

The Importance of a Backup

“There are two types of people. Those who don’t backup, and those that will.”

I’m not sure who originally said that but it’s a good quote for starting a discussion of the reasons why you might want a backup as well as a talk on backup media and strategies.

Why backup?

A good back up can provide disaster relief and peace of mind. It can save time and money in the event of disaster. (Hard drive failures and crashes could cost hundreds if not thousands of dollars to “try” and recover the data from Data Recovery services) It can provide a safe place for all our digital “stuff.” It can help preserve memories both now and in the future¹. It can provide a way to “undo” mistakes. And, in an increasingly hostile internet world, help protect us from “hacks,” “adware,” “malware,” and one of the most malicious form of internet schemes, “ransomware².”

How frequently?

I always answer this question by asking “How badly would you feel if you lost an hours worth of work? How about a days worth? Would you feel bad if you lost the last week or month of photos, documents and correspondence on your computer? Would you feel horrible if everything were wiped away?”

I think most people would be devastated about the latter. They’d probably feel that way for a month or weeks worth of data too. I wouldn’t feel great losing an hours worth of good, hard work on my laptop.

Backup apps, media and costs

Time Machine backup software has been built into the Macintosh Operating System since version 10.5 (Leopard). It requires a USB, firewire or thunderbolt connected hard drive. It can back up multiple Macs wirelessly using Time Capsule, Apples hardware router and network connected hard drive.

When you connect an external drive to the Mac for the first time, OS X will ask if you wish to use that drive as a Time Machine backup³. Answering “Yes” to the dialog that appears will begin the backup process. It will backup ALL data from the internal drive the first time. This includes the

¹ No backup is “forever” though. Magnetic media degrades and even CD’s and DVD’s have an expected shelf live of about 10 years (unrecorded) to about 30 - 100 years. At those time frames though, don’t expect a mechanism to be around to read the data. 8-Track tape, reel to reel, floppy discs? Remember those?

² This is a rather nefarious form of Malware in which the files on your computer are encrypted and you are required to pay a ransom for the files to be decrypted, usually in Bitcoins and by a specified time. If the ransom is not paid in time, the amount of ransom is increased. For more information, view this article at wikipedia: <https://en.wikipedia.org/wiki/Ransomware>

³ The drive should be formatted for the Mac.



operating system, applications, your files, photos and music, hidden files and preferences... everything needed to restore in the event of a problem. After this first backup is complete it will then do incremental backups every hour for up to 24 hours, daily backups for a week and weekly backups until the drive is full.

Here's a link to a wikipedia article that gives more information: [https://en.wikipedia.org/wiki/Time_Machine_\(OS_X\)](https://en.wikipedia.org/wiki/Time_Machine_(OS_X))

The price of portable, large capacity drives has become less and less expensive with 1TB (terabyte equal to 1000 gigabytes GB) drives selling for as little as \$60 at places like Apple, Best-Buy, Microcenter, Office Depot and Amazon⁴. Time Capsule retails for \$299. Considering the low cost of storage and the ease of set up, it's a good investment for the protection it offers.

Incremental versus Archival backup

As stated above, Time Machine creates Incremental backups. This type of backup only copies files that have changed since the last backup period and it does this each hour for 24 hours. At the end of the 24 hour period, it consolidates those hourly backups into a daily backup of the most recent changes. It then saves 7 daily backups for a week at which time it consolidates those 7 most recent daily backups into weekly backups until the backup drive is full. This type of backup is useful when you are not concerned about creating archives of your files but only want a means to recover from a hard drive crash or failure or lost or stolen computer. It can also help you recover deleted files but cannot recover a file from a specific date and time. Only an archival (or versioned) backup can do that.

For example:

If your cat accidentally deleted a file from your desktop at 3:15a, you could enter Time Machine, rewind the Desktop to 3a and recover the file.⁵ If you didn't discover the deletion until several weeks later, you can enter Time Machine and progress backwards through the hourly, daily and weekly backups until you find the file and recover it. Time Machine is really ideal for recovering everything from the point of last backup. It shouldn't be relied upon as an archive of older files.

Archival or Versioned backups

This type of backup software is much more sophisticated as it can be programmed to make backups at any designated time and across various storage options. Archival software can be set to backup all files in a given volume (hard drive), directory (folder) or individual files. You can have a variety of backup times scheduled and create backup sets that backup specific data at times you designate and across different media (hard drive, flash, DVD, Tape, Cloud).

For example:

You could set a backup set to backup your documents folder to an external hard drive every day at 6:30p and then backup that folder to the cloud once a week on Fridays at 12a. If you deleted

⁴ Portable drives no bigger than a mobile phone can be had from Western Digital and Seagate.

