What is Data Recovery? How does Data Recovery Work?

How does data recovery work? How much data can be recovered? How much does data recovery cost?

We've all experienced data loss, whether it's due to a hard drive failure, data corruption, or accidental deletion of a file. If you've ever experienced a serious data loss, you've probably wondered if it's possible to recover data. But how does data recovery work? How much data can be recovered? How much does data recovery cost?

Find out with TipsMake through the following article!

Data loss and data recovery

Data loss can happen in many forms: Accidental deletion, hard drive failure, software failure, data corruption, hacking, etc. Even a simple power failure can cause you to lose data. . And, of course, there are more extreme cases, like when a hard drive is recovered from a plane crash. Incredibly, data recovery professionals are able to retrieve data from almost completely destroyed storage media.

If a piece of data used to be on a hard drive, SSD, USB, RAID, or other storage medium, you can hire someone (or buy data recovery software) to restore your data. Simply put, data recovery is about getting back and repairing lost data.

Of course, it is not always possible to recover the data. Sometimes the data storage device is damaged or has a problem that makes data recovery impossible. However, data recovery technology has become extremely advanced. For example, Kroll Ontrack, an Australian data recovery company, recovered 99% of the data from the hard drive on the Challenger spacecraft after it exploded.

How does data recovery work?

The methods used to recover lost data depend on how the data was lost in the first place. Let's take a look at some of the most common forms here.

Delete files

On a regular hard drive, any file you delete actually stays on your drive until it is overwritten with another file. This means that if you act fast, you have a great chance of recovering your files. In case of file deletion, you can use file recovery software like TestDisk. This free and open source data recovery tool uses a complex algorithm to analyze information left on the hard drive to determine where files are physically stored. If the tool guesses right, you will get the file back. Otherwise, unfortunately you are out of luck.

However, doing anything on the computer can result in the file being overwritten and possibly lost forever. Even browsing the Internet can result in cookie or cache files being stored in that location, overwriting the information you want to retrieve. Even installing file recovery software to try to recover data can do the same thing. If the file has not been overwritten, the chances of getting the file back will vary depending on your file system format.

> For example, the Windows NTFS system retains file descriptor information after the file has been deleted, making it relatively easy for recovery software to find the file. However, other systems, such as UTF and FAT, destroy more information about the file when it is deleted, making it harder for recovery algorithms to guess the file's location on the drive.

You will note that the above relates to hard drives, the older spinning disk devices, found in millions of devices. However, many people now use SSD drives instead of traditional hard drives. SSDs handle deleted data and data recovery differently than traditional hard drives, and you can read more about SSD data recovery in the article: Recover Lost Data on SSD.

File is corrupted

You know how frustrating it can be when you see the error "corrupt hard drive." However, it is still possible to recover data, even if you see these errors. this shocking word.If you attach the hard drive to another computer, you may find that only the operating system is damaged and the rest of the data is fine.In this case, just copy everything to one drive. other hard.

Another option that can help you with this problem is a damaged partition table, which can be repaired with the right software. If you can successfully repair the partition table, getting all the files back will be easy. If not, you might still be able to recover enough information from the table to get some of your files back, although that very much depends on the extent of the damage.

Even if the files you're trying to recover are damaged, there's still a chance that you can get their usable parts back using data recovery software; As long as the software can find the file, it will try to recover the file. While you may not be able to use what you get, there's always a chance that you get part of the file back, which can save you a lot of time compared to trying to recreate the file.

Format or damage the file system

Similar to file deletion, formatting the file system destroys information about previous files and the structure of the drive, but the amount of data deleted depends on the format of the system.

For example, formatting with FAT destroys large amounts of data, rewriting that portion of the drive with zeros, greatly reducing the chances that you can recover your data. Some file systems, like NTFS, have a higher chance of recovery if they are overwritten with the same file system, while others actually have a smaller chance if they are overwritten with the same file system. system - overwriting XFS with FAT makes FAT files recoverable.

In the event of file system damage, the number of files that can be recovered depends on the extent of the damage and the allocation information available to the recovery software. If there is enough information for the recovery software to repair the file system and correctly locate the previous files, you should be able to recover a bit.

Physical drive damage

Recovering deleted or formatted files is one thing, getting files out of a damaged drive is another. While no special technical skills are required to install and run recovery software, handling a severely damaged drive is best left to professionals, as this often requires the drive to be disassembled.

It's hard to get the hard drive out without damaging it. Data recovery experts will open damaged drives in a clean room, highly controlled environment, with virtually no environmental contaminants. Even a small speck of dust on a hard drive can damage the read/write head and cause more problems with the drive. Static electricity can also cause damage, so these rooms, the equipment used in them, and the clothing the technician wears are all specially designed to minimize static electricity.

When a hard drive fails due to physical damage, it can be related to a number of factors, such as a damaged controller board or a dropped reader. Sometimes these problems can be fixed by replacing the damaged part, but in general, if there is physical damage to the hard drive, you will need some serious work done by professionals.
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If you take your drive to a data recovery specialist, they'll take a number of steps, from rebuilding parts of the hard drive to creating a disk image, and doing their best to repair the damaged parts with software. sophisticated soft. The cost of rebuilding, proprietary imaging technology, and maintenance in cleanrooms are things that can drive professional data recovery costs up to several thousand dollars (however, some vendors currently may offer a more reasonable price).

SSD data recovery

Recovering data from an SSD is more difficult than recovering data from a traditional hard drive. However, some of the same techniques can be used to recover deleted or formatted data.

However, recovering data from a physically damaged SSD is expensive.

Software and data recovery experts can do a great job of getting your data back, but it's not 100% certain, time consuming and expensive. The best measure you can take to prevent data loss in the long run is to create multiple backups! Use a cloud backup provider, keep a spare hard drive in your home, and make sure you're not affected by voltage spikes or random formatting.

The most important thing to remember when it comes to data recovery is to remove all power to the lost drive as soon as possible. Whether it's an HDD or an SSD, the sooner you stop any activity on the drive, the better your

chances of recovering your lost data.

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