

Using Online Storage for Backup is Now (July 2008) Quite Easy

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Introduction

Professional ethics, self-interest, and HIPAA all require health care providers to maintain their Electronic Protected Health Information (EPHI) so that it is accessible and secure under all circumstances. Off-site backups using the internet are now an efficient and economical option to meet these demands but choosing one is a requires care. I have written this article to support deciding and taking action¹.

About 400 companies are in this business and in July 2008 I selected those below as suitable for a small mental health practice, with the most valuable features, and reasonably priced. All prices listed are calculated per month for 10 GB of storage because that seems typical but all of these companies will sell you more storage space.

How Much Storage Do You Really Need?

Here is what you can fit in a 10GB account (depending on their size):

Office documents, word processor files, spreadsheets, schedules, etc.	5,000 or 50,000, or 100,000 documents
Photos	2,000 or 3500 or 5-15,000
Music	2500 or 3500 songs

Bear in mind that many programs (and perhaps all) compress you files which will greatly reduce the size of most text documents and spreadsheets.

Essentially, there are four levels of backups:

1. The (number of) undo functions of a program
2. The frequency of backups to your current hard drive.
You set both of these in the preferences of the application, i. e. in your word processor.
3. Backups to an local external or networked hard disk using a separate backup program (such as Retrospect) or function built into your operating system such as Mac's Time Machine.
4. Backups to an external drive or to a CD/DVD drive in your office which you then take to another safe location for storage.

The subject of this essay is using the internet to provide this last function - safe, reliable, off-site storage.

Some of the online backup programs described below backup newly created files and all changes you make to a file almost immediately (called continuous backup). Thus these programs combine the third and fourth functions (at least when you are using a fast internet connection). As Bill Benet noted, it is essential a RAID function and so very valuable.

Each program and developer has a slightly different model of services whose subtleties are not apparent. Also, the information available from these suppliers is not exactly equivalent or complete. I have tried to indicate advantages and disadvantages and the minima you should seek out.

¹ This project was done at the instigation of Gordon Herz, PhD or Madison WI, and much improved by input from W.E Benet, PhD of www.AssessmentPsychology.com to both of whom I am grateful.

Advice

- Good data management practice requires redundant copies and storage at several locations of the copies. If a file has any value at all, it must be backed up. There must be two full and restorable copies at all times, and the restoration process must be tested and proven. If the data is important, then there should be at least 3 copies, stored in diverse locations. The programs described below all satisfy the remote location requirement, and most if not all keep copies in redundant locations.

- Use these programs to store, easily access, and restore *essential* files but not to recreate a crashed computer. See below on Restoring for more.

- Don't buy on price. These services are quite cheap (I have excluded the high priced ones) and all prices will drop (and/or features will be added) over time. Ease of use and matching your needs are much more valuable. Also, these programs have lower prices for larger storage needs and you *will* have more to store as time goes by.

- All these programs encrypt your data before it is sent over the internet to them (except iDisk which requires you to do the encryption yourself first). Most use SSL (Secure Socket Layer) which uses a 128-bit algorithm and this is what the banks and credit card companies use (probably with a one-time key which these companies may use too. They are not too forthcoming about details and probably rightly so). Some re-encrypt the file at their servers using a longer key/higher security program (446-bit Blowfish is common). The bit size is only important in theory. Shortcuts are used to speed up the process and the true security of your files will depend on the providers' internal security procedures (such as separate employees managing the files and the backing up procedures) and the local laws applied by any investigating agency.

All require you to create a password/phrase which presumably is then used to encrypt your files. Most offer you the option of choosing to use your own key or theirs. The advantage is that if you use theirs and lose or forget yours you can get your files back: the disadvantage is that they could read your files, theoretically. This appears to depend on their internal procedures. Your security is greatly increased by choosing a longer and more complex password (e.g. Different letters, numbers, and cases).

What I have learned is that the file itself and its metadata (owner, date, size, name, etc.) should be stored separately with different encrypting keys so that even if someone were looking for your info and found your account they could not get to your files. Companies have been unclear about whether they do this.

