



[Personal Backup](#) [Business Backup](#) [B2 Cloud Storage](#) [Blog](#) [Help](#) [Sign In](#)

[All](#) | [Cloud Storage](#) | [Entrepreneurship](#) | [Backing Up](#) | [Backblaze Bits](#)

Search ...

Be the first to know! Subscribe today to
receive Backblaze blog post emails
automatically!



Email

Join

No Spam. Unsubscribe any time.

Follow us:

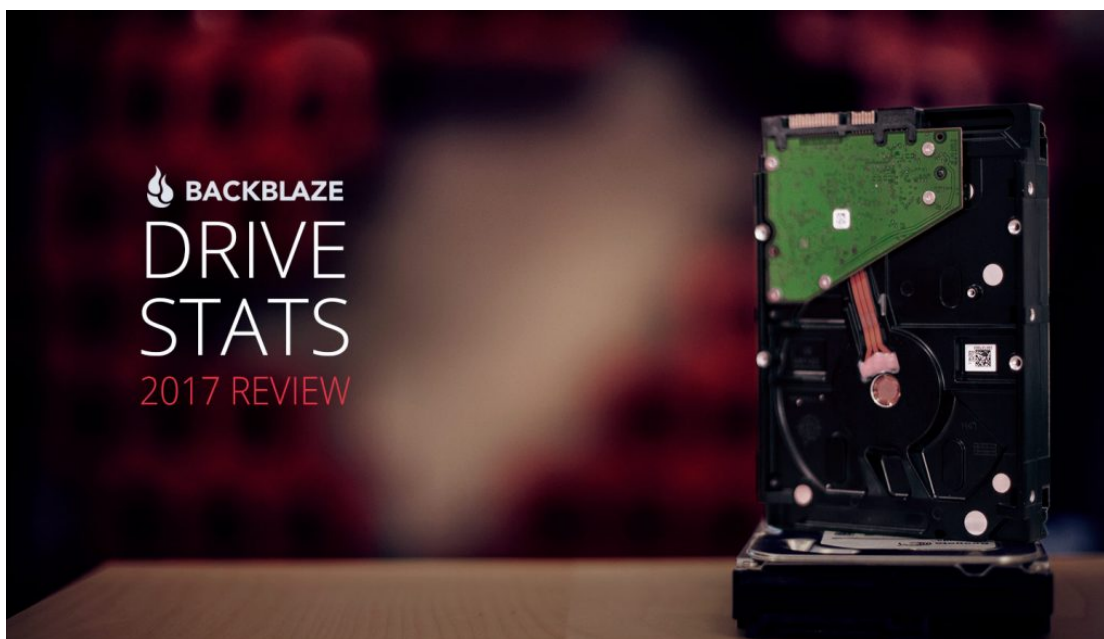


Cloud backup. Mac or PC. Unlimited data. \$5/month.

[And you can try it for free today.](#)

Backblaze Hard Drive Stats for 2017

By [Andy Klein](#) | February 1st, 2018



Beginning in April 2013, Backblaze has recorded and saved daily hard **drive statistics** from the **drives** in our data centers. Each entry consists of the date, manufacturer, model, serial number, **status** (operational or failed), and all of the SMART attributes



[Personal Backup](#) — [Business Backup](#) — [B2 Cloud Storage](#) — **[Blog](#)** — [Help](#) — [Sign In](#)

research, but for starters here's what we found.

Overview

At the end of 2017 we had 93,240 spinning hard drives. Of that number, there were 1,935 boot drives and 91,305 data drives. This post looks at the hard drive statistics of the data drives we monitor. We'll review the stats for Q4 2017, all of 2017, and the lifetime statistics for all of the drives Backblaze has used in our cloud storage data centers since we started keeping track. Along the way we'll share observations and insights on the data presented and we look forward to you doing the same in the comments.

Hard Drive Reliability Statistics for Q4 2017

At the end of Q4 2017 Backblaze was monitoring 91,305 hard drives used to store data. For our evaluation we remove from consideration those drives which were used for testing purposes and those drive models for which we did not have at least 45 drives (read why after the chart). This leaves us with 91,243 hard drives. The table below is for the period of Q4 2017.



