Care and Feeding of the Macintosh Computer

How to make a proper backup—and avoid needing one in the first place

INTRODUCTION

All hard drives will fail. The read/write head skips across a platter moving at about sixty miles per hour, separated by no more than the width of a smoke particle. Laptop drives are particularly at risk because of potential external forces exerted on the drive while it is operating.

That said, most drive failures are logical—not mechanical. If the invisible directory files (which keep track of where each little bit of this and that are on the disk) become corrupted, the drive can be rendered useless even though all your important data may be entirely intact.

While mechanical drive failure is inevitable and only somewhat preventable, logical drive failure is not entirely inevitable and almost completely preventable. What follows are some simple things your can do to prevent logical drive failure and the best practices for making a backup so it's ready to go when you really need it. Computers have a real knack for failing only when you've got a big deadline.

This article applies to all Macintosh computers running Mac OS X 10.3.x "Panther," 10.4.x "Tiger" and OS X 10.5 "Leopard." The latter has a built-in versioning utility which should not be mistaken for a fail-safe backup.

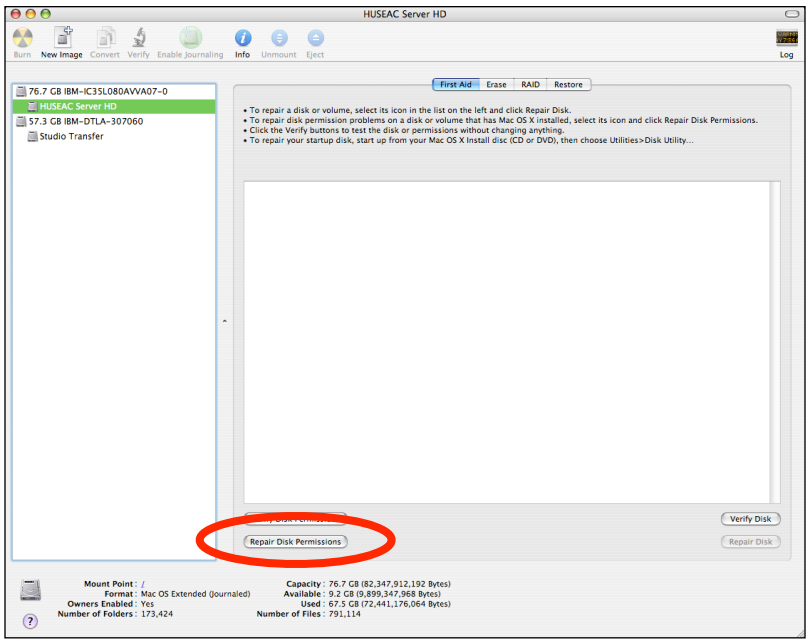
DISK MAINTENANCE

Apple provides a basic tool for disk maintenance with an application named Disk Utility. By default, it is installed in the Utilities folder within the main Applications folder (not a user's Applications folder). This application should be used once a month, more or less, so you might want to drag it into your Dock for easy access.

Among other duties, Disk Utility performs two vital tasks: repairing permissions and repairing disk directories. Permissions are typically munged (a technical term) when installing large, messy (think Microsoft, Adobe, et cetera) pieces of software. It is a good idea to repair permissions before and after large software installations in addition to a monthly regimen. Permissions can only be repaired on a volume that has a functioning OS X system folder. It is not possible, or necessary, on other volumes.

Disk directories cannot be repaired on the same disk that is running Disk Utility but, with OS X 10.4.x "Tiger," Apple has added the ability to verify the directory structure without rebooting the computer. (If you are running OS X 10.3.x "Panther," you'll need to boot from a CD, as detailed below, to perform this directory verification.) After repairing permissions, click on "Verify Disk" to check the disk directories. If the disk passes the test, you are done. If not, you'll need to boot the Mac from the original installation CD that came with the computer or any OS X 10.3.x or 10.4.x installation CD and then run the repair. Step-by-step instructions follow.

Start the Disk Utility application and you'll see a window something like this:



Disk Utility and the "Repair Disk Permissions" button.

