Technology Training Group

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* Solid State Drive Comparison

.Adding a solid-state drive (SSD) is one of the best upgrade options for your computer, offering impressive performance improvements for all kinds of tasks. A good SSD is now cheaper than ever, so upgrading makes sense. Here's everything you should know about your SSD, whether you're interested in upgrading or just want to learn the ins and outs of your hardware.

What Is A Solid-State Drive (SSD)?

A solid-state drive (SSD) is a data storage device for your computer. In everyday use, it provides the same functionality as a traditional hard disk drive (HDD), which has been the standard for computer storage for many years. HDDs write and store data on spinning metal platters. Whenever your computer wants to access some of that data, a little needle-like component (called the "head") moves to the data's position and provides it to the computer, one bit at a time. SSDs, on the other hand, have no moving parts, and store data in larger blocks. When the computer wants that data, the SSD essentially says: "OK, here it is." This is a simplified explanation, but the SSD's hardware and retrieval process makes accessing data much quicker. This means adding an SSD is often the single best upgrade if you want to make your computer faster (and already have a reasonable amount of memory).

Choosing The Right SSD To Buy

Choosing the right solid-state drive can feel overwhelming. In this section, we'll show you what you want to look for when choosing a drive and offer a few recommendations that have worked well for me. All SSDs will feel like a good upgrade from a HDD, but when you're spending significantly more money on a drive that provides less storage, you want it to be one of the best. Reliability can be hard to gauge if you have little experience with SSDs. Here are the qualities you want to look for:

- **High maximum speeds**: Max read speeds for SSDs are around 400MB/second, and max write speeds are around 300MB/sec (note: that's mega*bytes* per second). These numbers *do not* have to be exact. A little faster or slower won't make a significant difference.

Good real-world speeds: SSD manufacturers generally will not provide real-world read and write speeds, as they're guaranteed to be slower than the maximums. Fortunately, many online reviews contain speed test results. On Amazon, you can often find users who have posted screenshots of their test results (here's an example). Seeing this data can be discouraging because the real-world rates are quite a bit lower, but it's better to make an informed decision. If the test results reveal read and write speeds of about two-thirds of the maximum (in the sequential and 512KB block tests), you're good to go. If you apply this to our maximum speeds above, that comes out to read speeds of about 265MB/sec and write speeds of about 200MB/sec. If you want to work out if a more expensive SSD is worth the money, its real-world test speeds will be higher than two-thirds of its reported maximum capabilities.

Multi-Level Cell (MLC) NAND flash memory: There are two kind of memory: multi-level cell (MLC) and single-level cell (SLC). MLC memory can store more information on each cell, which typically results in lower error rates. Basically, you should only buy an SSD if it uses MLC. (You can read more about MLC here.)

SATA III Support: Not all SSDs use the latest version of the Serial ATA (SATA) interface, and this can limit the performance of your SSD. This is because SATA I can transfer data at 1.5Gbps, SATA II at 3Gbps and SATA III at 6Gbps. To ensure your SSD has enough bandwidth to transfer data as quickly as possible, you want it to be compatible with SATA III. You'll also want to make sure your computer is SATA III compatible as well. If not, SATA III-capable drives will still work, but you may not get the most out of your SSD if your computer doesn't support the most recent SATA specification.

ECC memory: Error-correcting code (ECC) memory provides your SSD with the ability to detect and correct common types of data corruption so you don't end up with unusable data on your drive. An SSD with ECC memory is more reliable. (You can read more about ECC memory here.)

A history of reliability: Look for an SSD that is made by a manufacturer who has been in the business for a while (I like OCZ and Crucial). The technology is fairly new, so you don't want to go with just anyone. Look at the rating each SSD receives in online reviews. If it is rated a 3.5 out of 5.0 or higher, this usually indicates a reliable drive. If the ratings are lower, you may want to look elsewhere. Even reliable companies make unreliable SSDs sometimes, so keep an eye on reviews to avoid buying a lemon.

Solid State Drive Comparision (Continued)

Which SSDs meet the above criteria? We've had a positive experience with the OCZ Vertex and Agility series of SSDs. But OCZ isn't the only company that makes fast and affordable drives. Crucial recently released a more budget-conscious set of SSDs in its m4 series. You'll pay a few dollars more, but you'll also get a few gigabytes as well. Going above 256GB on an SSD used to be very expensive, but prices have become more reasonable.