Personal Backup		Business Backup		B2 Cloud Storage		Blog	Help	Sign In
MFG	Model	Drive Size	Drive Count	Drive Days	Drive Failures	Annualized Failure Rate		
Seagate	ST12000NM0007	12 TB	7,220	308,864	17	2.01%		
Seagate	ST10000NM0086	10 TB	1,220	110,957	3	0.99%		
HGST	HUH728080ALE600	8 TB	45	4,420		0.00%		
Seagate	ST8000DM002	8 TB	9,886	901,785	28	1.13%		
Seagate	ST8000NM0055	8 TB	14,396	1,313,506	44	1.22%		
Seagate	ST6000DX000	6 TB	1,881	172,266	1	0.21%		
WDC	WD60EFRX	6 TB	437	39,856	4	3.66%		
Toshiba	MD04ABA500V	5 TB	45	4,050		0.00%		
HGST	HDS5C4040ALE630	4 TB	2,391	227,708	2	0.32%		
HGST	HMS5C4040ALE640	4 TB	6,032	587,667	3	0.19%		
HGST	HMS5C4040BLE640	4 TB	14,797	1,369,721	17	0.45%		
Toshiba	MD04ABA400V	4 TB	146	13,095		0.00%		
Seagate	ST4000DM000	4 TB	32,070	2,969,705	235	2.89%		
Seagate	ST4000DM001	4 TB	392	36,506	9	9.00%		
Seagate	ST4000DM005	4 TB	60	1,255	1	29.08%		
WDC	WD40EFRX	4 TB	45	4,113	1	8.87%		
WDC	WD30EFRX	3 TB	180	16,200		0.00%		
		Totals	91,243	8,081,674	365	1.65%		



A few things to remember when viewing this chart:

- The failure rate listed is for just Q4 2017. If a drive model has a failure rate of 0%, it means there were no drive failures of that model during Q4 2017.
- There were 62 drives (91,305 minus 91,243) that were not included in the list above because we did not have at least 45 of a given drive model. The most common reason we would have fewer than 45 drives of one model is that we needed to replace a failed drive and we had to purchase a different model as a replacement because the original model was no longer available. We use 45 drives of the same model as the minimum number to qualify for reporting quarterly, yearly, and lifetime drive statistics.



[Personal Backup](#)
[Business Backup](#)
[B2 Cloud Storage](#)
[Blog](#)
[Help](#)
[Sign In](#)

TB drive, model ST4000DM005, has a annualized failure rate of 29.08%, but that is based on only 1,255 drive days and 1 (one) drive failure.

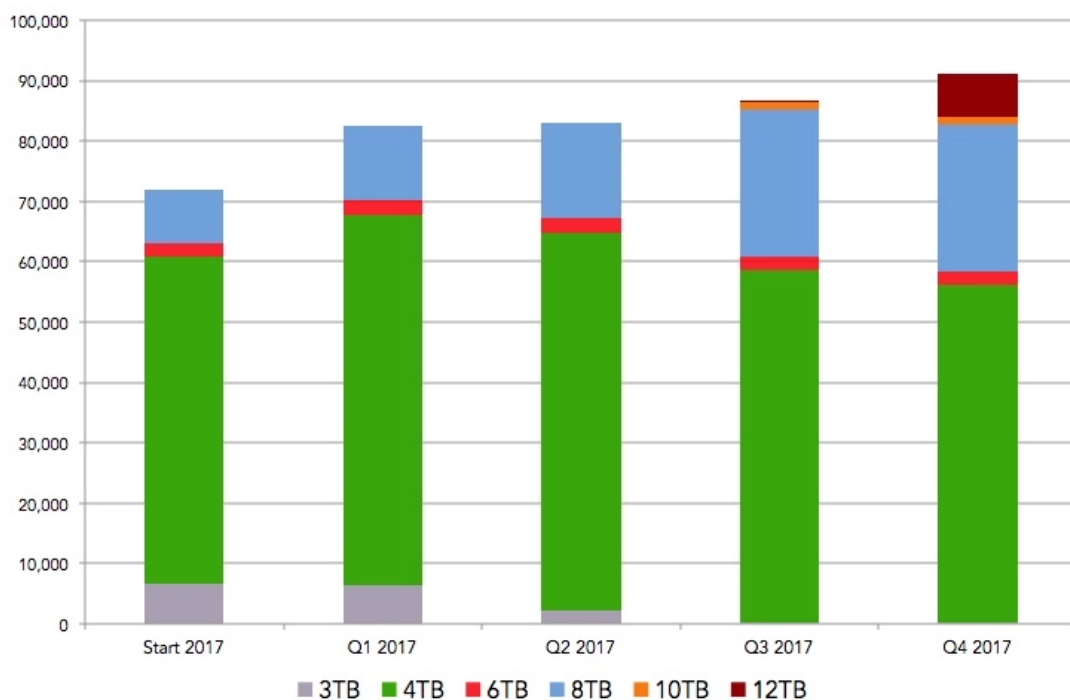
- AFR stands for Annualized Failure Rate, which is the projected failure rate for a year based on the data from this quarter only.

