

BACKUP STRATEGIES

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BACK UP MY HARD DRIVE?

**HOW THE HELL DO I PUT
THIS THING IN REVERSE?**

Backup?

- What is backup?
 - A backup is a second copy of all your important files — for example, your family photos, home videos, documents and emails.
 - Instead of storing it all in one place (like your computer), you keep another copy of everything somewhere safe.
- But why should I backup?
 - Losing your files is way more common than you'd think.
 - Ever lost your phone, camera or tablet? That counts. Your stuff could have been saved with a backup.
 - One small accident or failure could destroy all the important stuff you care about.

Backup?

- Factoids:
 - 30% of people have never backed up
 - 29% of disasters are caused by accident
 - 113 phones lost or stolen every minute
 - 1 in 10 computers infected with viruses each month
- So how do I backup?
 - Most people backup their files in one of two ways: to an external drive, or somewhere on the Internet.
 - It's really easy, and you only need to set it up once!

Types of Backup

- **Full**

- This type of backup makes a copy of all data to another set of media, such as a disk or tape.
- The primary advantage to performing a full backup during every operation is that a complete copy of all data is available with a single set of media.

- **Incremental**

- Result in copying only the data that has changed since the last backup operation of any type
- The benefit of an incremental backup is that it copies a smaller amount of data than a full

Types of Backup

- **Differential**
 - Similar to an incremental the first time it is performed, in that it will copy all data changed from the previous backup
 - Each time it is run afterwards, it will continue to copy all data changed since the previous full backup
- **Mirror**
 - A mirror backup is comparable to a full backup
 - The backup is a mirror of the source data, thus the name
 - All the different backed up files are stored separately, like they are in the source

Types of Backup

A comparison of different types of backup

| TYPE/BACKUP | FULL | MIRROR | INCREMENTAL | DIFFERENTIAL |
|-------------|----------|-------------------|-----------------------|-----------------------|
| Backup 1 | All data | All data selected | – | – |
| Backup 2 | All data | All data selected | Changes from backup 1 | Changes from backup 1 |
| Backup 3 | All data | All data selected | Changes from backup 2 | Changes from backup 1 |
| Backup 4 | All data | All data selected | Changes from backup 3 | Changes from backup 1 |

Types of Backup

A backup strategy's impact on space

| COMMON BACKUP SCENARIOS | MEDIA SPACE REQUIRED FOR ONE MONTH (20 TB @ 5% DAILY RATE OF CHANGE) | MEDIA REQUIRED FOR RECOVERY |
|--|---|--|
| Full daily (weekdays) | Space for 22 daily fulls (22 * 20 TB) = 440.00 TB | Most recent backup only |
| Full (weekly) + Differential (week-days) | Fulls, plus most recent differential since full (5 * 20 TB) + (22 * 5% * 20 TB) = 122.00 TB | Most recent full + most recent differential |
| Full (weekly) + Incremental (week-days) | Fulls, plus all incrementals since weekly full (5 * 20 TB) + (22 * 5% * 20 TB) = 122.00 TB | Most recent full + all incrementals since full |

What to Back Up (In Addition to the Obvious)

- Browsers
 - Don't lose carefully cultivated browser bookmarks or favorites
 - The browsers will back up data like bookmarks, history, add-ons, even your open tabs in some cases—and sync it across browsers and computers
- Email
 - If you're using a web-based email system all your mail is in the cloud, controlled by big companies, what could go wrong? Well, even big companies have outages and get hacked
 - Client software like Outlook with Microsoft Office 365 is the preference of many, but the backup situation is a lot more complicated

What to Back Up (In Addition to the Obvious)

- Drivers
 - Drivers are the software that lets your PC talk to video cards, printers, scanners, and the like
 - If you don't back up, you may have to rummage through manufacturers' websites to grab drivers during a PC restore
 - That might be the better way to go
 - Then you'll have the most up-to-date drivers all digitally signed and from the proper source
 - It will take more time, but may benefit your PC and you in the long run
- Social Networks
 - Backup not available
 - Get copy of your data

Backup Strategies

- Select Files and Folders
- Cloud Storage and File-Synchronization Services
- Online Backup Services
- Cloning a Full Disk Image

Select Files and Folders

- Use software that will let you pick and choose which files you want to save
- You need at least two copies
- Back up entire folders on a recurring basis to ensure that newly created or updated files get backed up at a later date
- Windows 10's integrated Backup and Restore
 - Create a full system image
 - Create a repair disc
- Windows File History

Cloud Storage and File-Synchronization Services

- Synchronization software ensures you have the same files on all your PCs – make a change to a file and it's automatically available to all the other PCs
- They always include a backup of files online, which you can access anywhere, even via smartphones
- It's the ultimate in redundancy
- Vendors
 - Dropbox
 - Google Drive
 - Microsoft OneDrive

Online Backup Services

- Online backup, once a bit specialized, is now the norm for important files
- Straight backup products lean toward direct transfer of files from a hard drive to online/cloud storage, with easy restoration options
- Some include file syncing, but you're more likely to see security as the bigger option
- Storage is online
 - you can typically read files via the browser
 - restore the files to other systems
- Vendors
 - iDrive
 - SOS Online Backup
 - Acronis True Image
 - Carbonite

Cloning a Full Disk Image

- Use software to copy all the files from the drive to another (larger) drive
- Do a full disk-image backup on a regular basis, with data included using software that can read images and selectively pull files for restoration when necessary
- You will need a very big backup destination drive to pull it off
 - typically an external hard drive
 - your own home network storage option
- Vendors (free)
 - DriveImage XML
 - Clonezilla
 - Macrium Reflect Free
- Recommend high-end paid solutions if you plan to make cloning a habit

The 3-2-1 Backup Rule

- An easy-to-remember acronym for a common approach to keeping your data safe in almost any failure scenario
- You need at least three copies of your data, meaning the primary data and two backups of this data
- Multiple copies protect you from losing your primary data together with its only backup copy

The 3-2-1 Backup Rule

- **Three** copies of your data
- Store **two** backup copies on different devices or storage media
- Keep at least **one** backup copy offsite
- Storing copies of data in multiple locations ensures that there is no single point of failure
- Your data is safe, should something happen to any of these locations.

Mobile Backups

- iPhone Backup -- iTunes
- Android Phone Backup -- Google Account

World Backup Day

- “I solemnly swear to backup my important documents and precious memories on March 31st.”
- I will also tell my friends and family about World Backup Day - friends don't let friends go without a backup.

HARD DRIVE FAILURE



**BACKED UP THIS
TIME**

References

- <http://www.worldbackupday.com/en/>
- <https://www.pcmag.com/article/250364/the-beginners-guide-to-pc-backup>
- <https://www.pcmag.com/feature/362617/how-to-back-up-and-restore-your-iphone>
- <https://www.pcmag.com/feature/363024/how-to-back-up-and-restore-your-android-phone-or-tablet/9>
- <https://www.pcmag.com/news/348565/how-to-back-up-restore-your-documents-in-windows-10>
- <https://www.nakivo.com/blog/3-2-1-backup-rule-efficient-data-protection-strategy/>
- <https://searchdatabackup.techtarget.com/feature/Full-incremental-or-differential-How-to-choose-the-correct-backup-type>