Dealing With The Limitations Of Your SSD

One of the most common problems new SSD owners face is adapting their current systems to run on a much smaller drive. Most HDD owners are accustomed to having at least 500GB of storage, if not upwards of 2TB. Downsizing to 120GB or 240GB — the most affordable and popular SSD sizes — can be a tough job. Sacrifices will be necessary, but there are ways you can make the process a little easier.

Option One: Start Fresh And Copy The Essentials

When upgrading to an SSD, the most obvious option is starting fresh with a new install of your operating system. While this might require a little more of your time, you'll have everything configured perfectly when you're done. Here are the steps you need to follow:

1. Install your operating system of choice on the new SSD.
2. Copy the contents of your home folder from your previous HDD to your new SSD. If you can't fit everything, start with the essential system files and settings, then migrate the media you have room for.

Go through the list of applications on your old HDD and install them on your new SSD. Run any updates, or save yourself some time by downloading the latest versions from their respective sources. Windows and Linux users can employ Ninite to get the latest versions of popular free software titles for their machines. OS X users can head to the Mac App Store to download the latest versions of their previous purchases. Neither option will cover everything, but both give you a solid head start.

1. Copy any important documents (or other files) you have room for on your SSD.

Put the old HDD in an external enclosure (like these), if you haven't already, and keep it handy for a month or two. This will help you see what files you use often and which ones you don't. If you find you're using something often, copy it to the SSD. If not, leave it on the external HDD for occasional access.

Again, this method requires more work but also handles the task of cleaning up your system at the same time. It may be more tedious, but it is an efficient way to solve two problems at once.

Option Two: Migrate Your Data From Your Old Hard Drive

If you don't want to start with a fresh installation of your operating system, you can always migrate your OS (and other data) to your new SSD. Chances are, however, that you're not going to be able to fit everything. That means you're going to have to start deleting files on your main drive until it is small enough to fit on your SSD. Because you don't want to lose that data forever, start by making a backup of your drive. Once you have a complete backup, you're ready to get started.

Use An External Drive

Regardless of the size of your SSD, it's never going to beat the storage capacity of a HDD. If you don't have a secondary hard drive installed in your computer, you're going to need to store your excess data elsewhere. An external HDD and the cloud are two of the best ways to get around the storage limitations of your SSD. Unless you have enormous collections, an SSD with a 240GB (or higher) capacity should be able house your operating system, documents, music and photos without issue. It's when you get into the business of music creation, video editing, professional photography and other work that produces large files will you regularly run into a storage ceiling. An external drive is often the easiest solution, so you'll want to pick up one with a large-enough capacity to suit your needs.

When an external drive won't do the trick, and you really need to downsize your space-hungry media collection, the cloud can come to the rescue. Most of the best solutions come from Google because they're both simple and free. Picasa allows you to upload your entire photo collection and give you direct access to them so long as you you have an internet connection. When it comes to other data, you have plenty of options. Google Drive is great for various files, Simplenote for text, and Evernote for rich text and PDFs. It doesn't matter which particular services you use; the important point is to start making regular use of the cloud if you have heavy data needs that can't be adequately served by an external or secondary internal drive.

Optimise Your SSD For Optimal Performance

For the most part, there isn't much you have to do to optimise your SSD. It's already really fast and should do it's job without any adjustment. That said, you can achieve better performance and longevity with a few adjustments.

Enable TRIM

The very first thing you should do after installing and setting up your SSD is enable TRIM. TRIM is a command [that] allows an operating system to inform a solid-state drive (SSD) which blocks of data are no longer considered in use and can be wiped internally. Basically, it prevents your SSD from being overused. Just like any component, SSDs have limited lifespans. TRIM helps keep your solid-state disk alive a bit longer, so you want to have it enabled if your drive supports it.

Enable Or Disable Hibernation Mode

Mac users can skip this section, but Windows users will want to decide between enabling or disabling hibernation. Both choices offer distinct advantages and disadvantages. When enabled, your computer will resume from hibernation almost as fast as it does from sleep thanks to the speediness of your SSD. On top of that, you won't use any power when in hibernation mode (which is especially useful for laptop users). The downside is that hibernating will eat up some of your SSD's limited space and require additional writes to the drive (which shortens it's lifespan a tiny bit).