**Why is SSD not a good option for long-term storage?**

Source: <https://www.quora.com/Why-is-SSD-not-a-good-option-for-long-term-storage>

[](https://www.quora.com/profile/Kim-Mohito%22%20%5Ct%20%22_blank)

[**Kim Mohito**](https://www.quora.com/profile/Kim-Mohito)

, B.E. Network Systems Administration & Information Technology, Malaysian Institute of Information Technology, …

[Answered March 16](https://www.quora.com/Why-is-SSD-not-a-good-option-for-long-term-storage/answer/Kim-Mohito)

It’s not bad, but the long-term viability of SSDs is less well-known, simply because they haven't been around long enough for any definitive studies to provide the answer.

A solid-state drive doesn't contain the moving parts of a hard drive. The spinning platter (the disk), the arm and the magnetic head are absent, and flash chips are used in their place.

This means an SSD is not vulnerable to head crash in the way that a hard disk is. The added durability gives the SSD an obvious reliability advantage, especially when it comes to shock or exposure to less than optimum environmental conditions. They're also not affected by magnets.

However, it should be remembered that the other components in an SSD are the same as those in a hard drive, and are no more or less likely to fail. SSDs are also extremely susceptible to power failure, leading to corruption of data or even the failure of the drive itself.

With solid-state drives still being in their relative infancy, it will likely be a few more years before we get a true picture of how well they hold up to repeated use.

The lifespan of each memory block in an SSD is limited to a certain number of write cycles i.e. the number of times a piece of data can be stored to it.

The number of cycles will only be a few thousand on most drives. This sounds alarmingly low but is not really an issue in modern SSDs. Unlike hard drives, which write their data to the earliest free block, an SSD uses a technique called wear-levelling to ensure that each memory block is used before the cycle begins again at the first block.

Unless you're writing tens of gigabytes of data a day, every day for several years, you won't get close to the limit on write cycles. Even if you did, the memory would become read-only, so your data would still be accessible.

All this means that SSDs are a great choice for day-to-day storage over HDDs, so long as performance is a bigger priority than capacity, given the relatively higher price of a solid-state drive.

An SSD is not a good option for long-term storage, though.

How long an SSD can store data without power depends on a number of factors including the number of write cycles that have been used, the type of flash memory used in the drive, the storage conditions and so on. A white paper produced by Dell in 2011 ([PDF link](http://www.dell.com/downloads/global/products/pvaul/en/Solid-State-Drive-FAQ-us.pdf)) stated that it could be as little as three months to as much as 10 years.

Many SSD manufacturers will list data retention either as part of the specification or the warranty for their drives. The JEDEC Solid State Technology Association sets the industry standard at one year for consumer drives.

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Desktop enthusiast

[Updated April 2](https://www.quora.com/Why-is-SSD-not-a-good-option-for-long-term-storage/answer/Sumit-Singh-275)

It's not true much! Consumer grade WD-Blue SATA SSD is advertised to have a MTTF (Mean time to failure) of 1.75 million hours or around 200 years. Most SATA HDDs start to show symptoms of some sort of degradation like lower average speed across all tracks or clicking noise caused by aggressive power-down frequency that also in turn make your average read/write speed worse than when it was new, within 20 years. SSDs only need trim command once in a while (depending upon how much rewrite operations are performed within a given time) to restore its speed to stock.

If a SSD is powered off for a very long time, as they say, it might lose the data like poof. Apart from that, a good quality SSD should be better for long term reliable storage.

But that's all theoretical. I believe we need like a decade of more data regarding SSDs' reliability to actually conclude if it really turns out more reliable for average consumer.

Also most people who care enough will have moved their precious data to newer, much faster and bigger storage of that time making the old drives no matter how much “MTTF" it had back then useless.

Hence, it looks like if you're not one of the NSA level enthusiasts in keeping and using old data for multiple decades, it shouldn't concern you whether you buy a good quality HDD or a good quality SSD specially for long term data storage.

