectors. While it's often possible to daisy-chain within a room, don't plan on this as a part of the design. Consider that you might want to add printers or other networkable peripherals to a room at any time in the future. You might also need to support devices that require multiple connections to the LAN, such as workstations, routers, and gateways. A good rule of thumb is to plan for at least twice as many connections as you actually require at present.

- Make sure that fiber and copper cable runs are within the specified length limitations, by carefully planning the location and distribution

of wiring closets. Be sure to allocate additional cable length for vertical distances (not usually shown on floor plans) and the routing losses that occur when cable is snaked above ceilings and through walls.

- Speaking of wiring closets, plan the layout and design of these rooms carefully. Make sure that the room is well lighted, ventilated, and capable of being securely locked. If the room is large enough, use industry standard 19" racks to contain the network devices. Obviously, because the room may house a number of routers, gateways, and other network devices, adequate electrical service is crucial. If you have the room, you may also find it convenient to install a small desk with a Mac that can be used for troubleshooting and maintenance. This Mac can also be used to maintain network configuration information, wiring diagrams, and problem logs. Quite often, this is also the room where the telephone equipment is located. Be sure that the two are kept separate as much as possible, to avoid confusion.

- Are your cables routed in such a manner as to avoid electromagnetic interference and undue mechanical stress? For example, don't drape cables around fluorescent light fixtures, and don't hang wet laundry from cables strung from the ceiling. Use common sense and consult the appropriate local codes and requirements.

- Plan to have your wiring tested before use. This is a particularly good idea for large, expensive installations that use structured wiring. The

time to discover breaks or discon-tinuities in the cable is before network deployment. If you use a wiring contractor, be sure to include testing and validation as part of the agreement. The devices used for testing can be rather expensive, so it's likely that this task is better handled by the cable installers.

- Adopt an adequate cable marking and identification scheme. Each and every cable should be unambiguously marked — in a location that will be visible after installation. Be sure to mark both ends of the cable. Make sure the marking is permanent and won't easily be erased or detached. There are many adequate marking systems. Some utilize heat-shrinkable tubing, while others use labeled wiring ties.

- Document everything from the outset. Create a logical and physical diagram of your network. If you're using a cabling system that has physical hardware addresses, such as EtherNet, register these numbers along with their location and description. For this task, a spreadsheet or a simple database (such as FileMaker Pro) is ideal.

- Before you start planning, call the Black Box Corporation at (800) 552-6816. They'll send you a free catalog that's chock full of many networking products. It's like the "L.L. Bean Catalog" for networkers.

Network, Structured Wiring   Sometimes the simplest answer to wiring a network seems the most complex. The technique sometimes referred to as structured fits that definition. Every node on the network is wired to a central point, which is designated as the wiring closet. The wires meet at a

punch block or patch panel, which connects them to the appropriate hub or other device.

In one example, a star topology is used to wire all offices and cubicles with several runs of 10Base-T (or even Level 5 compliant) twisted-pair wiring. All wires converge at the master patch panel within the wiring closet. From this patch panel, connections are made to the appropriate wiring devices based on requirements of the connected device. LocalTalk devices are interconnected to a LocalTalk hub and router; EtherNet devices are connected to an EtherNet hub. While it's not shown the figure, the 10Base-T hub could also be connected to an EtherNet-to-EtherNet router. Serially connected devices are patched to a terminal server. What's important about this scheme is that all devices use identical wiring. Changes are confined to the wiring closet. If an elderly LocalTalk Mac SE is replaced with an EtherNet Power Mac, the only required change is to move a patch cord from the LocalTalk hub to the EtherNet hub. The time saved is obvious.

Some integrated hubs merge the different hubs (such as terminal servers, 10Base-T, and even LocalTalk) into a single, unified chassis. These devices make the wiring process even easier and less cluttered by eliminating the cross-connects that are now part of the hub's backplane.

Remember that networks, like people, aren't fully grown at birth. They keep on growing and changing as the technology changes, and users are added or relocated. While it's not always necessary to upgrade immediately to the latest, fastest gimmick that comes along, growth is both healthy and

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inevitable. The more you can do today to anticipate and prepare for tomorrow's needs, the better off you'll be.

See Also
Network Administration; Network Communication; Network Maintenance; Networking, Why and How

Network Zones

Zones are a way to logically group network nodes. Zones are commonly defined on the basis of physical proximity. All the Macs and Laser Printers and other peripherals on the first floor of a building might be in Zone one, those on the second floor in zone 2, and so on. Zone names can be assigned to the network zones.

Zones must be no more than 32 characters long, and are case insensitive. The Zone list is a listing of available network zones, commonly displayed in the Chooser. (If there's only one zone, the Chooser doesn't display a list of zones, only a list of similar devices within the zone.)

See Also
Networking and the Chooser

Networking and the Chooser

The Chooser is one of the least understood parts of the MacOS, but one of the coolest. With it, a user can find and select network (and local) services in an easy and consistent manner. The Chooser does many interesting things behind the scenes. It dynamically generates a list of available **network zones** . When you choose a particular service by clicking on an icon, the Chooser then generates a list of those devices that meet the selection criteria. Finally, once you've selected a particular named service, the Chooser proceeds to discover the AppleTalk address of the chosen service. (You see, the names in the Chooser are for your benefit, while the network addresses are for the benefit of the Macintosh.)

Each AppleTalk device automatically generates a unique **node number** , but initially it's only known by that device. Nodes don't automatically know the node numbers of other devices. With other protocols, such as DECnet, this problem is solved manually. Someone (usually the DECnet administrator) uses a utility program to create a database of node addresses. This database is required on every DECnet node in order for that node to communicate with the other nodes.

Apple, desiring a plug-and-play environment, decided that this manual creation of node lists was not in keeping with the spirit of Macintosh. An alternative approach was developed to solve the problem of address determination. Let's consider a Mac that needs to print a document to a particular LaserWriter on the network. The Mac doesn't have any idea of the

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other nodes on the network. Therefore, it must go through a process of discovery to identify the available services. This is done by the AppleTalk protocol known as the Name Binding Protocol, or NBP. The process is simple.