What they backup and when

- Programs will sync (create an identical version of) your computer files and their backup of it so that you always have the most current version of a file available for backup. Some do this almost immediately (real-time, automatic, continuous backup) and some save a file only when you close it. If you have a slow internet connection such as dial-up the latter may be better but continuous backup will recover all the minor changes you make as you work on a document.

However scheduling daily backups after hours is probably sufficient for most practices. Check to see how flexible the scheduling options are for a program you are considering.

- The better programs allow you to choose which files (not just folders or locations) to back up and which to ignore (automated backups) and some allow different schedules of backup for different files.

- If you delete a file from your computer their copy of your original usually will be retained on their system for a month. The disadvantage is that you cannot use these programs or this option for archiving - keeping obsolete files. Exceptions are noted.

- Most programs do incremental (just the changes to a file, not a new copy of the whole file) backups for speed and then link these new files to the old ones. Some programs keep only one file by overwriting the older version with a new one that incorporates the changes (simpler but less desirable).

- Most programs indicate that if the transfer up or down to your machine is interrupted (e.g. dog lays on switch of power strip) the backup will simply resume when the internet connection is restored.

- No program mentions any limitations on the amount you can transfer each month as this is likely to be small (a few GB up and much fewer down - back to your computer from storage on their servers) and so likely to be unlimited. For the more entrepreneurial, their contracts with you prevent your using their storage to sell or distribute stuff.
- All programs limit the size of each individual file you can transfer generally to 5 GB but this is large enough for most clinician's procedures.
- Prices listed here which are based on per GB storage may well be cheaper than "tiered" pricing if the steps are large and if you back up many small files (especially if you are using multiple computers into one account).

Access to and restoring files

- Your system files (Windows, OSX) and applications (e.g. word processors) do not require encryption and can be restored faster from the original CDs/DVDs or better from a clone kept on a local hard drive. For post-crash restoration use a cloning program (like Carbon Copy) or one that creates a disk image (For Macs, use Disk Utility in the Utilities folder in Applications) to create an exact and full copy of your computer (This is also an easy way to move to a new computer.). Making a new version every few months is all that is necessary for this approach when combined with a file backup program (such as Retrospect or Macintosh's Time Machine) and one of those below for offsite storage.
- Some programs allow you to view your data from anywhere you have an internet connection (ideal access) and some allow you only to set up a restore (but perhaps not delete?) to a new computer after a crash or see only the names and dates of your files when you are not at your home computer (better security because someone with access to your account could not read, change, or delete the data).

Other points

- Do you have files that you want to access with a smart phone (iPhone, Blackberry, Palm)? Some programs will do this.

HIPAA

HIPAA requires assuring both the privacy and security of your records but does allow you to decide how to implement the necessary "safeguards" to prevent "foreseeable" threats. You do not need to have "safeguards" against all possible risks, but only to be realistic and thoughtful. (For more on this, see *HIPAAHelp: A compliance manual for psychotherapists* by Ed Zuckerman at www.hipaahelp.info).

Of concern here is that each service has some kind of EULA (End User License Agreement) that you must agree to before using their program and each EULA has some wording to the effect that you agree to not hold them responsible if your data is lost, destroyed, or stolen, etc. There is no way around agreeing to this so I asked each developer about HIPAA.

In late July 2008 I emailed each company about signing a Business Associates agreement to support a Covered Entity like a therapist's safeguarding of EPHI. Even among those companies who understand HIPAA none would agree to sign a BA agreement. This may legally not be necessary for those programs which do not store your data on their servers but use another's (such as Amazon's S3) because they are only conduits or cannot "see" or read your data (because you encrypted it). As conduits they are functionally the same as telephone companies, internet service providers, the USMail, and FedEx which are exceptions to the need for a BA.

Based on their replies, information on their website, my understanding of the HIPAA regulations, and of how computers and the internet work, I have assigned a rating to each company of A = Appears to meet all reasonable HIPAA requirements. B = Seems to meet HIPAA's requirements but they are not clear or not forthcoming. C = Lacks some features so that it does not appear to be a top choice for clinicians. Then I added a plus or a minus for functionality and features relating to backup, storage, and restore functions. Additional security efforts are noted under Safeguards with each company.