Bulking Up and Adding On Storage

Looking back over 2017, we not only added new drives, we “bulked up” by swapping out functional and smaller 2, 3, and 4TB drives with larger 8, 10, and 12TB drives. The changes in drive quantity by quarter are shown in the chart below:

Backblaze Drive Population by Drive Size

January 1, 2017 through December 31, 2017 by quarter



For 2017 we added 25,746 new drives, and lost 6,442 drives to retirement for a net of 19,304 drives. When you look at storage space, we added 230 petabytes and retired 19 petabytes, netting us an additional 211 petabytes of storage in our data center in 2017.



[Personal Backup](#)
[Business Backup](#)
[B2 Cloud Storage](#)
[Blog](#)
[Help](#)
[Sign In](#)

operational at the end of Q4 2017. As with the quarterly results above, we have removed any non-production drives and any models that had fewer than 45 drives.

Hard Drive Annualized Failure Rates

Reporting period April 2013 - December 2017 inclusive

MFG	Model	Drive Size	Drive Days	Drive Failures	Annualized Failure Rate	Confidence Interval Low	Confidence Interval High
Seagate	ST12000NM0007	12 TB	294,924	17	2.10%	1.2%	3.4%
Seagate	ST10000NM0086	10 TB	121,017	3	0.90%	0.1%	2.2%
HGST	HUH728080ALE600	8 TB	47,483	2	1.54%	0.2%	4.5%
Seagate	ST8000DM002	8 TB	4,579,774	138	1.10%	0.9%	1.3%
Seagate	ST8000NM0055	8 TB	2,636,788	89	1.23%	1.0%	1.5%
Seagate	ST6000DX000	6 TB	1,882,520	57	1.11%	0.8%	1.4%
WDC	WD60EFRX	6 TB	499,533	62	4.53%	3.5%	5.8%
Toshiba	MD04ABA500V	5 TB	46,170	2	1.58%	0.2%	5.7%
HGST	HMS5C4040BLE640	4 TB	9,394,769	136	0.53%	0.5%	0.6%
HGST	HDS5C4040ALE630	4 TB	4,280,569	93	0.79%	0.6%	1.0%
Seagate	ST4000DM000	4 TB	35,168,535	2,850	2.96%	2.9%	3.1%
Seagate	ST4000DM001	4 TB	78,503	33	15.34%	10.6%	21.5%
Seagate	ST4000DM005	4 TB	1,255	1	29.08%	0.0%	120.0%
Toshiba	MD04ABA400V	4 TB	141,381	4	1.03%	0.3%	2.6%
WDC	WD40EFRX	4 TB	63,127	4	2.31%	0.6%	5.9%
HGST	HMS5C4040ALE640	4 TB	8,797,680	130	0.54%	0.5%	0.6%
WDC	WD30EFRX	3 TB	1,233,586	171	5.06%	4.3%	5.9%
Totals			69,267,614	3,792	2.00%		



The chart above gives us the lifetime view of the various drive models in our data center. The Q4 2017 chart at the beginning of the post gives us a snapshot of the most recent quarter of the same models.

Let's take a look at the same models over time, in our case over the past 3 years (2015 through 2017), by looking at the annual failure rates for each of those years.