When a user opens the Chooser and clicks on a service icon (such as the LaserWriter icon), the Macintosh first acquires a list of zones from the nearest routers with the Zone Information Protocol (ZIP). It then sends out a NBP Lookup Request packet. (Actually, it doesn't simply send it out, it broadcasts — or multicasts — the request to all devices on the cable. This makes sense because the Mac has no idea who to send the request to anyway.) Essentially, the NBP Lookup Request packet contains information on the requested named service. The Object name is the name of the entity that is usually assigned by a person. For a Mac, the object name is defined in the Macintosh Name field of the Sharing Setup Control Panel. LaserWriter object names are established by the Namer utility program. Examples of object names include: Alfie's Mac, 2nd Floor LaserWriter, and Mom's File Server.

Of course, multiple LaserWriters can respond to the NBP Lookup Request, and as they do, your Macintosh displays their names in the Chooser. Then, when you select a printer, the Macintosh simply remembers the name of the currently selected printer. This name is then stored in the memory of the Macintosh. This is why, for example, when someone moves their PowerBook from the office network to their home network, the office printer will still be selected. To solve this problem, the LaserWriter must be reselected from the Chooser.

This process also offers an explanation for the rare event that occasionally happens when someone selects a printer on Friday, then the network is altered over the weekend and the printer just so happens to choose a new node number for itself. When Monday comes, the user receives a "…can't locate printer" message. Again, reselecting the printer from the Chooser solves the problem.

This NBP request/response conversation happens every time a Macintosh user selects a service from the Chooser. Because the NBP delivery mechanism involves broadcasting (or multicasting), NBP traffic can be a significant part of AppleTalk network traffic.

Networking and Education

Computer networks aren't restricted to businesses. You can also find them in classrooms and school "computer labs" from kindergarten on up. The only problem with networking at this level is, well… kids will be kids. There's always going to be one in the class who "accidentally", or otherwise, drags the group project to the trash, or tries to erase the shared hard drive "just to see what would happen". The solution to this, and to most other classroom computing problems is to control access to files and applications on shared systems. Several years ago, Apple introduced At Ease, a "goof-proof" desktop for the family Mac. It had a simple desktop with large buttons for accessing files and applications and two large folders to keep things organized. It also kept anyone who didn't know the password procedure from getting into the

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"real" desktop, or into any non-approved applications or folders (and especially the system folder).

Now, there's **At Ease** for Workgroups. It can be used at the elementary level with the same child-proof desktop, or at the "experienced Mac user level" with the familiar Finder interface, with its windows, icons, and pull-down menus. Administrators can manage security in both environments, preventing users from changing system settings and controls or from deleting, accessing, or modifying files and applications that are not in their designated folders. The hard disk on each Macintosh system can also be locked to prevent users from accessing information on that disk if they start the system from another disk.

At Ease for Workgroups is designed especially for networked computers. The network administrator can configure At Ease from any Macintosh system on the network. They can also authorize teachers or other users to perform basic At Ease administrative tasks. Shared applications and documents can be stored on any file server on the AppleTalk network, and teachers can have centralized "drop-box" folders into which students can submit assignments electronically.

You can even create a list of approved CDs to prevent users from accessing unauthorized materials. And within the At Ease desktop, each CD or floppy disk conveniently appears in its own At Ease folder. At Ease for Workgroups supports up to 200 different configurations and 4,000 distinct users. It's the best way to make sure your network is child-proof.

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Networking, Why and How

While PC-based platforms require the addition of expensive and difficult-to-use hardware and software, networking on the Macintosh is actually quite easy and inexpensive. Generally, Macintosh users begin with the built-in LocalTalk networking, and expand to Ethernet as their needs (and budget) expand. Usually, one computer called the server is in charge of collecting and distributing information. The computers used to connect to the servers are called clients. There are several types of servers, each of which handles specific tasks.

There are several advantages to networking your Macintosh. Computer networks enable people to accomplish more with their computers than they could without the network. Networking saves both time and money. It's an investment that pays for itself very quickly.

Device Sharing The most obvious advantage of a network is the ability to share expensive equipment. This is important in the small office and even in a home situation where there might be one computer for the adults and one for the kids. A single laser printer or scanner can be used by many people, effectively driving the equipment cost down. Also, other items such as modems and fax modems can be shared by everyone, without needing to

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purchase one for each user.

Information Sharing Networks enable computer users to pool their information, leading to better communication. In a business setting, it's important for the secretary or office manager to know what his or her boss's schedule is. A shared calendar lets the people who need to locate someone know whether that person is in the office, in a meeting, or at an outside appointment. It lets managers plan meetings, knowing in advance that the people who must be present will be available, and it even lets users see what conference rooms will be available on a particular day and time.

It's common for several people to have input into a document or spreadsheet. These "workgroup" projects are handled much more easily when each member of the group can access the document through a central file server and make his or her additions to it without the need to deliver updated print-outs to the other members of the group, or to crowd a group of people around the screen to attempt to work together. Networking enables each member of the group to work in the comfort of his or her own office and have the same amount of control (or possibly more than) they'd have in a group meeting.

Databases are information repositories. It's only reasonable for everyone in an office to have access to the same database. Keeping a printed copy of it on each desk means reprinting every time a new customer is added, or a phone number changed. Keeping it accessible on the network saves paper, and gives everyone the same opportunity to use the most current information.

See Also

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Network Administration; Network Communication; Network Maintenance; Network Wiring Strategies

New Folder Command

Folders help you organize your work. Empty new folders are created by selecting New Folder (⌘-N) from the **File menu** in the Finder. You can create as many new folders as you want, and you can place folders within other folders (just like a real file cabinet).

Folders help you stay organized by letting you group similar items together. If, for example, you're designing résumé's for all your friends, you might want to create a folder called "Resumes" where you can store all of your friends' resumes.

That way, when you're looking for a particular resume, you know to look inside the resume folder. But what if one of your friends has three different lines of work and you've designed three different resumes? You can create another new folder within your "Resumes" folder and put all of this person's resumes within that folder for easy organization. Imagine how your hard drive window would look if every document you saved was saved in your startup hard drive window. Soon there would be hundreds of documents all over your main hard drive window, and finding anything would be a confusing and time-consuming task. It would be like having a real file cabinet, with no dividers.