And besides all of that, the most important factor in my opinion is the quality of the DC input voltage and voltage stability within the tolerable range as required by your storage device. For example, the Seagate Barracuda (2018) HDD has tolerance of +/– 10% for +12v input and +/– 5% for +5v input. SSDs must be following similar limits to input voltages too. What this means, is, that, if your computer's power supply (SMPS) goes bad to a level that can't provide voltage within those range, chances are your SSD or HDD will go prematurely kaput and it can happen way before it reaches its “MTTF" limit.

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[](https://www.quora.com/profile/Wayne-Francis%22%20%5Ct%20%22_blank)

[**Wayne Francis**](https://www.quora.com/profile/Wayne-Francis)

, Amateur astronomer for over 2 decades.

[Answered May 26](https://www.quora.com/Why-is-SSD-not-a-good-option-for-long-term-storage/answer/Wayne-Francis)

[Franklin Veaux](https://www.quora.com/profile/Franklin-Veaux) ‘s answer is a good one. Note to many people about “long-term storage” while SSD’s are shorter term than other electronic media the others aren’t as long term as many people might think.

Not only do various media have various problems with data corruption just due to aging the hardware and software needed to access the media often become obsolete and eventually extremely difficult to find.

I’ve had a number of clients over the years want to restore some information they had on some type of back up to realise they no longer had the equipment to read the backup or if they did their computer couldn’t use the equipment.

Those burned CDs or DVDs you might have full of photos? They only have a 2–5 year shelf life. The data on them degrades. Magnetic hard drives have a similar problem. The magnetic charges degrade at about 1% a year without being refreshed. Sit a hard drive on a shelf for a decade and you’ll get corruption just by signal loss. For some files it isn’t a big deal. If a few bits change in an image the odds are you’ll not even notice. If it is a program it could easily be in locations that don’t cause critical failure.

If you have old systems you might have backed up some stuff to tape drives. If you did I’m betting you don’t have the hardware to recover it and even if you did the tapes degrade their data too.

So how should you back up your data? My suggestion is back it up to some cloud based service. Let a reputable organisation like Google etc manage you data. They make sure it is stored redundantly and because of upgrades the data gets refreshed on to new hardware more frequently than you’d probably do at home.

[](https://www.quora.com/profile/Michael-Mcdonald-121%22%20%5Ct%20%22_blank)

[**Michael Mcdonald**](https://www.quora.com/profile/Michael-Mcdonald-121)

Semiconductors for many (many) years at Various Companies (1989-present)

[Answered Thu](https://www.quora.com/Why-is-SSD-not-a-good-option-for-long-term-storage/answer/Michael-Mcdonald-121)

**Expense**and **reliability**.

SSD is one of the more expensive $/bit solutions out there. If you aren’t going to touch it often and performance isn’t a requirement (both are typical in archival solutions), it is a fairly expensive option and doesn’t leverage well the values of SSD/flash. (Think of a Facebook or YouTube that stores millions of videos and pictures forever, some of which - like your meal from last night - will never be looked at again. Store those pics on cheap storage…)

Of course, SSDs are coming down in price, but much of that comes from using new flash technologies: SLC, MLC, TLC, QLC, …. These technologies are basically increasing the numbers of bits per cell; this lowers the $/bit, but it comes with a penalty. Voltage differences between levels becomes smaller. Over time, a degraded voltage could be mistaken for another value, especially as the voltage levels converge with more bits/cell; this would corrupt your data. In short, SSDs achieving lower cost through more bits/cell flash memory are more likely to be less reliable.

HDDs also have issues; an unused hard drive, like an unused car, doesn’t always start up like it is supposed to after a long sabbatical.

Tape can also have issues, with drying and breaking of the tape over time.

Host issues also can create issues over time. If you stored your data on a SCSI drive years ago, good luck finding a modern host bus adapter card or computer that can talk to it.

Of course, you can add redundancy to your data using RAID technology, but even that has issues. RAID 5 does a great job rebuilding an array, but large drives can take so long to rebuild that a second drive could fail during that time, making a brick out of your storage solution. And then if you accidentally pull the wrong drive out of an array, more problems.

You can store the data remotely, but what if that data center becomes flooded or a natural disaster occurs or a fire happens… choice of technology and RAID may not make any difference. This has also happened.