[Personal Backup](#) [Business Backup](#) [B2 Cloud Storage](#) [Blog](#) [Help](#) [Sign In](#)

MFG	Model	Drive Size	Drive Count	Failure Rate	Drive Count	Failure Rate	Drive Count	Failure Rate
Seagate	ST12000NM0007	12 TB					7,220	2.01%
Seagate	ST10000NM0086	10 TB					1,220	0.89%
HGST	HUH728080ALE600	8 TB	45	4.93%	45	0.00%	45	0.00%
Seagate	ST8000DM002	8 TB			8,660	1.63%	9,886	0.96%
Seagate	ST8000NM0055	8 TB			60	0.00%	14,396	1.21%
Seagate	ST6000DX000	6 TB	1,882	2.22%	1,889	0.85%	1,881	0.70%
WDC	WD60EFRX	6 TB	458	6.05%	446	5.49%	437	2.06%
Toshiba	MD04ABA500V	5 TB	45	2.69%	45	2.22%	45	0.00%
Hitachi	HDS5C4040ALE630	4 TB	2,699	0.90%	2,700	0.52%	2,391	0.34%
HGST	HMS5C4040ALE640	4 TB	7,085	0.62%	7,014	0.40%	6,032	0.33%
HGST	HMS5C4040BLE640	4 TB	3,091	0.39%	9,362	0.51%	14,797	0.63%
Toshiba	MD04ABA400V	4 TB	145	3.04%	146	0.00%	146	0.70%
Seagate	ST4000DM000	4 TB	29,024	3.15%	34,737	2.77%	32,070	3.17%
Seagate	ST4000DM001	4 TB					392	15.19%
Seagate	ST4000DM005	4 TB					60	29.08%
WDC	WD40EFRX	4 TB	46	4.45%	46	2.17%	45	2.21%
WDC	WD30EFRX	3 TB	1,046	7.81%	1,102	3.27%	180	1.09%
Totals			45,566	2.35%	66,252	2.00%	91,243	1.83%



The failure rate for each year is calculated for just that year. In looking at the results the following observations can be made:

- The failure rates for both of the 6 TB models, Seagate and WDC, have decreased over the years while the number of drives has stayed fairly consistent from year to year.
- While it looks like the failure rates for the 3 TB WDC drives have also decreased, you'll notice that we migrated out nearly 1,000 of these WDC drives in 2017. While the remaining 180 WDC 3 TB drives are performing very well, decreasing the data set that dramatically makes trend analysis suspect.
- The Toshiba 5 TB model and the HGST 8 TB model had zero failures over the last year. That's impressive, but with only 45 drives in use for each model, not statistically useful.



A Few More Numbers

To save you countless hours of looking, we've culled through the data to uncover the following tidbits regarding our ever changing hard **drive** farm.

- **116,833** — The number of hard **drives** for which we have data from April 2013 through the end of December **2017**. Currently there are 91,305 **drives** (data **drives**) in operation. This means 25,528 **drives** have either failed or been removed from service due for some other reason — typically migration.
- **29,844** — The number of hard **drives** that were installed in **2017**. This includes new **drives**, migrations, and failure replacements.
- **81.76** — The number of hard **drives** that were installed each day in **2017**. This includes new **drives**, migrations, and failure replacements.
- **95,638** — The number of **drives** installed since we started keeping records in April 2013 through the end of December **2017**.
- **55.41** — The average number of hard **drives** installed per day from April 2013 to the end of December **2017**. The installations can be new **drives**, migration replacements, or failure replacements.
- **1,508** — The number of hard **drives** that were replaced as failed in **2017**.
- **4.13** — The average number of hard **drives** that have failed each day in **2017**.
- **6,795** — The number of hard **drives** that have failed from April 2013 until the end of December **2017**.
- **3.94** — The average number of hard **drives** that have failed each day from April 2013 until the end of December **2017**.

Can't Get Enough Hard **Drive** Stats?



[Personal Backup](#) [Business Backup](#) [B2 Cloud Storage](#) [Blog](#) [Help](#) [Sign In](#)

yearly, and lifetime hard drive stats and include the annual and lifetime stats by drive size and manufacturer. You will need to subscribe to the Backblaze BrightTALK channel to view the webinar. [Sign up today.](#)

As a reminder, the complete data set used to create the information used in this review is available on our [Hard Drive Test Data](#) page. You can download and use this data for free for your own purpose. All we ask are three things: 1) you cite Backblaze as the source if you use the data, 2) you accept that you are solely responsible for how you use the data, and 3) you do not sell this data to anyone — it is free.

Good luck and let us know if you find anything interesting.