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When you select new folder, the new folder appears in the **active window**. If no window is open, the new folder appears on the desktop but can be dragged anywhere. Folders are created with the name "Untitled Folder," but the name field is already **highlighted**, ready for you to type in a new name. If you decide to create many folders at one time, each subsequent folder has a number added to the end of the folder name("Untitled Folder 2," "Untitled Folder 3," and so on).

To create a new folder, follow these steps:

1. At the Finder level, select New Folder (⌘-N).

2. A new folder appears with the name field highlighted for you to type in a new name. You can type the new name immediately.

See Also
Active Window; File Menu; Highlighted

New Group Command

If you're connected to a **network**, you can assign a number of individual **users** to one group of registered users. To create a new group, you must use the **Users and Groups** Control Panel and choose New Group from the **File menu**, as shown in the figure. A Group **icon** appears, and you can add user names to this group by clicking and dragging the user icons onto the Group icon. You can see the members of a given group by double-clicking the

Group icon. The groups that an individual user belongs to are found by clicking the individual user's icon.

To create a new group, follow these steps:

1. Choose the Users & Groups Control Panel.

2. Choose New Group from the File menu.

3. Name the group, and add users to the group by clicking and dragging their user icons onto the Group icon. They are then part of that group. To see the users in a group, **double**-**click** the Group icon. To remove a group member, drag their username from the group. This group now appears in the User/Group **pull**-**down menu** in the **Sharing** Control Panel.

See Also
Control Panel; Double-Click; File Menu; Icon; Network; Pull-Down Menu; Sharing; Users and Groups

Newsgroups, Subscribing

When you first launch a client program for reading and posting to **Usenet newsgroups** , you must subscribe to the groups you want to read. This enables the **client** program to know what groups to present to you, rather than having to load the entire (lengthy) list of newsgroups each time you connect.

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Occasionally, the newsreader software, such as **NewsWatcher** or **Netscape Navigator**, automatically subscribes you to a couple of basic groups with good information for beginners, such as news.newusers.questions and news.announce.newusers.

For the most part, however, the thousands of available newsgroups are in the "unsubscribed" category. Although most news servers do not carry a list of all newsgroups, you still have to navigate through a full group list at least once in order to subscribe to the groups you expect to visit often.

See Also
Internet; Newsgroups; Netscape Navigator; NewsWatcher; Thread; Usenet

NewsWatcher

A well-known and popular freeware program that enables Internet users to connect to **Usenet** newsgroups and post and read messages. This news browser was developed by John Norstad and is the leading news reader for the Mac.

The first time you launch NewsWatcher, a dialog opens, asking for the addresses of your news **server** and your mail server, as shown in the figure that follows.

You need to ask your **Internet service provider** or system administrator for these addresses, as well as other essential information for connecting to

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the Internet (see the list of questions in the entry on **SLIP** , for instance).

After you enter this information, you are presented with a screen asking for your personal information and email address. After you enter this information, NewsWatcher downloads the Full Group List of newsgroups available on your news server, the computer that routes Usenet information. Downloading this list can take several minutes.

After the full list appears on-screen, choose New Group Window from the File menu. NewsWatcher then opens a small, empty window. Scroll through the Full Group List and drag groups that interest you to the small, empty window. This will serve as a list of groups you expect to visit regularly, thus eliminating the need to load the full list every time you connect.

NewsWatcher's Preferences settings enable one to specify where to save files, identify a **signature file** for postings, specify font and size for viewing articles and files, and a choice of single-key navigating of messages with the keypad. A spacebar shortcut takes you to the next screen and then to the next unread message. NewsWatcher can also automatically download and decode binary files that have been posted, usually in **BinHex** or uuencoded form.

To read a newsgroup in your list, double-click it or use one of the keypad shortcuts (if you have them enabled). NewsWatcher opens another window containing the subjects of all the articles in the group. Alongside each subject is either a dash or a triangle and number, as shown in the following figure.

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A dash indicates that the article is the only one in the **thread** or series of messages on a particular topic. The triangle indicates that there are more than one message, and the number indicates how many articles are in that thread. You can click the triangle to show the other articles, just as you click a triangle in the System 7 Finder to display a folder's contents.

With an article window open, you can go to the next article, next thread, or next group. You can also reply to an article via **email** or post a follow-up to the newsgroup using commands in the News window.

Because John Norstad makes the NewsWatcher source code freely available, others have enhanced the program and created "clones" such as VA.Newswatcher and YA.Newswatcher. The new programs incorporate enhanced features such as message filtering.

See Also
AppleScript; BinHex; Email; Internet Service Provider; Netscape Navigator; Signature File; SLIP; Thread; Usenet

NeXT

After leaving Apple in September 1985, **Steve Jobs** founded NeXT Computer, Inc., to create computers specifically targeted at the higher education market. When Jobs informed Apple's board of directors of his plan, they initially considered investing in the company until they found out that Jobs intended to take five key Apple employees with him. Apple sued but

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eventually dropped the suit when Jobs agreed not to hire away any other Apple employees for a period of six months.

After this inauspicious start, NeXT managed to get going anyway. In early 1988, it received a major infusion of cash when H. Ross Perot invested $20 million.

The first NeXT computer, a sleek black cube with some impressive technical features inside, was introduced in October of 1988. The NeXT used a version of the UNIX operating system combined with a sophisticated **object-oriented development environment**, together known as NEXTSTEP.

Although NeXT aimed the machine at colleges and universities, they didn't show much interest. It was overpriced as a personal computer, but underpowered as a workstation. The computer also suffered from some of the same problems as the original Macintosh: a disk drive incompatible with everything else, no color, and poor performance.

NeXT rectified these problems in subsequent machines, but even some of these machines were plagued with problems. The one thing that to garner praise was the NEXTSTEP operating system. In January 1992, Steve Jobs announced that NeXT would port NEXTSTEP to run on Intel-based PCs.