I monitor the HIPAA news and I have not seen a case of a key being broken to read medical records (EPHI). All "unauthorized access" cases are credit card theft and similar financial crimes or accidental losses or theft of laptop computers lacking encryption and very similar breaches.

This data was collected in July 2008 N= 12

Name of Program, Website, and Location	Costs ¹	Windows versions. Mac ⁵	Frequency of Back-ups ⁹	Number of Computers, Users per Account	Number of Versions of a file backed up	Safeguards	HIPAA Grade (A+ to C)	Functionality or Ease of Use Grade (A+ -C)	Free trial and size of storage included ⁸	Summary	Comments
Altexa Backup www.altexa.com France2	\$15/mo. or \$120 by the year.= \$10/mo. 1 GB is \$1.50/mo.	Windows only, Vista is not recommended.	Checks for revisions every four hours	No additional charges for more users/accounts or machines	Keeps unlimited versions.	Uses Amazon's servers. Does a second encryption for storage on their servers.	A	A Very complete control of backup jobs. Compression to save space ³	30-days with 100 MB of space.	Excellent Not for Macs or Vista users.	"File access key computed dynamically by the Altexa Backup server when file access is requested - the file access key is valid for only 30 seconds, and for one file only."
Carbonite www.carbonite.com . In Massachusetts, started 5/06.	\$50/yr. = \$4.50/mo. for "Unlimited" ¹¹ storage or \$3.75/mo. if buying 2 years worth of storage.	Windows XP and Vista. Mac version promised.	Continuous back-ups	One computer only but appears to back up attached drives as well and the main hard drive.		Can backup all files and Operating System. It appears that they do keep data and metadata ⁴ encrypted separately. Can use your own key.	A See Comments.	A Backs up internal and external or networked drives.	15-day trial.	Perfectly adequate and very functional. Cheap. Not for Macs.	We encrypt your files twice before backing them up securely offsite." "Carbonite will not share your encrypted files with any third party unless such action is necessary to comply with a government or court order legally compelling us to do so.
Data Deposit Box www.datadepositbox.com Located somewhere on the East Coast	\$2/mo. per GB (not rounded up).	Windows only.	Continual incremental backups,	Unlimited users, computers, transfers ¹⁰	Up to 28 versions so can archive. Won't backup Operating System or Applications.	Responded to my email indicating they do their part for HIPAA and I must do mine such as not deleting some files. Encrypts authentication data. ⁷	B+	B	14-day trial.	Perfectly adequate for Windows. Not for Macs.	File sharing using the web. Many features. Not cheap for archiving or large storage needs but cheap for small files.
DriveHQ4.0 www.drivehq.com In California. In Business since 2003.	\$8/mo. for 6 GB. Free service is 1 GB storage.	Uses Windows Explorer as interface, Mac and Linux versions use a web interface.	Continual and scheduled backups	Can backup four computers in Home Edition.	Presumably can retain all versions but check.	?	B. See comments.	A-	15-day trial.	Perfectly adequate.	Very full featured - variable number of versions, multiple users, drag and drop transfers, data compression, and is part of a much larger set of programs. Mac and Linux versions use a perhaps less functional web interface. Responded to my email without specifics and indicated signing any special agreement would cost more.

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Elephantdrive www.elephantdrive.com Located in California.	1 GB storage is free (Open Edition). Unlimited storage is \$10/mo. or \$100 for a year = \$8.50/mo. (Home Edition).	Windows and Mac but see Comments.	?	Can backup four computers in Home Edition.	"Retains versions forever."	?	B	A-	15-day trial.	Perfectly adequate.	Many options for more complex organizations. Different programs for Windows (Elephant Desktop - more options and control over TrunkDrive) and Macs (TrunkDrive only).
IBackup and IBackup Professional www.ibackup.com Located in California.	Basic is \$10/mo. for 10 GB or \$100 for a yr = \$8.50/mo. Professional is \$15/mo. for 15 GB or \$150/yr.	Windows has regular and Professional but Mac is only in IBackup (in beta in 7/08).	?	Can backup multiple computers and users.	10 in IBackup and 30 in Professional.	Can't choose own key unless use Professional	A+. See comments.	Can set it to power off your computer after a backup.	15-day trial with 5 GB with all features but limited sizes.	Extremely full featured. Not the cheapest but for a small group the Professional version does a lot	Very detailed FAQs. Support: 24/7 Toll-free. Can access data on web and iPhone. Can share/collaborate in Professional version. Can share/collaborate with Professional. This company specifically indicates their support for compliance with the relevant laws: HIPAA, Gramm-Leach-Bliley, Sarbanes-Oxley, and the SEC/NASD (stocks).