Bio

Latest Posts



Andy Klein

Director of Product Marketing at [Backblaze](#)

Andy has 20+ years experience in technology marketing. He has shared his expertise in computer security and data backup at the Federal Trade Commission, Rootstech, RSA and over 100 other events. His current passion is to get everyone to back up their data before it's too late.



234



569



202



417



1K
SHARES

Category: [Cloud Storage](#) Tags: [hard drive stats](#)

« [Previous Post](#) [Next Post](#) »

84 Comments

Backblaze

1 **Login** ▾

Recommend **3** **Share**

Sort by Best ▾



Name



James • 4 months ago



I've been reading these reports for as long as I can remember, I don't know why I read them, I don't own or operate any kind of data storage solution, but this is fascinating, thanks for sharing.

33 ^ | v • Reply • Share ›



Oracles → James • 3 months ago



Me, too. It's just too interesting to pass up. I also read through the storage pod design and build posts with great glee.

^ | v • Reply • Share ›



0x3333 → James • 3 months ago



Hahahahah same as me!

^ | v • Reply • Share ›



James Lee • 3 months ago



Could you post the result in regular html table instead of an image? Screen readers can't read the image. I understand that the raw data is available to download, but it would be great for people with visual impairment could just read without extra steps.

Thanks!

17 ^ | v • Reply • Share ›



Alec Martin → James Lee • 3 months ago



@Andy Klein this isn't the first time this has been brought up. Please consider valuing accessibility!

6 ^ | v • Reply • Share ›



Bryan • 4 months ago



I look forward to these reports every time - keep it up!

8 ^ | v • Reply • Share ›



Adam Brown • 4 months ago



It's half the cost to buy external 8tb drives than it is to buy internal ones. I know after the floods a few years ago, you guys bought externals and shucked them. Do you still do that because of the major price differences? If so, is there anything you've learned about the process that might be helpful to the rest of us trying to get storage "on the cheap?"

8 ^ | v • Reply • Share ›



Andy Klein **Mod** → Adam Brown • 4 months ago





6 [Personal Backup](#) [Business Backup](#) [B2 Cloud Storage](#) **Blog** [Help](#) [Sign In](#)



Lanstar • 3 months ago



I use Backblaze for offsite backup. I bought some of those HGST/Hitachi 4TB'ers for my own local backup based on your last report. :) You're right, they're amazing... and thank you for the free information! It's so valuable to be able to buy something with confidence based on real world data.

2 [^](#) | [v](#) • [Reply](#) • [Share](#) ›



cbmeeks • 3 months ago



What do you do with failed drives or any other drive removed from commission? Do you destroy them or wipe them?

2 [^](#) | [v](#) • [Reply](#) • [Share](#) ›



Snayperskaya → **cbmeeks** • 3 months ago



They probably degauss and shred/smash them.

[^](#) | [v](#) • [Reply](#) • [Share](#) ›



Kacey Hemway • 4 months ago



Mr. Klein thank you for the write up.

Very interesting how the 12TB drives will hold up. Filled with gas, packed fairly densely, and having a large number of precision electro-mechanical parts it is amazing these drives don't self-destruct in one hundred start cycles.

Time of course, will tell.

2 [^](#) | [v](#) • [Reply](#) • [Share](#) ›



phuzz → **Kacey Hemway** • 3 months ago



I guess BackBlaze keep the disks powered on all the time, so they won't have many start cycles.

2 [^](#) | [v](#) • [Reply](#) • [Share](#) ›



Kacey Hemway → **phuzz** • 3 months ago



Excellent point. Unless they go rogue and use non 24/7/365 drives too. I don't but 12TB is pretty insane.

[^](#) | [v](#) • [Reply](#) • [Share](#) ›



Hickeroar • 4 months ago



Do you plan on adding solid state drives into the mix? I'd love to see their failure rates along side their spindled brethren.

Would you say that your write operations are frequent enough that the write limits on SSDs



[Personal Backup](#) [Business Backup](#) [B2 Cloud Storage](#) **Blog** [Help](#) [Sign In](#)

We don't use SSDs for data drives because of the cost versus HDDs. We do use SSDs in some of our internal systems, but they are not instrumented the same way as our data drives.

