

The background features a light gray circuit board pattern with black traces and circular components. A solid dark gray horizontal band runs across the middle of the image, serving as a backdrop for the text.

Digital Storage Devices

Palm Creek Computer Club
December 2017



USB flash drive



A USB flash drive, also variously known as a, thumb drive, pen drive, jump drive, disk key, disk on key, flash-drive, memory stick or USB memory, is a data storage device that includes flash memory with an integrated USB interface. [Wikipedia](#)

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What is the difference between a 2 and 3 USB? 

When comparing 2.0 and 3.0 there are a few major **differences**. First the transfer rates: **USB 2.0** offers transfer rates of 480 Mbps and **USB 3.0** offers transfer rates of 4.8 Gbps - that's 10 times faster. Note that the transfer speeds also depend on the device in use in addition to the bus type and **USB** ports and cables.

Can you plug a USB 2.0 into a 3.0 port? 

USB 3.0 is also backward-compatible with **USB 2.0**, so you **can plug a USB 2.0** peripheral **into a USB 3.0** port and it will function properly. You **can also plug a USB 3.0** peripheral **into a USB 2.0** port and it will work just fine. ... If your computer doesn't have **USB 3.0** ports and isn't too old, then you're probably in luck.

Hard Drive Cost per Gigabyte



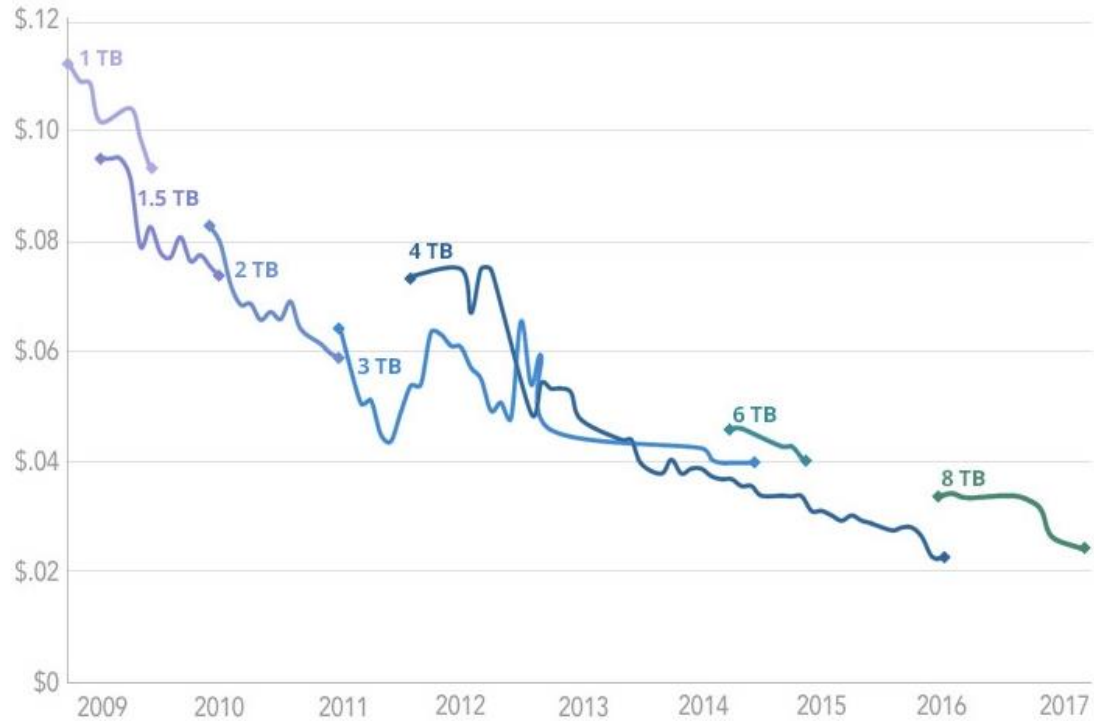
Hard drives and their declining cost per gigabyte from 2009 to 2017

For hard drive prices, the race to zero is over: nobody won. For the past 35+ years or so, hard drives prices have dropped, from around \$500,000 per gigabyte in 1981 to less than \$0.03 per gigabyte today. This includes the period of the Thailand drive crisis in 2012 that spiked hard drive prices. As you'll see, the hard drive pricing curve has flattened out.

In 2013 when we examined the effects of the Thailand Drive crisis on our business we wrote that post, the cost per gigabyte for a 4 TB hard drive was about \$0.04 per gigabyte. Since then 5-, 6-, 8- and recently 10 TB hard drives have been introduced and during that period we have purchased nearly 75,000 drives. Below is a chart by drive size of the drives we purchased since that last report in 2013

Backblaze Average Cost per Drive Size

By Quarter: Q1 2009 - Q2 2017



Observations

We purchase drives in bulk, thousands at a time. The price you might get at Costco or BestBuy, or on Amazon will most likely be higher.

