

Backup 101

By Phil Davis

January 2020

Everyone should back up their computer. Lots of things can happen that result in data loss – no one is immune, so you should be prepared. If you choose the right hardware and software, backups shouldn't be a burden. What could go wrong?

- You could delete the wrong file or folder.
- You could format your system drive by accident and lose everything.
- You could modify a document, and decide that you liked it the way it was.
- Some of your files could become corrupt due to a hard drive or system problem. Operator error is a common problem!
- Your computer or hard drive could suddenly die. There are two types of hard drives in this world, those that have died and those that will. The failure rate for hard drives in the first 1.5 years is about 5%. After 4 years, the average rate is about 12%.
- You could drop your laptop. Don't laugh, this happens!
- Your computer could be stolen.
- Your home could burn down.
- You could be attacked by a virus or hacker. Ransomware can encrypt everything on your computer.

If you have nothing critical or worth saving on your computer, then you can stop reading here.

Five Things to Consider

1. Backups should be automatic. You don't want to rely upon your memory to make a backup.
2. Backup drives can fail so you might want to back up to more than one drive or have multiple drives you can rotate. Sure, one backup is better than nothing, but if that drive fails, and it will fail at some point, you no longer have a backup.
3. You should keep a backup copy off-site since when terrible stuff happens – theft, fire, tornado, lightning, or whatever – you may lose both your computer and your backup.
4. You should test backups regularly. If your backup drive fails, you won't know until it's too late unless you test it regularly.
5. You need to know how to restore your files from a local or off-site backup, should the worst happen.

Incremental Backups

Some backup apps are great at helping you get back a lost file or folder. Incremental backups save versions of your files along with all changes you make. They allow you to go back in time and fully recover an earlier version of a file or folder you changed or accidentally deleted.

Clone Backups

Clone backups are great if your internal drive fails, or your computer is visited by a major disaster. A clone backup contains an exact copy of everything on your internal drive. Most of the clone backup software can configure the backup so it is not only a copy, but it is “bootable” – this means you can start and run your computer from the external drive. It will be slow, but in a disaster, you won’t really care!

In a pinch, you can take your backup drive to a compatible computer and boot from it as though you were working from your own machine. A clone backup is also typically faster than an incremental backup when you are trying to restore a system. This is because it only contains one full copy of your data.

Be aware though that the clone will be a copy of everything at the time you make the clone. If you delete a file or folder, it may be deleted from the backup too, unless you have configured the software to archive deleted files.

Software

Mac: Time Machine is Apple’s built-in incremental backup solution. Time Machine stores one version per hour for the past 24 hours along with versions from the past few days and weeks. Time Machine is easy-to-use and reliable; however, it is not bootable and may not include all your applications. For clone backups, you will need one of the applications listed below.

- Carbon Copy Cloner [<https://www.bombich.com/>]
- SuperDuper [<http://www.shirt-pocket.com/SuperDuper/>]
- Chronosync [<https://www.econtechologies.com/>]

PC: Windows 10 File History only backs up copies of files that are in the Documents, Music, Pictures, Videos, Desktop folders, and the OneDrive files available offline on your PC. To get incremental or clone backups for Windows 10 PCs you will need one of the applications listed below.

- Acronis True Image [<https://www.acronis.com/en-us/personal/computer-backup/>]
- ToDo Backup [<https://www.easeus.com/backup-software/personal.html>]
- Macrium Reflect [<https://www.macrium.com/reflectfree>]

Hardware

Incremental Backups: An external drive that is 2–3 times the capacity of your internal drive. Small USB-powered drives are good to use for backups, but make sure that the drive supports USB 3.0 or Thunderbolt connectivity. You can use any brand, but since most of

them are pre-formatted for PCs, Mac users must use Disk Utility to format them before using. You can also use network-attached or RAID drives, but these are usually more expensive to purchase and replace.

Clone Backups: An external hard drive at least the size as your internal drive. The drive should support USB 3.0 or Thunderbolt connectivity. You can use any brand, but since most of them are pre-formatted for PCs, Mac users must use Disk Utility to format them before using. You can also use network-attached or RAID drives, but these are usually more expensive to purchase and replace.

Off-Site Backups

An “off-site backup” can be “in the cloud” using a backup service. It can also be as simple as putting an external drive in your safe deposit box or storing it with a friend.

You should have an off-site backup in case of theft or disaster (fire, flood, etc). If someone breaks into your home and takes your computer, they will probably grab any hard drives they see. If your home burns down, is flooded, or gets wiped out by a tornado or hurricane, your backup is going to be just as destroyed as your originals.