7 ^ | v • Reply • Share ›



Megouski → Andy Klein • 2 days ago

When do you see that starting to change? Your infrastructure is designed for HDD im sure and not SSDs, namely M.2. The power savings of running these and not having to cool them nearly as much must factor into this decision. I believe in the next 4 years they will be a very enticing option as they start to hit 8TB for the same price 8TB HDD are today and at GBps rates that are easy as cake to expand. By then we might be looking at 16-20TB HDDs but that is an insane amount of data to have on one disk that cannot hope to retrieve much of that data at any given point in time, and forget it if you have 5+ people trying to access data off it. I cant wait till SSD tech improves and it is replaced. Really going to revolutionize this buisness

^ | v • Reply • Share ›



Angelos Pitsos • 4 months ago

I would like to ask what you do with the retirement drives. Are you selling them or they are just going for recycling? Because I would be interested to buy a few good retired drives.

2 ^ | v • Reply • Share ›



hetzbh → Angelos Pitsos • 4 months ago

They'll never sell you (or anyone else) retired drives since they contain data, so they probably destroy them.

3 ^ | v • Reply • Share ›



Johny Bravo → hetzbh • 4 months ago

This doesnt make sense. They can easily overwrite data multiple times with random data and then sell retired drives.

1 ^ | v • Reply • Share ›



Yehuda → Johny Bravo • 4 months ago

What is your definition of easily? It takes a significant amount of time to do that kind of work - plus the time it takes to track all those drives. All of that costs money, so it is easier and cheaper to throw them in the shredder or degausser.

9 ^ | v • Reply • Share ›



Hickeroar → Yehuda • 4 months ago

Contrary to popular internet belief, a single full write over is sufficient



[Personal Backup](#) — [Business Backup](#) — [B2 Cloud Storage](#) — **[Blog](#)** — [Help](#) — [Sign In](#) —**Darren Starr** → [Hickeroar](#) • 4 months ago

Hickeroar, there are multiple papers that contradict that. Companies like OnTrack have made an entire business model debunking that myth.

In the old days, it was much easier to recover data that could be located due to misaligned head movement. These days, hard drives are probably the most precise consumer products at least in term of moving parts. That said however, unless the drives are actively employing vertical write methods (the really modern big ones usually do), recovering data from one full write-over is definitely not good enough... especially for PCI compliance. Let's not even discuss FIPS

I haven't read anything on drive recovery on vertical encoding methods, but this is mainly because I lost interest. My data needs have been dropping lately. Smarter storage systems use far less data.

Then for security reasoning, remapped sectors can never be overwritten as they are no longer accessible by software. So, bit errors on a disk will protect that data from rewrite indefinitely... meaning for PCI and FIPS, there's no possible way you can reuse that drive... ever. Should be true for HIPAA too

2 ^ | v • Reply • Share ›

**William Warren** → [Hickeroar](#) • 4 months ago

Best practices say otherwise...and that is what Backblaze is following.

1 ^ | v • Reply • Share ›

**LazLong** → [William Warren](#) • 4 months ago

"Best practices" as defined by who?

1 ^ | v • Reply • Share ›

**Hickeroar** → [William Warren](#) • 4 months ago

My point was that the best practices are unfounded and unnecessary.

^ | v • Reply • Share ›

**jeffb_mukilteo** → [Hickeroar](#) • 4 months ago

I have read computer forensics articles detailing technicians going through and recovering all the data from the last 3-5 writes on the drives.. Hints of the old data do remain in the margins of the data tracks and the right equipment can recover that at least in some situations. Now, the article was quite a while ago and as drive technology advances, the margins get smaller and more difficult to deal with, but so too do the forensics tools



Personal Backup Business Backup B2 Cloud Storage **Blog** Help Sign In

Since Backblaze can not speak to the motivation or resources of potential attackers, it's easiest to just break the platters after a crude wipe.

^ | v • Reply • Share ›



LazLong → jeffb_mukilteo • 4 months ago

— | 🚩

It sounds like you are referring to the 1996 paper by Peter Gutmann. He claimed that it was possible to recover data with magnetic force microscopy and scanning tunneling microscopy, unless the drive was overwritten 35 times with a pattern appropriate for the drive's encoding method. This paper was refuted in 2008:

<https://www.vidarholen.net/...>

As for BB reselling the used drives; a cost-benefit analysis would have to be made. It may be that the amount of money they made from selling the drives wouldn't be worth the effort put into scrubbing and marketing them, along with the legal exposure were a drive to be sold that had failed to be properly processed.