In February 1993, NeXT abandoned the hardware market entirely, announcing that it would sell its hardware operations to Canon and focus its business exclusively on the NEXTSTEP operating system. Although NEXTSTEP is still a small player in the Operating System wars, it has gained a

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significant following among developers who write custom applications for corporations. More recently, NeXT has made significant strides on the Internet with its "WebObjects" tools for building server applications for the **World Wide Web** .

See Also
Development Environment; Jobs, Steve; Object-Oriented Programming

Next File (Keyboard Shortcut)

To move to the next file down (alphabetically) in a **window** viewed in a **list view** , use the Tab key as a keyboard shortcut. The Tab key will move you alphabetically through the contents of the active window. For example, if you're navigating through a window in the list view, rather than using the mouse to click on the next item in the list, you can scroll alphabetically through the items in the list by using the **tab key** . If you should pass an item you're looking for, you can use the keyboard shortcut Shift-Tab to move alphabetically backwards through files in the list.

See Also
Keyboard Shortcuts; List View; Tab Key; Views; Window

Night Trap
See

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Violence in Games

Nickel Cadmium
See
PowerBook Batteries

Nickel Metal-Hydride
See
PowerBook Batteries

Nine Men's Morris
See
Classic Collection

Nine Month Miracle
See
ADAM

Nisus Writer

Nisus Writer 4.0 is the current incarnation of a word processor that has been around, and largely overlooked, for quite a few years. Nisus was responsible for many of the innovations later found in other word processors, including macros, multiple undos, and the capability to zoom in and out of a page. It still has a few tricks not yet appropriated by the big names, such as noncontiguous text selection and multiple Clipboards. Nisus enables you to keep ten separate Clipboards. You can edit the contents, and copy and paste from all of them independently. Nisus Writer also has a powerful Find/Replace tool that will find and replace a word or phrase in any open document, not just the one in which you happen to be working. It also has the capability to search closed files, giving you the option of opening them and making changes if the search target is found.

Nisus Writer 4.0 uses a new simplified interface with eight floating tool palettes. One of its strengths is its foreign language capability. If your word processing needs demand writing in several languages, Nisus Writer is your best choice. It supports over eighteen different languages, including Arabic, Hebrew, Japanese, and Russian, as well as those that use the Roman alphabet. It even has a right-to-left ruler for those languages that are written in the opposite direction as English. Some languages require system additions (for example, Control Panels, Extensions, fonts) that can be purchased from Nisus Software or Apple Computer. Additionally, certain language capabilities require a language enabling hardware device called the Language Key. It

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has built-in support for text-to-speech conversion in five languages, so that you can hear the proper pronunciation of what you have written.

Nisus most definitely is not the best program if you need to send lots of letters. Its mail merge function is practically nonexistent. You must enter all field names, field markers, and merge commands entirely by hand. If you dread the thought of sending out mass mailings, don't even think about buying Nisus. It also is not the program of choice for creating a newsletter or setting text in any kind of creative layout. Nisus Writer restricts you to columns of equal width. You can use only one column format per document. Even worse, it's impossible to edit in the only view that displays multiple columns.

On the other hand, if your word processing consists of sending letters to your friends or business associates in other countries, or making lots of changes in plainly formatted documents, Nisus will do the job quickly and easily.

See Also
MacWrite; Word; WordPerfect; Word Processors; WriteNow 4

NNTP

A protocol or set of standards designed to enable the distribution, posting, and responses to **Usenet newsgroup** articles on the **Internet** .

NNTP (Network News Transfer Protocol) performs the essential task of

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enabling news articles to be stored in a central database called a news server, so that a newsgroup subscriber can view the brief title and sender information about each article and then select the ones he or she wishes to read.

Most newsgroup participants probably take NNTP for granted because it works in the background and is a well-established part of the Internet infrastructure. But enabling central storage of news on news servers via NNTP dramatically impacts network traffic.

All popular newsgroup **client**s support NNTP, including **NewsWatcher** and **Netscape Navigator.**

For more information see the Internet Working Group Request for Comments (RFC) 977 (ftp://ds.internic.net/rfc/rfc977.txt).

See Also
Internet; News Article, Posting; News Article, Replying to; Netscape Navigator; NewsWatcher; TCP/IP; Usenet; World Wide Web

Node ID
See
Node Number

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Node Identifier

See
Node Number

Node Number

In networking, a Node number is the specific address of a computer or peripheral device that's part of a network. On an AppleTalk network, it's an 8-bit number unique to that node. It's also called the node identifier or node ID.

Non-Breaking Characters

See
Tracking

Non-Breaking Space

Non-breaking spaces are one of several **invisible characters**. A non-breaking space keeps two words from being separated at the end of a line. If, for instance, you didn't want your client's name, Universal Buggywhip Company, to wrap around in the ad, you'd put non-breaking spaces after Universal and Buggywhip, to keep the whole name on one line. A non-

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breaking space is also called a hard space. Use the combination Option-spacebar to type a non-breaking space.

Non-Linear Storytelling Games

Before the days of multimedia enhancement, 3D sound and graphics and animation, the main form of gaming was Interactive Fiction. Similar to the action of **MUDS** on the net, early games focused on exploring a text in much the same way that the Choose Your Own Adventure book series operated in the seventies. Using short commands like "Pick up book" and "open door," you moved to the next stage of the story. Each scene opened with a brief description of where you were and what objects were near you that you could interact with it. Basically, interactive fiction was an adventure game without the graphical user interface (**GUI**).

In fact, one of the most popular series of IF games was the Zork series from Infocom, which has given us the incredible multimedia game **Return to Zork** and the forthcoming Zork: Nemesis. Infocom was the leading publisher of these games, which Activision recently made available on CD packages with different themes such as The Adventure Collection and The Comedy Collection. Each CD contains one of the original Zork titles, along with other interactive games. One of the all-time greatest examples of this type of game was Douglas Adams' Hitchhiker's Guide to the Galaxy, based on the best-selling novel.