Select your startup disk in the left column and click on the "Repair Disk Permissions" button at the bottom. When that is complete, click on the "Verify Disk" button in the lower right corner. (Do this for every disk.) If a disk *other* than the boot volume fails this test, it can be repaired with the "Repair Disk" button—also in the lower right corner. In cases of extreme directory corruption, Disk Utility may not be able to repair the disk completely and other, more expensive directory repair utilities will be required. The best of these is DiskWarrior 4 from Alsoft ($ 99.95). Do this maintenance on a regular basis though, and you should never need to shell out that cash—spend it on an external hard drive for backing up instead!

If "Verify Disk" reports that there is a problem with the *boot* volume, get the original CDs that shipped with the computer or any retail OS X (10.3.x +) system installation CD/DVD and put it into the machine's optical drive. Restart the Mac and, immediately upon hearing the startup chime, hold down the "C" key. This tells the computer to boot from the CD/DVD drive. (You can also select the startup drive in the "Startup Disk" preference pane, but holding down the "C" key is easier.) Keep holding down the "C" key until you see the Mac OS X startup window with a blue progress bar. When the computer is finished booting, the OS X installer will start up automatically. DO NOT run the installer! Instead, pull down the "Utilities" menu and select "Disk Utility." Once Disk Utility is running, select the original boot volume in the left column and click on "Repair Disk." When the repair is complete, restart the computer in the usual way. (Holding the mouse button down while the Mac starts up will eject the CD, speeding up the boot process.)

BACKING UP

Most people back up a few files here and there by dragging them to an external hard drive or burning them to a CD or other optical media. This is not a bad thing at all, but won't be a huge relief when—not if—your hard drive fails. Imagine you've just replaced a dead hard drive with a new, blank one. That CD of Word documents won't be of any use until you've installed the operating system and updates, Microsoft Office, all of its updates, and the registration code which you've got, somewhere… Multiply this effort by every application you use—and all the information required to set them up, email account info, bookmarks, preferences, et cetera—and you'll probably find that *days* of your time will be required.

A better backup solution is to make an exact, bootable clone of your entire hard drive. With a clone available, restoring a computer after a hard drive failure requires only a short time once a replacement drive is installed. Simply boot from the clone, make another clone in the reverse direction, and the job is done.

First, you'll need an external hard drive the same size or larger that the internal drive you're backing up. If it is much larger, say 1.5 times the size, the drive should be partitioned before using it to make a clone. Partitioning is simply a means of defining two or more logical volumes on a single drive mechanism. This can be done with Apple's Disk Utility software, but it will erase *everything* on the drive so only partition a drive before using it for any sort of vital backup. One partition should be the same size as your internal drive—to be used for cloning—and the other partition(s) may be used for anything.

Many varieties of external hard drives are available, but FireWire 400 or 800 drives (with the Oxford 911+ bridge chip) are recommended. While most of the new, Intel Macs can boot from USB drives, older Macs cannot. The overall performance of FireWire drives is better anyway, and the prices are very comparable. Other World Computing carries several lines of affordable external drives with the Neptune among the cheapest.

Second, some software to make this vaunted clone would be handy. While Apple's Disk Utility can make clones, it can only make an entire clone—which is a time consuming process—and it's not all clear how to get Disk Utility to do this and make the clone bootable. What is really needed is a way to make an entire clone only once, then subsequently update the clone with only the parts of the hard drive that have changed. This is called an *incremental* backup and it's a real time-saver. (A *versional* backup adds the step of saving a copy of any file on the clone that is to be replaced with a newer copy.) Apple's new operating system, Leopard (Mac OS X 10.5.x), includes a utility named Time Machine which excels at versional backups, but does not make clones which are bootable—a critical shortcoming. SuperDuper! ($ 27.95 and worth every penny) is the fastest disk cloning tool, but Carbon Copy Cloner does a fine job too and is donationware. Both of these tools are well documented and, when combined with the maintenance techniques described earlier, will create great peace of mind.

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