4 ^ | v • Reply • Share ›



Darren Starr → LazLong • 4 months ago

— | 🚩

I remember that paper :)

You're correct that the recovery method described there is generally considered ineffective. And to be honest, there is never a cost benefit to reselling old drives. It's best to just nuke them. The article mentioned instilled a healthy level of paranoia in people who should be paranoid.

That said, there's the additional issue that 30 rewrites or 1000 isn't good enough because of the statistical reality that sectors most likely to be marked bad by the drive and therefore never written again tend to be the sectors which experience the most daily use. As such, it doesn't matter whether recovering the sectors you did overwrite 30 times is impossible. What matters is that heavily updated files and database records will be stored on the bad sectors which can generally be read by replacing the hard drive controller board.

So... the 30 rewrite thing is just meaningless... there's absolutely no value to it. Even one rewrite is wasted time. There are combination degausser/microwaves developed specifically for hard drive "erasure".

As for BackBlaze... if they ever start selling their drives after use... or any of them eventually show up on eBay... they should be sued. So I doubt they would.

2 ^ | v • Reply • Share ›



[Personal Backup](#)
[Business Backup](#)
[B2 Cloud Storage](#)
[Blog](#)
[Help](#)
[Sign In](#)

but not for military / government purposes where lives depend on it. Like with cryptography, the real answer depends on the resources and interest of your adversaries.

1 ^ | v • Reply • Share ›



LazLong → innerspaceroobot • 4 months ago

— | 🚩

I'm sorry, but I don't think you know what you are talking about. You are confusing protection requirements with the technical means of achieving those requirements.

1 ^ | v • Reply • Share ›



Hickeroar → innerspaceroobot • 4 months ago

— | 🚩

My comment is simply true. The military/government purposes don't actually require any of those extra 29-99 rewrites, but they do it just to be safe, probably mandated by someone who doesn't know any better. The fact of the matter is that the first rewrite renders the data as "gone" as the 100th wipe does.

1 ^ | v • Reply • Share ›



LazLong → Hickeroar • 4 months ago

— | 🚩

Based upon my experience, three wipes is all that is required by US DoD regulations. Any variation on this (writing more times) would be something instituted on a local-authority basis. Meaning it may be done, but it isn't required.

2 ^ | v • Reply • Share ›



Darren Starr → Hickeroar • 4 months ago

— | 🚩

With secure data, it's always best to prefer microwaves.

There's no software which is able to overwrite sectors marked as bad from bit errors/wear and tear. As such, there is no reliable or legal way to erase a drive. The one possible exception may be to erase it once (multiple overwrites) and then switch the controller board on the drive with a different board with a different bad sector map... then erase it again.

Nope... this 30 rewrite method is just as ineffective as 1 rewrite. :(

1 ^ | v • Reply • Share ›



innerspaceroobot → Hickeroar • 3 months ago

— | 🚩

Believe what you will. I've worked in this area.

^ | v • Reply • Share ›



Johnny Bravo → Yehuda • 4 months ago

— | 🚩



Personal Backup — Business Backup — B2 Cloud Storage — **Blog** — Help — Sign In

anything, just sell them

2. if they are not encrypted, well, you can mark these disks for retirement.

Remember that they already track all drives. As they are doing replacement process in batches, it doesnt really matter that overwriting takes few days and process can be automated

3. If they are retiring all disks in pods at same time, its even simpler, they can just schedule overwriting of data in pod few days before replacement of these disks

1 ^ | v • Reply • Share ›



Chuck → Johnny Bravo • 2 months ago

— | 🚩

This whole discussion is absurd. Backblaze is not storing data unencrypted. As long as the keys are not shared, they can give the hard drives to anyone they want.

^ | v • Reply • Share ›



Viktor Banica → Angelos Pitsos • 3 months ago

— | 🚩

You really cannot afford a new HDD to store your data? They're not expensive anymore and I'm assuming it's always better to have a new than a discarded one (and heavily used, like the ones in Backblaze case).

^ | v • Reply • Share ›



emiliosic → Angelos Pitsos • 3 months ago

— | 🚩

Seriously, retired drives could be useful. In my case, could use them on a DVR application with Plex. They can also be used for throwaway VMs in labs, or surveillance apps (ie, basic consumer / light commercial multi-camera DVRs in shops).