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Aside from the Activision CD's and the interactive fiction and multiple MUDS on the Internet, non-linear storytelling is alive and well on CD-ROM in the form of innovative titles like **The Residents' Bad Day on the Midway** and **The Dark Eye** from Inscape and hypertext titles from Eastgate Systems. A multimedia enhanced mystery, spanning a thousand years is available in the CD-ROM magazine Launch.

See Also
Cypher, the; Dark Eye, the; Hypertext Fiction; Residents' Bad Day on the Midway, the

None Compressor

This **compressor** saves a video sequence to disk without performing any compression. Video is simply digitized and saved to disk. This may seem an odd type of "compressor," but it is an option that makes it possible to capture video without risking drop frames. A fast and large hard disk is needed to accomplish this task. You won't be able to capture full frame video with this technique, because the amount of data becomes too large. After the images are captured, they should be **recompressed** in order to reduce the file size.

See Also
Asymmetrical Compressors; Compressor; Drop Frames Spatial Compression; Symmetrical Compressors; Temporal Compression

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Norton Disk Doctor

Norton Disk Doctor from Symantec 10201 Torre Ave, Cupertino, CA, 95104-2132, Phone (800) 441-7234. Web URL http:// www.symantec.com) part of **Norton Utilities** for the Macintosh, is a repair utility that diagnoses and repairs damaged **hard disks** or **disks**. This utility searches on the disks for bad areas or sectors, checks for system software damage or corruption, and searches for any problem that might cause hard disk or system crashes.

There are a number of symptoms that might cause you to call upon the Disk Doctor to give your Mac a checkup (sorry). They include frequent crashes, the inability to startup from the startup disk, missing files or files that have lost their icons, files whose names appear scrambled, and most any other unusual occurrence. It's better to be safe than sorry.

In many cases Norton Disk Doctor can repair common software problems it encounters during its search. If Norton Disk Doctor encounters a software problem, it reports the problem to you in a **dialog box** and gives you the option of fixing the problem (if the Disk Doctor can fix it) or ignoring the problem. To help you make your decision, this report also tells you what the nature of the problem is and how serious it is.

At the end of the diagnostic test, a complete report of the results of the Disk Doctor's tests can be viewed on-screen, saved, or printed.

See Also
Crash; Dialog Box; Disks; Hard Disk

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Norton Fast Find

This is a popular third-party "Find File" DA that is part of the Norton Utilities suite of utility programs. Norton Fast Find offers you a very speedy Find function that is somewhat similar to Apple's own find function, except many users feel that Norton Fast Find is significantly faster than Apple's own search engine.

The list of available disks to search appears in a small window on the left of the dialog box. To select a disk, simply click it. To search all available drives, you can choose **Select All** Drives from the **Edit menu** (⌘-A). You search for files by entering a name or keyword in the "Look For:" field and then clicking the icon of a man running.

A window will display all possible matches. For more information on a particular file found in the search, click the file. The path to that file is displayed in a lower window and the file's information from the **Get Info** window is displayed, including creation date, modification date, and size. If you click the magnifying glass icon, the file's contents are displayed in a window, helping you to determine whether this is actually the file you're searching for.

If you click the icon that looks like a Mac, it will return you to the Finder and open the window where the file is located. If you click the "i" icon, it takes you to the Get Info screen for that file and you can add **comments** to the file if you wish. You can also edit other attributes in the info section as well,

including editing the icon in an icon painting window.

There are a host of other options available, including moving the selected file to the desktop or into the Trash, narrowing the search by choosing specific parameters, and printing a list of the items found in the search.

To use Norton Fast Find to search for a file, follow these steps:

1. Select Norton Fast Find from the Apple menu. (The System does not automatically install Norton Fast Find; it is a third-party utility that is part of the Norton Utilities package.)

2. Enter the name, part of the name, or a keyword in the Look For field. Click the icon of the running man, or press Return, to begin your search.

3. After Norton Fast Find displays the list of matches, click any item to display the file information. For more in-depth info, use the "i" icon or the magnifying glass. If you want to access the file, click the icon that looks like a Mac and you will return to the Finder. The window that the file is located within opens and the file will be highlighted to help you find it.

Norton Speed Disk

The Norton Speed Disk utility program is part of the **Norton Utilities** package from Symantec (10201 Torre Ave, Cupertino, CA, 95104-2132, Phone

(800) 441-7234. Web site at http:// www.symantec.com), which enables you to optimize your hard disk by defragmenting your **hard disk** . Over time, the information on your hard disk can become fragmented into various locations on your hard disk.

This can slow the access speed of your hard disk as it tries to find requested information. Speed Disk defragments this information and puts the most frequently used information closest to the drive heads and less frequently used further away. By making these files easily available to the hard disk, your hard disk's speed is enhanced.

See Also
Hard Disk, Norton Utilities

Norton Utilities for Macintosh

Norton Utilities, from Symantec Corporation, (10201 Torre Ave, Cupertino, CA, 95104-2132, Phone (800) 441-7234. Web site at http:// www.symantec.com) is a popular suite of commercial diagnostic and system enhancement tools that add a host of features, enhancements, and repair utilities to your Mac's system. They include:

- **Norton Disk Doctor** , a repair utility designed to diagnose and repair damaged **disks** or **hard disks** . This utility searches disks for bad areas or sectors, checks for system software damage or corruption, and searches for any problem that might cause hard disk or system

crashes. In many cases, Norton Disk Doctor can repair common software problems it encounters during its search.

- Norton Backup offers an automated customizable backup for files on your hard disk or over a **network** .

- Norton Disk Editor enables you to view and edit a disk's resources (which in many cases contain invisible files, like the desktop file). This tool is used by professionals and technicians for repairing damaged or corrupted files.

- Norton Encrypt enables you to protect sensitive files by using an encryption algorithm to scramble the contents of a selected file and attach password protection to these files. To be able to read the files, you must enter the secret password. Encryption is popular for sending sensitive files across a **modem** or network that you don't want to be read by anyone without the proper password.

- Floppier is designed to quickly and easily copy the contents of one disk to a number of disks. An example would be a users group that offers a disk-of-the-month full with shareware titles. They can create a master disk, and Floppier copies that disk onto disks inserted into the disk drive. It even initializes unformatted disks if necessary during the copying sequence.