So, interestingly, some people are foregoing technologies like RAID, and just mirroring data to multiple sites. They can then take advantage of new storage technologies as they emerge: failure on the old storage medium means you make a copy to the new storage medium. And $/bit is small, so you have multiple copies in the cloud, further improving reliability. While still likely being less expensive than SSD.

170 views

dd Comment

[](https://www.quora.com/profile/Ewan-Marshall-2%22%20%5Ct%20%22_blank)

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lives in The United Kingdom

[Answered June 10](https://www.quora.com/Why-is-SSD-not-a-good-option-for-long-term-storage/answer/Ewan-Marshall-2)

Depends on what precisely we mean by long term storage.

Do we mean we unplugged it and sat it on a shelf?
Do we mean we have it plugged in and wrote the data once then just left it plugged in so it has power?

Most SSDs if unplugged will keep data for about 10 years (though this isn’t guaranteed, it is on the order of years, not days) if just left on a shelf. It needs power now and then to recharge the cell capacitance but it doesn’t need to be used. As Frandklin points out in his article, electrons can leak and so it comes down to how quickly this happens.

Reading the data is also fine, on an SSD we generally read data at 3.3V (NAND Flash, which most today are). To write the data we need to do this at 12V, that puts a lot more energy through the cells and causes a little damage.

Upshot of this, if one can maintain power or even just power it up once every 5 years or so, the data should remain in a reasonable quality SSD (I’m sure there is some poorly cheaply made NAND flash chips in USB memory sticks or something that can’t even manage this) but writing and rewriting data will hurt an SSD.

* It should be noted, other media has issues too that we need to think about when it comes to long term storage:
For magnetic media, Earths magnetic field is a constant magnet, and changes in Earths magnetic field can cause issues (this is rare, but can happen and we are talking long term here. This can be decreased by good climate control of the storage location and having the drive data checked and corrected using ECC if need be.
* Hardrives specifically, the mechanical components are housed within the drive and they need to be run from time to time to those moving parts from siezing up.
* Optical media can be affected by light and degrade over time if not stored in darkened conditions.
* All depend on availability of supporting hardware when one wants to read the data again, whether that is a blueray reader, or a sas interface.

The real question is, how long term do we need? 10 years, 50 years?

mment

[**Jerry Lucas**](https://www.quora.com/profile/Jerry-Lucas-2)

, retired DEC computer design engineer, small business owner

[Answered May 21](https://www.quora.com/Why-is-SSD-not-a-good-option-for-long-term-storage/answer/Jerry-Lucas-2)

Originally Answered: [Is an SSD reliable for long term storage?](https://www.quora.com/Is-an-SSD-reliable-for-long-term-storage?no_redirect=1)

SSD product specifications do not guarantee a data retention time.

Any storage device can fail at any time, so always keep multiple backup copies of important files.

A proper **active archive**strategy does periodic data integrity checks so that data problems are detected quickly and bad files can be replaced with known good copies.

A **passive archive**strategy is not recommended since you will not know if the data is good or bad until you attempt to restore it.

There is some backup software, such as **Acronis True Image**, that includes a scheduler to do automated periodic data checks to detect and report problems.

When an SSD reaches its end of useful life, the data retention time is shorter. So, look at the **Terabytes Written (TBW)** and don’t use it for a long-term archive if the actual TBW is near or over the device rating.

There are many anecdotal reports of flash drives and SSDs retaining data for many years, but that is not a manufacturer’s product specification.

I only use Samsung flash drives and SSDs and have never had a failure. They have a 5-year warranty and I replace them about every 5 years with newer technology.

I also keep backup copies of important files on SpiderOak encrypted cloud storage, 600 miles away, for disaster protection.

**Decentralized cloud storage**is now available where you can store encrypted copies of files at multiple locations around the world. The files are stored by hash values, not file names. If one storage node has a corrupted file, it will not be delivered to the user. Another storage node with correct file content will be deliverd automaticallly to the user.

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[**John Furreh**](https://www.quora.com/profile/John-Furreh)

, Space Janitor (1914-present)

[Answered Mon](https://www.quora.com/Why-is-SSD-not-a-good-option-for-long-term-storage/answer/John-Furreh)

Umm, an SSD can fail, just like any other medium that’s re-writeable.

