10 Reasons Why SSDs Are Better Than Mechanical Disks

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Have you ever heard the terms, head crash or stiction? Better yet, have you ever experienced either of them? These terms are just two of the unhappy occurrences associated with mechanical disks. What if disks didn't spin? What if there were a way to create rewriteable storage in such a way that there were no platters, no spindles and no heads? You'd have a solid state disk with no moving parts. Solid state disks (SSDs) are all the rage for server vendors, SAN vendors, and appliance manufacturers. Why? Not because they're cheap -- they're not. SSDs have several advantages over traditional mechanical (spinning) disks. Here are 10 of the most frequently quoted advantages of SSDs over mechanical disks.

1. Life Expectancy

SSDs may be expensive, but they're well worth the price when you consider their advantages.

Mechanical drives have an average life expectancy of three to five years. Many fail long before the lower end of the average, and few last beyond the upper end of the average. At three years, you should seriously consider a refresh. At five years, you're skating on ice so thin it's really just very cold water. Alternatively, SSDs have life expectancies reaching into decades, although trusting the 1 million to 2 million hour SSD expectancy claims seems as ridiculous as the 500,000-hour claims of mechanical drive manufacturers. Expect your SSDs to last two to three times longer than mechanical drives.

2. Performance

Since SSDs have no moving parts, their access and seek times are many times faster than those of their mechanical counterparts. Mechanical drives have high-burst speeds, but their sustained speeds are unimpressive by SSD standards. However, write performance is not significantly different between the two technologies*. Therefore, read and access performance-heavy workloads will benefit from SSDs, while workloads that are write-intensive would do as well with the less-expensive standard disks.

3. Physical Size

You usually see standard disks in 3.5 inch or 2.5 inch formats, but SSDs take small form factor two steps further with 1.0 inch and 1.8 inch disks. These smaller sizes allow manufacturers to build smaller appliances, mobile systems and blades that occupy very little space. With rack space at a premium, that's a very good thing.

4. Shock Resistance

SSDs are a good choice for mobile systems due to their resistance to drops, bumps and g-forces. Such forces don't often act on standard concrete and steel data centres, but what about mobile ones -- mobile data centres such as those used by ground military forces, aboard ships, on aircraft or at trade shows? Movement can have devastating effects on mechanical drives, especially during write events. SSDs, again having no moving parts, aren't affected by mobility and are well-suited to such physical abuse. SSDs can withstand up to 1,500 g during operation or 25 times that of a standard drive.

5. Failure Rate

Any mechanical or electrical device can, and will, fail, but your chances are greater for failure when those parts are in motion. Mechanical disks are not particularly robust and can fail at any time, as one manufacturer's representative once stated, "Any time between 15 seconds and 10 years." While SSDs haven't reached the adoption level of mechanical drives, manufacturers estimate very low failure rates compared to standard technology.

6. Power Loss Protection

Enterprise-class SSDs rely on power failure circuitry to monitor voltage changes. If the voltage drops below the threshold, a secondary voltage hold-up circuit ensures that the drive has sufficient power to save any pending writes to disk. A supercapacitor, a discrete bank of capacitors or a battery acts as this secondary voltage hold-up circuit.

7. Power Consumption

SSDs draw very little power. Even at a full sprint, SSDs consume approximately three Watts or less compared to six or more Watts by standard disks. However, most impressive is the power consumption of quiescent drives. SSDs sip from 0.05 Watts to 1.3 Watts, while their gluttonous counterparts gobble at a rate of 4 Watts or more. You will pay more for an SSD, but the long-term cost reduction might offset the initial sticker shock.

8. Heat Dissipation

Everyone knows heat kills electronic performance. That's why data centres have to stay at those chilly temperatures. SSDs reduce heat dissipation significantly compared to their spinning cousins. Less heat loss means lower cooling requirements, which in turn means reduced costs. Less heat to move away from sensitive electronics also means that system fan sizes can shrink along with your power consumption. Mechanical drives are responsible for more than 70 percent of the heat generated from a system. Without them, you could realize sizable savings and longer lasting hardware.

9. Hot Plug/Unplug Ability

It might not surprise you to know that SSDs have hot plug and unplug capability. However, it might surprise you to know that since SSDs don't have to "spin up," their capacity is available immediately upon plug-in. Although it might take several seconds for your operating system to recognize the drive, you will not have to wait through a lengthy discovery process or an even lengthier reboot.

10. Noise

If you've ever stood in a data centre, you probably noticed the very high noise level. Imagine a data centre filled with SSDs instead of standard drives. Other than the sound of system fans, cabinet fans and the central air conditioning system, the data centre becomes significantly quieter. As noted in the Heat Dissipation entry, fans would likely experience a 'downsizing' as well and further reduce the ambient noise level.

* Some independent tests conclude that SSDs write two to three times faster than standard hard disks. However, there are studies that suggest the differences are not so marked.

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