Name of Program, Website, and Location	Costs ¹	Windows versions. Mac ⁵	Frequency of Back-ups ⁹	Number of Computers, Users per Account	Number of Versions of a file backed up	Safeguards	HIPAA Grade (A+ to C)	Functionality or Ease of Use Grade (A+ -C)	Free trial and size of storage included ⁸	Summary	Comments
iDisk www.Apple.com/mobileme . Located in California.	\$99/year = \$8.50/mo. for up to 20 GB storage and 200 GB transfer. 20GB more storage is \$49/yr = \$6.25/mo.	Mac and Windows	?	?	Syncing controls deletion of files.	It appears that using a password is the only safeguard available. Transmitted and stored content is not encrypted although the password is. Mac users can use the very secure File Vault program (or Disk Utility also included with the Mac OS) to encrypt a folder and set iDisk to store that folder. Alternatives include PGP and an Automator script.	C	A	60 day trial - very long and includes all services and sizes.	Backup is not central focus so buy if you want the other, well integrated features.	Part of a package - MobileMe (nee .Mac) - of many services and programs which includes online and local backups, remote access to your computer, and file sharing, a website, photo gallery, email (works with Microsoft Outlook), calendar and contacts/phone book syncing, etc.
iDrive IDrive.com from ProSoft-net Corp. Located on the West coast.	IDrive Basic is 2 GB free. 150GB storage for \$4.95/mo. or \$49.50/yr. with Pro version	Windows and Mac with different features.	Backs up open files every ten minutes so you don't have to close a file	One computer.	It seems that the Mac version stores files but only over the last 10 days (with daily Snapshots) so can't archive. Windows seems to store 30 versions without regard to date.	Backs up attached external and network drives. User can choose a key which is not stored by them. Encrypts authentication data as well as your content.	A+. See Comments .	A. User manual is downloadable. Large FAQs.	15-day trial	Very functional with large storage but limited to one computer. Mac version not good enough.	Can backup applications. Can shut down automatically after a nightly backup. This company specifically indicates their support for compliance with the relevant laws: HIPAA, Gramm-Leach-Bliley, Sarbanes-Oxley, and the SEC/NASD (stocks). Page is just like IBackup. Has an additional page showing they understand HIPAA.

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Jungle Disk Desktop Edition www.jungledisk.com In GA. Founded 2007.	Software program is \$20 (lifetime cost) after free trial. Storage is \$0.15/mo. per GB. plus \$0.10 per GB uploaded & \$0.17/downloaded. See Comments for more.	Windows, Mac, Linux.	User selectable.	Multiple computers.	No deletion when you delete on your computer so can archive.. Each file is limited to 5GB but the number of files in a folder is thousands.	You can choose the encryption key. The program constructs a unique key for each file transfer. Uniquely you can use JD's backup program or any other (including Windows Home Server) such as ChronoSync.	A. "when properly configured, JD meets applicable HIPAA requirements"	A. Manual is downloadable, Only FAQs and support forums not email or phone. No email notification of completed backups.	30-day trial.	Very inexpensive even with Pro services. Highly reliable storage company and open source programming are very reassuring.	Jungle Disk is a separate company but uses Amazon.com's S3 storage and servers. Can backup OS and applications. No limits on transfers because these are priced separately. The Plus version allows web access to files/file sharing, automatic resumption of transfers that are interrupted, and "block-level file updates" (incremental backups for very large files) for \$1/mo. more Estimated costs: For a small practice with 10 GB stored and 5 MB per month transfers total cost is ~ \$2.15. For a group with 20 GB stored and 10 MB transferred it costs ~\$3.75 per month.
Mozyhome www.mozy.com Location unclear.	Free 2GB account. \$4.95/mo. for unlimited storage in Home Edition. The business version, MozyPro does much more for \$4/mo. & \$0.50/GB stored.	Windows (using NTFS, not FAT 32) and Mac (in beta).	Incremental backups. Automatic (real time, of all changes) or scheduled backups.	One.		Backs up MS Outlook files as well. Can select your own key.	B	B Only email support. Clean interface.	Free permanent account.	Best for one computer offices with large dead storage needs.	Mozy is now owned by EMC, a huge data storage company. Response to Email: No address to ask.