^ | v • Reply • Share ›



Greg Zeng • 3 months ago

— | 🚩

<https://www.youtube.com/res...>

Above link are the relevant YouTube reports, this year, so far, afaik.

1 ^ | v • Reply • Share ›



Megouski • 2 days ago

— | 🚩

I wonder what year we are going to start seeing SSD storage start to replace these entirely. 18 month? 36? Aside from still being cost prohibitive on the initial investment, the power savings in not having to keep them actively cooled, their idle and peak power usage, their performance, their size and ease of expand-ability in terms of infrastructure around them... seems like its just a 2-5 years away before we see this explode. Also they 'die' more gracefully and their writes-to-death is going up in huge leaps every year. What a time to be alive!

^ | v • Reply • Share ›


[Personal Backup](#)
[Business Backup](#)
[B2 Cloud Storage](#)
[Blog](#)
[Help](#)
[Sign In](#)

you have to compare the same numbers for each brand... this is a simple statistical rule

^ | v • Reply • Share ›



Ahmed Fathy • a month ago

— | 🚩

if they are not encrypted, well, you can mark these disks for retirement. Remember that they already track all drives. As they are doing replacement process in batches, it doesn't really matter that overwriting takes few days and process can be automated

<https://www.tech-spotlight...>

^ | v • Reply • Share ›



OfficialG3 • 2 months ago

— | 🚩

i have 4 seagate drives (80 3.5, 500 2.5, 500 2.5, 1tb 3.5), one dating from 2010 all of them working, the 80tb and 500gb have 7/8 bad sectors and that's about it

meanwhile i have 4 toshiba drives (320 1.8, 500 2.5, 1tb 2.5, 500 3.5), all of them forming bad sectors after a year (one died without warning)

my wdc have 3 bad sectors from beginning

my 2.5 hitachi have relocation counts, 3 weak sector and my 3.5 hitachi have a head error does that mean my luck is reversed :P ?

^ | v • Reply • Share ›



Vinnie • 2 months ago

— | 🚩

Where do all those "retired" hard drives go...? Wiped & sold I'm guessing? Ebay? etc.? Very interested to know!

^ | v • Reply • Share ›



Hank • 2 months ago

— | 🚩

What constitutes a failure failure in this study? I understand it's a failure if the disks just don't spin any more or if it is making a horrible scraping sound constantly and nothing is going in or coming out (except smoke). Would you, for example, include soft errors nearing a limit, a given percentage of remapped sectors, a growing defect list, some SMART attributes out of whack and so forth?

^ | v • Reply • Share ›



Qualified Expert • 2 months ago

— | 🚩

Hitachi HDD still reign supreme :-)

^ | v • Reply • Share ›



Stefan Huber • 3 months ago

— | 🚩

@Andy Klein is there a special reason you opted for 512e Sector drives, and not 4Kn?

^ | v • Reply • Share ›



ol lo • 3 months ago

— | 🚩

[Personal Backup](#) — [Business Backup](#) — [B2 Cloud Storage](#) — **Blog** — [Help](#) — [Sign In](#)**Rawr** • 3 months ago

So which hdds would you recommend then in the 4TB/6TB range? I know this data should be taken as a grain of salt since it's just a representative sample of how drives perform in this specific workload. Looking for one that can take constant downloads, managing hundreds of images and being able to multitask between downloads and opening stuff within the drive.

[^](#) | [v](#) • [Reply](#) • [Share](#) ›[Load more comments](#)**ALSO ON BACKBLAZE****Ode to 'Locate My Computer'**

2 comments • 3 months ago



Egypt Urnash — Huh. I didn't realize you've been doing this. On the one hand, hooray for a way of tracking my computer that people savvy

Backblaze's New Cloud Storage Offering

14 comments • 2 months ago



YevP — We have not yet perfected the design of our floppy pod, but we're working on it.

Hard Drive Stats for Q1 2018**The Challenges of Opening a Data Center —**

Thanks for scrolling all the way down the page.
Here's your prize — a FREE trial of Backblaze Personal Backup.
Cloud backup. Unlimited data. Automatic backup. PC or Mac. Awesome.

[Start Today for Free](#)[About Us](#) | [Partners](#) | Resources: [External Drives](#) | [Hard Drive Stats](#) | [Backup Guide](#)Backblaze © 2018. [Terms & Privacy](#)