The easiest way is to sign up for an online backup service from a place like [Backblaze] or [Carbonite]. For a fee, they will automatically backup your internal drive anytime you connect to the Internet.

The biggest problem with an off-site backup is that upload speeds are usually slow and the initial backup may take several days. Once the initial upload is complete, the backup only saves changes to files and is usually fast.

Both Backblaze and Carbonite require you to create an account, download and install their app, and let it run. Both offer a free trial period of at least a couple weeks (which is good since it will take a while for your files to upload anyway). After that, it’s a matter of leaving your computer turned on, even when you aren’t using it, until the initial upload is completed.

A benefit of a Backblaze or Carbonite account is that you can use a mobile device to get a copy of a file from your account, even when you are not at home. Also, if you lose both your computer and local backup, the companies will send you a hard drive with your entire backup on it.

You can also store a second clone backup at the house of a friend or relative. The problem with this is that you will have to update the clone periodically so that the files will be reasonably current.

Dropbox, iCloud, Google Drive and Other Cloud Storage

[Dropbox] has been around for several years now. When you create a Dropbox account, you have a local folder on your computer and a folder on the Dropbox server.

When you are connected to the internet, every time you save a file to your local Dropbox folder, it gets uploaded to the server folder. If you have Dropbox installed on all your computers and mobile devices, changes to the files and folders will be automatically synchronized.

iCloud functions the same way and has the advantage of synchronizing your data between all connected devices. iCloud is native to the Mac but can be installed on Windows PCs.

There are other cloud storage choices including [Google Drive], [Box], [Amazon Cloud], [OneDrive].

One caution. These services should not be used to replace your local or remote full backups, but they can be useful for saving and synchronizing your current work. Some of them also make it easy to share your work and collaborate with others.

Archives

Many of us are moving from traditional hard drives to lower capacity SSDs in our computers and find that storage space may be an issue. You should manage files on your computer so that you always have at least 20% free space. When you have files you may never need again, but can't bear to part with, you should archive them by saving to an external drive. Some people with large collections of photos, videos, or music find that storing these externally is a good solution.

Your archive drive is not the same as your backup drive. The archive drive must be backed up because it too is susceptible to hardware failure, theft, and other problems that could cause data loss. You must consider this when planning your backup strategy.

Adopt a 3-Legged Stool Strategy

The 3-legged stool strategy calls for:

1. A bootable clone – to guard against complete system loss;
2. An incremental backup – to guard against individual file loss; and
3. An off-site backup – to guard against catastrophic failure.

This will provide a well-rounded backup strategy that will protect you for the inevitable day when you make a stupid mistake, your hard drive dies or disaster strikes.

Do I need a separate hard drive for my clone and incremental backups?

No, but with one important caveat. All hard drives die, and that includes backup drives. If you use one drive for both backups, and that drive has a hardware failure, you will have lost both of them.

How to Format an External Drive

Use Disk Utility to erase (format) a hard disk, SSD, flash drive, or other storage device. Remember, erasing a disk or volume permanently deletes all of its files. Before continuing, make sure that you have a backup of any files that you want to keep.

1. Plug the drive into a USB port on your computer.
2. Select **Disk Utility** from the Utilities window (or launch it with Launchpad).
3. Select the external disk from the sidebar. Make sure that you haven't selected the internal drive, usually called Macintosh HD.
4. Click the **Erase** button, then complete these items:
 - **Name:** Enter a name that you want the volume to have after you erase it, such as **Backup 1**.
 - **Format:** Choose either **APFS** or** Mac OS Extended (Journaled) **to format as a Mac volume. Disk Utility shows the recommended Mac format by default. If you are planning to use the new drive for a Time Machine backup you must use ** Mac OS Extended (Journaled).**
5. Click **Erase** to begin erasing and reformatting.
6. When done, quit Disk Utility.

If you want to format a disk so that it can be read on Mac and PC, you must use a PC format (FAT, ExFAT, or NTFS). Do not use these formats for backing up a Mac.

Important Reminders

1. Keep external drives plugged in and configure the software to backup automatically on a regular schedule.
2. Test the backups. Boot from your bootable clone occasionally. Check your incremental backup every so often to see if you can view and restore earlier versions of files.
3. Make sure you know how to contact your off-site backup services in case you need to recover your data. Phone numbers, email addresses, and login credentials are essential.
4. Keep your software updated.

*Postscript: Many technology experts and writers have discussed the need for backups in blogs, forums, and written articles. While the specific recommendations may vary, the underlying message is the same: ~ **back up your computer!** You could save yourself the agony of restoring a crashed system or the anguish of losing irreplaceable photos and important data.*