The effect of the [Thailand Drive crisis](#) is clearly seen from October 2011 through mid-2013.

The 4 TB Drive Enigma

Up through the 4 TB drive models, the cost per gigabyte of a larger sized drive always became less than the smaller sized drives. In other words, the cost per gigabyte of a 2 TB drive was less than that of a 1 TB drive resulting in higher density at a lower cost per gigabyte. This changed with the introduction of 6- and 8 TB drives, especially as it relates to the 4 TB drives. As you can see in the chart above, the cost per gigabyte of the 6 TB drives did not fall below that of the 4 TB drives. You can also observe that the 8 TB drives are just approaching the cost per gigabyte of the 4 TB drives. The 4 TB drives are the price king as seen in the chart below of the current cost of Seagate consumer drives by size.

Seagate Hard Drive Prices By Size

Drive Size	Model	Price	Cost/GB
1 TB	ST1000DM010	\$49.99	\$0.050
2 TB	ST2000DM006	\$66.99	\$0.033
3 TB	ST3000DM008	\$83.72	\$0.028
4 TB	ST4000DM005	\$99.99	\$0.025
6 TB	ST6000DM004	\$240.00	\$0.040
8 TB	ST8000DM005	\$307.34	\$0.038

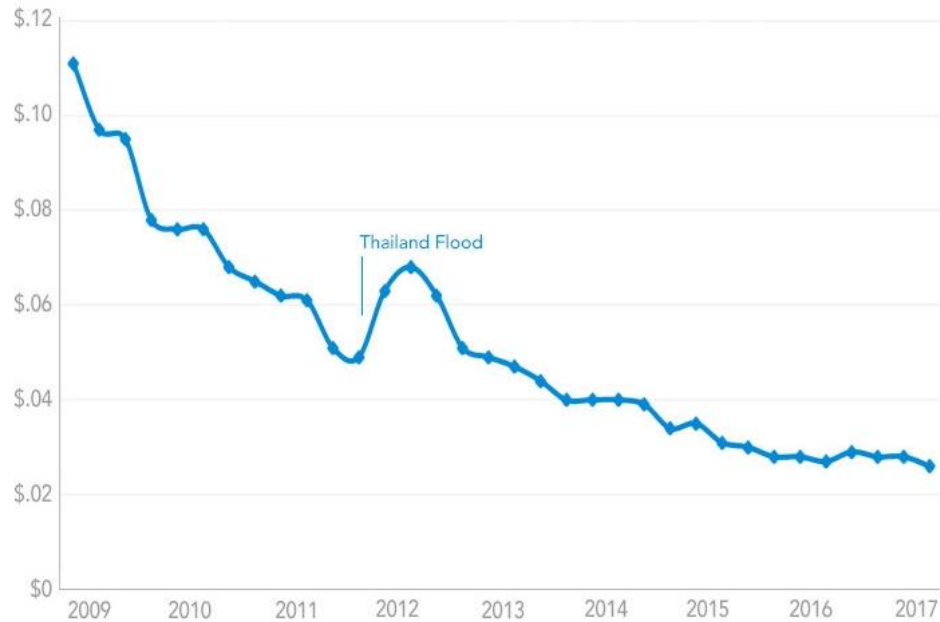
The data on this chart was sourced from the current price of these drives on Amazon. The drive models selected were “consumer” drives, like those we typically use in [our data centers](#).

The manufacturing and marketing efficiencies that drive the pricing of hard drives seems to have changed over time. For example, the 6 TB drives have been in the market at least 3 years, but are not even close to the cost per gigabyte of the 4 TB drives.

Meanwhile, back in 2011, the 3 TB drives models fell below the cost per gigabyte of the 2 TB drives they “replaced” within a few months.

Backblaze Average Cost per GB for Hard Drives

By Quarter: Q1 2009 - Q2 2017



The change in the rate of the cost per gigabyte of a hard drive is declining. For example, from January 2009 to January 2011, our average cost for a hard drive decreased 45% from \$0.11 to \$0.06 – \$0.05 per gigabyte. From January 2015 to January 2017, the average cost decreased 26% from \$0.038 to \$0.028 – just \$0.01 per gigabyte. Back in 2011, [IDC predicted](#) that the overall data will grow by 50 times by 2020, and in 2014, [EMC estimated](#) that by 2020, we will be creating 44 trillion gigabytes of data annually.

Improvements in existing storage technologies (Helium, HAMR) along with [future technologies](#) (Quantum Storage, DNA), are on the way.