- **Speed Disk** is a utility program that enables you to optimize your hard disk by defragmenting it. The information on your hard disk

becomes fragmented into various locations on your hard disk. This slows the access speed of your hard disk as it searches through your disk to find requested information. Speed Disk defragments this information and puts the most frequently used information nearest the drive heads, and the less frequently used files toward the back. By making these files easily available to the hard disk, your hard disk's speed is enhanced.

- Unerase is a utility designed to enable you to recover files that you have deleted from your hard drive, often including "**trashed**" files. When you **empty the Trash**, the filename is removed from the directory as a visible file, but the file still exists on the hard disk until another file is written over it. If that file hasn't been overwritten, in most cases it can be recovered. If the file has been overwritten, it cannot be recovered. So the sooner you try to recover a trashed file, the better your chances are that it hasn't been overwritten.

- Volume Recover is used when a disk is so badly damaged that you want to recover as much information as possible off the disk and store the contents of the volume on another disk before attempting to repair or reinitialize the damaged disk. If you have a severe hard disk crash, recovering the data and reinitializing the damaged disk is often your only choice.

- Wipe Info makes certain that sensitive data deleted from a disk is in fact erased from the disk and irretrievable by using recovery

software. Wipe Info deletes the file and writes over it to ensure that the file is not only erased from the disk's directory, but is erased from the disk as well. This is a necessary precaution when erasing sensitive files because when you empty the Trash, the filename is removed from the disk's directory, but the file remains on the hard disk until another file is written over it. This file can be recovered by using Unerase or another recovery utility.

- **Disk Light** is a utility that flashes an **icon** of the active disk in the upper corner of the menu bar anytime that anytime a disk is active. This helps you determine if your system has experienced a "freeze-up" or if it's just taking a long time to complete a request.

- Fast Find replaces Apple's built in Find function. The Fast Find utility is faster than Apple's Find function and offers a wide variety of added features and functions that enhance your system's find capabilities.

- Key Finder is a replacement for Apple's **Key** Caps desk accessory that gives you a map of a selected font's special characters.

- Norton Partition enables you to create partitions for hard disks and manage their use. You can also encrypt selected volumes and password protect their contents using this combination desk accessory and **extension** .

See Also
DAs; Desktop File; Disk; Extensions; Find; Hard Disks; Icons; Key Caps; Modem;

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Network; System Crashes; Trash; Utilities

Not Enough Memory Message

If you have one application running and **launch** another, you might receive an **alert box**, or message, stating, "There is not enough **memory** available to open this program." The alert message may also advise you: "To make more memory available, quit the other currently running applications."

This memory message deals with how the Macintosh handles **RAM**. Each program takes a certain amount of RAM to launch. If you have 16MB of RAM installed in your Macintosh, the programs you have open, combined with the **operating system**, cannot take more than 16MB of combined RAM to operate. If, for example, you have two programs open that use 5MB each, and your system is using 3M, you're using 13MB of the 16MB available. If you then try to launch an application that uses 6MB of RAM, you are exceeding the installed RAM of 16MB and get the Not Enough Memory message.

It's also possible to get the Not Enough Memory message even when there isn't enough RAM available as a result of memory fragmentation. Memory fragmentation sometimes occurs when you've been running a number of different applications, and you **quit** one or more of these applications, and all of the memory used by that application is not properly released to be made available to other applications. So while it may appear that you have enough

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memory available to open a particular application (by checking the "About This Macintosh" dialog at the top of the Apple menu), the memory that is available is fragmented, and the system needs contiguous memory to open the application. Although memory fragmentation is a temporary situation, in many cases you'll need to close all your applications or even restart to free up this fragmented memory.

Sometimes the system doesn't release the memory that the application was using. When you check your memory usage by choosing **About This Macintosh** on the **Apple menu**, it looks like you have more than enough memory to launch a particular program. But when you try to launch the program, memory fragmentation causes you to get a Not Enough Memory message. You normally have to quit out of your applications to get the memory to defragment, and depending on how badly it's fragmented, you may have to **restart** your computer to make that fragmented memory available to launch programs.

Another strategy to try if you don't have enough memory available to operate a particular application (or set of applications) is to use **Virtual Memory**. This feature (available in System 7 and higher) enables you to set aside a portion of your available hard disk to use as RAM. Virtual Memory is toggled on and off through the **Memory Control Panel**, and there you can decide how much hard disk space will be used for Virtual Memory and which disk will be used as your "virtual disk." A restart is required after making these choices for Virtual Memory to be initiated on your system.

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The downside of Virtual Memory, when compared to actual RAM, is that it is slower than real RAM because you're accessing a hard disk and using it as RAM, and your hard disk is considerably slower than real RAM (which is your fastest source of memory.) The upside is; it's free!

There is also a very popular commercial product called RAM Doubler, from Connectix Corporation (2655 Campus Drive, San Mateo, CA 94403, Phone: 800.950.5880, Web site http://www.connectix.com), which works with System 6.05 or higher, and uses a Virtual Memory scheme to fool your Macintosh into thinking there's twice the available RAM than there really is present. RAM Doubler works quite well, and is especially popular with PowerBook users whose units shipped with a minimum amount of RAM.

The implementation of RAM Doubler is very simple: you install the application and restart your computer. If you had 8MB of RAM before you installed RAM Doubler, upon restart the system will act as though it has 16MB and will let you open applications until you've reached your new 16MB limit. To see how RAM Doubler affects your system, choose the "About This Macintosh" dialog box at the top of the Apple menu with RAM Doubler on. You'll see two figures for memory: Built-in memory (which is the actual figure for your installed RAM) and Total Memory (which is double your installed memory, courtesy of RAM Doubler).

See Also
About This Macintosh; Alert Box; Apple Menu; Launch; Memory; Memory Control Panel; Operating System; Quit; RAM; Restart; Virtual Memory

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Notebook Computers
See
PowerBooks

NotePad

The NotePad, found on the **Apple menu**, acts as a replacement for a regular note pad and enables you to type brief notes. The first time you **launch** NotePad it gives you eight blank note pages to write on, and you can navigate through these pages by clicking the peeled-back left corner.