If you want to store something for like a decade, right now blue ray is the best I’d say. This has limited capacity though, so any truly epic data storage, like 50 Terabyte would mean an aweful amount of those for backups.

Right now the very best and large storage is much like raid HDDs, where they simply ‘fail’ HDD’s in triple redundancy. When an HDD starts getting close to failure, they take it out and replace it, after which the new HDD can be both higher capacity and have much greater reliability yet again. The information is then re-written on the HDD, with the newer HDD having more space so new info can be written on it as well.

This works for really large datacenters like Google’s and such.

A lot of large pro datacenters have this, while some may reduce to double redundancy, and other to even quintuple redundancy. This ofc results in drastic different prices, since all data must then equally be stored on that much space.

For non managed, extreme long preservation of info, you can also use paper punch tape, which up to date has the highest non managed shelf life. Or a newer version, in which a synthetic resin is used instead of paper, which is also weather and moisture proofed, but this only works for very small amounts of data.

For eon storage, use stone tablets.

Also, the Voyager probes have gold disks on board which are practically everything rpoofed, save falling into a star, but that is extremely costly.

[](https://www.quora.com/profile/Franklin-Veaux%22%20%5Ct%20%22_blank)

[**Franklin Veaux**](https://www.quora.com/profile/Franklin-Veaux)

, My experience with hard drives dates back many decades.

[Answered May 21](https://www.quora.com/Why-is-SSD-not-a-good-option-for-long-term-storage/answer/Franklin-Veaux)

Originally Answered: [Is an SSD reliable for long term storage?](https://www.quora.com/Is-an-SSD-reliable-for-long-term-storage?no_redirect=1)

Long term? No.

SSDs store data in “floating gate transistors.” These transistors have a gate surrounded by insulator. A weird quirk of quantum physics means you can get electrons to “tunnel” onto the gate, passing onto the gate without crossing the space between, and then, since the gate is surrounded by insulator, the electrons remain trapped there.

However, the same weird quirk of quantum physics means that every now and then, an electron will tunnel right back out.

If you take an SSD, record files on it, and sit it on a shelf, over time the data on the disk will slowly evaporate. Come back in five years and the disk may be unreadable and all the files corrupt.

An SSD is absolutely positively no-nonsense **not** an archival storage medium.

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[**Duchene Dominique**](https://www.quora.com/profile/Duchene-Dominique)

, studied at Post Graduate Diploma in Management

[Answered June 12](https://www.quora.com/Why-is-SSD-not-a-good-option-for-long-term-storage/answer/Duchene-Dominique)

Bonjour

Ce sont les constructeurs de SSD qui donne un TBW beaucoup plus faible qu'en réalité. C'est certainement dû au fait que c'est une nouvelle technologie et que nous n'avons pas suffisamment de recul 😁

Plusieurs tests donnent des résultats très nettement supérieurs aux données constructeurs.

dd Comment

[](https://www.quora.com/profile/J-C-Ambrosi%22%20%5Ct%20%22_blank)

[**J. C. Ambrosi**](https://www.quora.com/profile/J-C-Ambrosi)

former Communications and Satellite Expert (1980-2007)

[Answered Mon](https://www.quora.com/Why-is-SSD-not-a-good-option-for-long-term-storage/answer/J-C-Ambrosi)

It’s an option, but not the best one at this point ... spinning disks (magneto plates) are still more reliable and offer better byte/$ cost, with very good sequential r/w speed for both on-line and off-line storage and archiving. Tapes are still in use, but many has seen failed attempts to read not-so-old tapes, especially if not stored with environment humidity, dust and temperature in mind.

169 views

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[**Glen Herrmannsfeldt**](https://www.quora.com/profile/Glen-Herrmannsfeldt)

, BS Applied Physics, California Institute of Technology (1980)

[Answered June 1](https://www.quora.com/Why-is-SSD-not-a-good-option-for-long-term-storage/answer/Glen-Herrmannsfeldt)

That leaves the question about magnetic disks as long-term storage media.

I suspect that there are enough problems, such as grease hardening, or otherwise problems with the bearing or motor. And it might have firmware in flash memory.

376 views

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3 Answers Collapsed

(Why?)

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