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SugarSync www.Sugarsync.com . Located in California.	\$2.49/mo. or \$25/yr. for 10 GB.	Both	?	Multiple	?	Metadata/ authentication data is apparently encrypted as well.	B	A. Very functional Manager interface. Support by forums, email, and chat.	45 day trial with 10 GB.	Best for very mobile practices.	Big features are that it synchronizes, backs up, and shares files, across PCs and Macs, laptops and phones (Blackberry, iPhone) without using cables. Response to Email: No address to ask.
Webroot Secure Backup http://www.webroot.com/En_US/consumer.html Located in Colorado since 1997 with US-based support.	\$49.95/yr for 10 GB = \$4.16/mo.	Windows only	?	For up to 3 computers but number of users per accounts is unclear.	?	The program backs up files to online as well as to attached local drives or media.	B	? Web access to files. Can share files securely.	30-day trial with 2 GB storage.	Seems to be a very capable company (in light of its other products) and price is low.	Not tried. Website is poorly linked. It seems they prefer to serve large clients. This is one of several programs from this company. For extra cost they provide individualized support.

Footnotes

1. Costs are for 10 Gigabytes of storage paid each month and lower priced yearly fees are noted when advertised. Prices may have changed when you go to their sites.

2. Company is in France which may be an asset as European privacy laws are much stricter than in the US.

3. Compression of files before transmission to the backup servers is a minor advantage for photos but major one for documents. However this may be so common that it is not mentioned by many programs.

4. Metadata is the information about the file such as its owner, date of creation, size, encryption algorithm, passwords, etc. Keeping this separate from the data (contents of the file) is more secure.

5. Macs can, of course, run any Windows program under emulation with the built in BootCamp program or inexpensive and more functional programs like Parallels. Windows programs often run faster on a Mac than on a Windows PC. However to emulate you must buy MS Windows, keep your virus programs up to date, download patches, etc. If you are considering buying a Mac in the future you might want to choose a program which is Mac-friendly (“cross-platform”) so you won’t have to change later.

6. (removed)

7. I believe all of these programs encrypt the authentication data (which might be the same as what is called metadata) as well as the files' contents before sending data over the internet. Some companies note this but most do not.

8. The longer the free trial the better because it allows you to test out the backup (and restoration) of more of the kinds of data your practice and habits generate. The size of the storage offered during the trial matters little unless you will be storing very large photo collections or small video collections because text takes up little space.

9. It appears that all the programs allow you to schedule backups from say monthly down to continuously (that is, with every change you make to a document). However, I believe you should rely on your computer's or your applications' own backup options for very frequent (say every 5 minutes) backups because not doing so means you will have no backups when you are not online. For example, I have set my word processor to backup changes I make to open files every 3 minutes because I believe I can recover lost changes using the undo function (set to 25 undos) more easily than finding and restoring a backup.

Note that I am unsure that developers (or their lawyers) know the difference between "continual" and "continuous."

10. Being able to combine files across users computers is a great advantage for saving storage space/ costs and simplicity but means access to each user's data must have separate passwords to make it private. Only trying out the procedures of each product can tell you if this is implemented, I'm sorry to report.

11. "Unlimited" may not be truly unlimited with limits on file size, transfer rate, or even "unreasonable" use.

Appendix

These were not evaluated.

BackupAgent

(www.backupagent.com)

Only larger companies.

Company is in the Netherlands (which may be an asset as European privacy laws are stricter than in the US).

iStorage. Home edition

www.iomega.com

\$36/mo. for 10 GB.

Too expensive.

Multiple computers backup to one account. 30-day trial. WhaleMail allows emailing of giant files. Manuals available as downloads. Tutorials.