The pages make a flipping sound as your move from page to page. You can add additional note pages by choosing New Note from the File menu. You can also delete the current page by choosing Delete Note from the File menu as well. If you know which note page you want to go to, you can select **Go To** from the File menu and enter the note page number and you'll move directly there.

You can print any note by choosing **Print** from the **File menu**, which brings you the standard Apple print **dialog box**. If you want to print one copy of the note, you can bypass the Apple print dialog by choosing Print One from the File menu. The NotePad also has its own **find function** to help you find a particular word or phrase within your NotePad pages, by choosing Find from the Edit menu. The NotePad now enables you to set your default

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font for text by choosing the Preferences command in the Edit Menu.

To use the NotePad, follow these steps:

1. Choose NotePad from the Apple menu.

2. You may begin typing notes on the top page, or used the peeled-back lower-right corner to navigate to the page you want to use.

3. To add more pages, choose New Note from the File menu. To Delete a page, select Delete Note. To Find a word, use the Find function on the Edit menu and enter the word you're looking for and choose whether you want to search only the current note or all notes.

See Also
Apple Menu; Dialog Box; File Menu; Find Function; Go To; Launch; Print

Novell NetWare
See
Servers File Server

Now Compress
This is a compression utility replaced by the built-in compression of the Now QuickFiler module that is a part of the **Now Utilities** suite of Macintosh

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enhancements.

See Also
Compression Utilities; Now Utilities

Now Contact

Now Contact and its fraternal twin, Now Up-to-Date, are sold bundled together, as well as separately. The chances are, if you use one, you'll use both. Now Contact has some very good features, chief among them being a Quick Contact icon on the menu bar that brings up a list of people and phone numbers. It's available anytime, even when Now Contact isn't open. Another good feature is the free-form comments area on the individual contact records, which gives you space to enter, or drag-and-drop, information from other applications. You can also view your contacts in a spreadsheet-like list view, but unlike most such programs, Now Contact lets you modify the information in individual cells while in the list view.

The single best feature of Now Contact is its easy integration with Now Up-to-Date. If you open your Now Contact record to make a note of a business call, and decide on a meeting, a couple of mouse clicks will place the meeting on your calendar. If you're on an office network, a few more clicks will schedule your coworkers to attend the meeting, too. The meeting will show up on your calendar and as a contact item in the contact manager. The contact manager also keeps a record of notes and phone calls. The latest version of

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Up-to-Date includes optional ToDo lists on the calendar pages. To Do items can be assigned priority levels (None to High) and marked "in progress" or "done," as appropriate. Unlike previous versions of the software, this one will support wrap-around banners, so that your events can occur over a weekend, or for two weeks at a time. The calendar can be customized with your favorite fonts, and decorated with colorful icons.

QuickPad is a mini-application that comes with and talks to both Now Up-to-Date and Now Contact. It's a convenient way to enter appointments, notes, and other information quickly. Click the calendar icon to set a date and time for your appointment. Click the contact icon to enter the name of the person you'll be meeting with. The information will be transferred to the calendar and contact manager.

Now Up-to-Date
See
Now Contact

Now Utilities

Now Utilities, from Now Software, Inc., (921 SW Washington Street, Suite 500, Portland, OR 97205-2823, Phone: 503-274-2800, Web site at:

http://www.nowsoft.com

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is a popular suite of commercial diagnostic and system enhancement tools that add a host of features, enhancements, and repair utilities to your Mac's system. The individual modules that make up Now Utilities include:

- Now Folder Menus adds the capability to make folders in the icon view hierarchical by adding a black triangle to the folder icon. You can expand the folder into a hierarchical view by clicking and holding on the folder. A hierarchical listing of the folder's contents appears.

- Now Menus enables you to arrange items in the **Apple menu** in any order you'd like, add separator bars to help you organize your Apple menu, and add additional hierarchical capabilities to the Apple menu. It also enables you to add up to two new pull-down menus to the menu bar to use as launchers for frequently used programs or documents.

- Now Profile gives you a detailed report on your Macintosh computer's hardware and software configuration, including software version numbers, installed font listings, printer drivers, **extensions** , and more.

- Now QuickFiler enables you to view all files and folders on your drive in a window and enables you to edit, rename, move, and open selected files quickly and easily. Now QuickFiler also contains a find function for locating files on your hard disk.

- Now Save enables you to set up a time interval for automatic saving of any open documents.

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- Now Scrapbook is a catalog of cut/copy and pastable items that you can arrange, sort, name, and retrieve, that helps you organize and store graphics, text files, sounds, and QuickTime movies you've placed into Now Scrapbook.

- Now Startup Manager manages the loading order of extensions, startup files, **Chooser** items, and control panels to help you isolate conflicts within your system. You can also create different sets of startup items for different applications or different users.

- Now SuperBoomerang adds four **pop-up menus** to the standard **Open/Save dialog box** . The Folder menu enables you to go to any of your most recently opened folders. The File menu enables you to go to the most recent files you've used. The Drive menu enables you to have instant access to any mounted disk, and the Options menu enables you to add folders, rename files or folders, and has a find function. Now SuperBoomerang also puts a recent file/folders menu on the Apple menu, but this feature is already built-in to System 7.5 and higher.

- Now WYSIWYG Menus enables you to customize the **font** menu in applications by making font names appear in their own typefaces, uniting font families, and enabling you to rearrange the sequence of fonts in the font menu for easy organization.

The latest version of Now Utilities (version 6.0) adds some new modules and updates the functionality of many of the existing modules. The new modules include:

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- Now Auto Type enables you to create macros on the fly as you type commonly used phrases, such as your street address, Web URL address, signature, and so on.

- Now Shortcuts enables you to access a set of customizable Finder commands at any time by adding them to a "hot key" combination. If, for example, you've selected a folder, you can access commonly used Finder menu items without having to go up to the various menus by pressing the Now Shortcuts "hot key." A pop-up menu appears where your cursor is, and you can customize which items appear on this menu.