⁵ I'm making the assumption that the backup schedule is on the hour.

your document folder you would be able to recover that folder (and the files in it) from any particular day since the start of the backup.

If you were working on your Great American Novel in Word or Pages, you could set the software to backup that particular file every hour to, say, Dropbox. That way you could recover any version of your file from any hour of any day since you first created the backup set.

Bootable Backup Solutions

A bootable backup is another good solution for disaster recovery. It creates a fully bootable clone of your hard drive based on a backup schedule you determine. If anything should happen to the drive you start your computer from, you can startup from this external backup clone. However, the data on this bootable clone will only be as up to date as the last backup. For more recent data, you'll need to recover using one of the methods above.

There are several very good, simple to set up and use Bootable Backup programs:

Carbon Copy Cloner (https://bombich.com)	\$39.99
SuperDuper! (http://www.shirt-pocket.com/SuperDuper/SuperDuperDescription.html)	\$27.95
Get Back Up Pro (http://www.belightsoft.com/products/getbackup/)	\$19.99

can also do incremental and versioned backups and sync folders

Backup Media

It's safe to say that almost no one backs up to tape or DVD's much anymore. Especially for personal backups. Hard drives offer the least expensive option with 1TB portable hard drives available for as little as \$60. Flash media, in the form of ubiquitous thumb drives, offer another, though slightly more expensive, alternative. Prices for 128GB thumb drives can be had for less than \$30 or around \$65 for 256GB drives on Amazon.

Hard drives and Thumb drives, connected directly to your computer, offer the fastest, least expensive means of backing up.

Cloud based backup services serve to protect your data even further by creating an "off-site" backup. This is useful in the event of the worse kind of disaster in which your computer AND the backup hard drive next to it are destroyed, damaged, lost or stolen. Because your data is stored in the Cloud, you're able to restore your data to a replacement hard drive.

The problem with Cloud based services is two fold. First, they are impractical for backing up large amounts of data over the slow internet connections most people have. It could take DAYS to back up a 100GB photo library for instance (due in no small part that upload streaming is often 10 times slower than download streaming) not to mention the impracticality of a complete backup of the entire hard drive. Second, most services are subscription based. **Backblaze** (<https://www.backblaze.com/cloud-backup.html>) is a very good service and charges as little as \$5/month for unlimited backup. They also offer to FEDEX your backup on either Flash drive or external hard drive should you need to recover your data quickly (remember that slow internet connection?) As a side note: I had read that FEDEX can actually deliver more data, faster, than even the fastest internet connection just by offering overnight shipping! They can ship Terabytes and Petabytes (1000 terabytes) of data on hard drives, pack it and transport it by plane, but it on a truck and deliver to a doorstep anywhere in the world.

The 3-2-1 Backup Scheme

One of the more comprehensive backup schemes is the 3-2-1 Backup. It states that a safe backup doesn't exist until the following conditions are met:

- You must have 3 backups
- 2 of those backups should be on two different kinds of media
- 1 of those backups **MUST** be stored offsite

Redundancy is a safety measure in the event that whatever affected one drive and caused it to fail doesn't affect all connected backups as well. For example, if a power surge, brown out or black out caused your hard drive to crash, it's possible those conditions could do the same to your backup.

For point 2, having the backup stored across different media, say between hard drive, flash, Cloud, tape or DVD may prevent a glitch that affects a particular type of media. Some media are more susceptible to static electricity for instance. Others have a shorter shelf life.

Finally, keeping 1 of your backups offsite insures that should the worse happen...someone steals all of your equipment, the home or office is damaged or destroyed, your grandkids decide to format your system...this offsite backup can be used to restore your data. For offsite backups you could use Cloud services like BackBlaze, Google Drive, Dropbox or iCloud Drive or create a backup that is on a physical hard drive that gets stored away from the backed up computer.

In Summary

Data is the most valuable item stored on the computer. It is the one thing that can't be replaced by insurance companies the way that hardware and software can be. The memories you've saved; precious photos, videos and audio recordings can be invaluable to you. Documents that you create for work, school or personal use can be difficult, time consuming or impossible to recreate from scratch.

Having some form of backup is key to piece of mind. You may not need a 3-2-1 backup scheme. You could get by with a 2-1 backup in which one of your backups is offsite. Even if you have only 1 backup, like Time Machine, you are ahead of the game. You just need to evaluate how you use your computer, what data is important to you, and then make a decision on the backup scheme that suits your needs.

Yours,

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