- Now Tabs enables you to have a small row of tabs across the bottom of the screen that give you one-click access to frequently used Finder windows. You could, for example, have your System Folder window, hard disk window, and Apple Menu Items window one click away by adding them to the Now Tabs module.

See Also
Apple Menu; Chooser; Clipboard; Control; Extensions; Folders; Fonts; Norton Utilities; Open/Save Dialog Box; Panels; Pop-Up Menus

NREN
See
Internet

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NSFNET

See
Internet

NTSC

NTSC (National Television System Committee of the Electronics

Industries Association) is a standard for encoding and decoding an analog video signal. It is used in the United States, and several other countries (but there are other standards, such as **PAL**). The signal is made up frames of video, each frame contains 525 lines (a line is a row of phosphors on a television tube, essentially the equivalent of pixels on a computer monitor). This translates digitally to an image of 640 x 480 pixels, because the "lines" aren't all used for holding picture information. The top and bottom lines in the image are called the vertical banking areas. This is used as "blank time"; the time it takes the electron tube in the television set to go back up to the top of the screen to start drawing the next frame.

NTSC is an **interlaced** format. NTSC displays at 30 frames per second (actually 29.97 frames). Each frame is made up of two fields, which are the odd and even horizontal lines of the frame. The electron gun in the television set first draws one field and then the other, creating an interlaced effect. When a television camera records video, it also uses fields; first the odd

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horizontal lines, and then the even horizontal lines are passed to the recording device. If an object is moving rapidly while it is being photographed, feathering can sometimes be seen in the frame. Feathering is a slight offset between the position of the object in the odd lines and the even lines because the object was in a different location when the two fields were recorded. Feathering appears as jagged edges on the object.

See Also
Analog Video; Digital Video; PAL; QuickTime

NuBus
See
Power Mac Logic Boards

NuBus Slots
See
Power Mac Logic Boards

Numbers
Used for setting your preferences for numbers and currency, the Numbers **Control Panel** enables you to set the numbers format and how you want

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decimal points to be displayed. You can choose the default U.S. format or create a custom setup for an international number format and add it to the **pop-up menu** . You can choose the separators for decimals and thousands, what the currency symbol is, and whether the currency symbol appears before or after the numbers. These new settings become the custom settings in the Numbers pop-up menu. A display of the current number format appears in the bottom of the Numbers window.

Being able to choose a number format other than the default U.S. English is helpful anytime you're traveling abroad or if you're working in a foreign country. If you're working in France, for example, where the currency is French francs, you could set up your Mac to treat currency as if it were French francs, which use periods for the thousands delimiter in numbers rather than the comma used to distinguish thousands in U.S. dollars. Also, when writing out the date, many European countries list the day first, followed by the month, then the year, whereas in the U.S. we list month, day, year (9/30/96, for example).

To use the Numbers Control Panel, follow these steps:

1. Open the Numbers Control Panel from the Control Panels submenu on the Apple menu (or System Folder).

2. Choose a number format from the **pull-down menu** . This is also where you can decide whether to display the thousands separator.

4. Separators are chosen from pull-down menus or are entered from the

keyboard.

5. To enter a default symbol, highlight the current symbol and type a new symbol from your keyboard.

See Also
Close; Control Panel

Numbers, International Formatting

The Numbers **control panel** enables you to set how numbers are displayed within your system. You can choose the default U.S. format or create a custom setup for an international number format and add it to the **pop-up menu** . You can choose the separators for decimals and thousands, what the currency symbol is, and whether the currency symbol appears before or after the numbers. These new settings become the Custom settings in the Numbers pop-up menu. A display of the current number format appears in the bottom of the Numbers window.

Being able to choose a number format other than the default U.S. English is helpful anytime you're traveling abroad, or if you're working in a foreign country. If, for example, you're working in France, where the currency is French francs rather than dollars, you could set your Mac up to treat currency as if it were French francs, which use periods for the thousands delimiter in numbers rather than the comma used to distinguish thousands in U.S. dollars. Also, when writing out the date, many European countries list

the day first, followed by month, then the year, where in the U.S. we list month, day, year (9/30/96 for example).

To set your Numbers preferences to an international number format, follow these steps:

1. Choose the Numbers Control Panel from the **Apple menu** .

2. Enter the desired foreign currency symbol, decimal symbol, and thousands symbol.

3. These settings now become the Custom setting and can be chosen from the Numbers Control Panel pop-up menu in the future.

See Also
Apple Menu; Control Panels; Pop-Up Menu

Numeric Keypad

The numeric keypad is styled after the keypad of a calculator and appears on the right side of some keyboards. It's designed so you can quickly enter numbers and easily use Apple's **Calculator DA** . A number of programs enable you to control the movement of the cursor with the numeric keypad.

Controlling the Pointer with Numeric Keypad   You can use Apple's **Easy Access** Control Panel so that the numeric keypad controls your cursor. With Easy Access, you can control the speed and delay time of the **cursor's**

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movements. A number of programs enable to use the numeric keypad to control the movement of the cursor built-in.

The 8 key, for example, would move the cursor up, and the 2 key moves the cursor down. The 4 and 6 keys move the cursor left and right, respectively. You can move the cursor diagonally using the 7 or 9 keys to move up and the 1 and 3 keys to move down.

See Also
Calculator DA; Cursor; Easy Access; Keyboards

nVIR Virus

This virus is also known as nVIR-a, nVIR-b, Hpat, Jude, nFLU, MEV#, AIDS, J-nVIR, prod, nVIF-F, nCAM, MODM, and zero. Once the System file is infected, a counter is set to 1000. The counter is decreased each time the system is started up or an infected application is run. When the counter reaches zero, the virus sometimes says "Don't panic" if MacinTalk is installed. The nVIR virus is not malicious except that it occupies memory and disk space.

See Also
ANTI Virus; CDEF Virus; CODE 1 Virus; CODE 352 Virus; Frankie Virus; INIT 17 Virus; INIT 1984 Virus; INIT 29 Virus; INIT 9403 Virus; INIT-M Virus; MacMag Virus; MBDF Virus; MDEF Virus; nVIR Virus; Scores Virus; T4 Virus; WDEF Virus; ZUC Virus