

## Big Impact Upgrades on a Small Budget

Maybe you missed the opportunity to purchase a new computer or laptop for tax purposes in the last quarter of the year, or you simply didn't have the cash flow to support it. The good news is that we have some great alternatives that have the potential to make a big impact if you are on a small budget, or you just need to keep your system going for another year or so. Even if you want better performance from the system you have, regardless of age, this article will help with that too!

### The Myth

How many times have you heard someone say 'My computer is getting so slow!?' The fact is, your computer and the hardware is just as fast as it was the day you purchased it. You loved it when you first bought it, but what happened? Why does it seem so slow now?

Historically, as our computers age, the software that we use is updated and patched regularly, including the operating system. As the software vendors add more great features, the software becomes more resource intensive. Even though the speed of your hardware and the amount of resources your system has available to run your updated software hasn't changed, the usage and demand has. In addition, as you add more and more applications, over time it exacerbates the problem.

If you have read some of my other articles, you know I've spoken about the difference between symptoms and problems. The decrease in speed that you notice with your computer is actually a symptom, not the problem or root cause. Your problem is most likely related to a lack of system resources. The misconception is that you think your computer is getting slower and you think the only way to fix it is to buy a new one. But that's not how we roll.

### What now?

There are really only a few reasons why your system seems so much slower: system memory, hard drive, and the applications installed on your computer. Specifically, the amount of system memory in your system, the speed of your hard drive, and the amount of applications that you have running on your system will all slow down your system at various times your computer is in use. This includes the applications that you use, as well as the ones that are always running in the background.

### Just how old is it?

It's time to face the facts though. If your computer is older than 6 or 7 years... it's time to replace it. Technology and software change too quickly and any equipment older than 5 years is considered a dinosaur. We are proponents of getting your money's worth, but somewhere along the line the equipment just can't keep up with current software and it probably isn't compatible with most current hardware you continue to purchase. Your time is more valuable than you think. Often, you will lose more money on tech support and the time it takes to do your work than it would be to purchase a new system.

The great thing about our tips and tricks in this article is that they can even be applied to brand new computers. When people buy computers, there are so many options to choose from, they typically don't know which to choose. This normally leads to playing it safe and picking the cheapest options.

The cheapest options will often get you a system very low on resources. Sure, it seems faster than the one you are replacing, but trust me... you don't know what you are missing until you do these upgrades.

So, let's fix our speed problems and get some more life from our systems.

## Tips & Tricks

1. Memory upgrade
2. SSD Upgrade
3. Uninstall that app!
4. Turn off auto-start features
5. Get it right the first time

## Memory Upgrade

By far, the biggest bang for your buck will always be a memory upgrade. Just note, memory has nothing to do with your hard drive. Your hard drive stores your applications and data when the computer is off, while memory is only used by the system when it is running. The more memory you have, the more software you can run simultaneously and the faster the computer can perform calculations.

Computers boil down to almost 100% math. The operating system uses memory to store various data and perform calculations as you use the system. The more memory that you have, the more it can do at any one given time. But what happens when you run out of memory? The operating system performs a task called 'caching', which drastically slows down the system.

Caching is when the operating system instead uses the hard drive to store some of the data and applications that are supposed to be running in-memory. The operating system determines which parts it should save to the hard drive and which it should keep in memory based on need, frequency of use, and other factors. While caching sounds like a good thing for a system that is memory deficient, it isn't. Hard drives can be as much as 1,000 times slower to access than memory. Memory processes calculations in nano seconds, while hard drives operate at the millisecond level. So, a system that is starved for memory and caches some of the running applications, will slow down considerably when it has to access this data. It also puts unnecessary stress on your hard drive, which ultimately reduces the life expectancy of the drive and increases the risk of drive failure exponentially. Remember, your data is stored on the hard drive, so the last thing we want to do is put the data at risk!

While there are some systems out there that require very specialized memory modules, this is rare. Most memory upgrades are cheap and can often be installed in less than 15 minutes. On average, you can typically purchase a memory module for less than \$50. At the time this article was created, it is recommended that you have no less than 8GB of memory for a desktop or laptop computer. After the upgrade, you should see a big difference while using your system, but you will only see a small change when the system starts up or shuts down. Continue reading to help resolve your startup and shutdown times.

## Memory or Hard Drive? I'm confused.

Technology in the hard drive world has come a long way in the last few years. Until recently, hard drives have been mostly mechanical parts consisting of motors that rotate multiple spinning disks called platters with arms that go back and forth across those platters to read (fetch) and write data. The

physical nature of hard drives has always been our limitation. The spinning platters and arms can only go so fast and it takes time to move those arms back and forth to go find or write the data on the platters. The faster the drives rotate (revolutions per minute = RPM's), the more expensive they are, the more electricity they use and the more heat they generate.

In recent years, storage manufacturers have been able to bring memory chips into the storage realm in a new technology called Solid State Drives (SSD). With solid state drives, there are no moving parts and there are no motors. The time it takes to locate (fetch) or write data is a minimum of 4x faster than standard hard drives and the power consumption is less than half for SSD's. For laptop hard drives, it is even more noticeable than desktop hard drives. The drive standard for laptops is 5400 RPM's where standard desktop hard drives is 7200 RPM's, which means laptops read and write data over 30% slower than desktops. This also means they start up, shut down, and operate slower when in use. Why is 5400 RPM's the standard for laptops? Power consumption. The slower the drive, the less power it uses, therefore extending battery life. Laptop users always complain about battery life, so it has been the trade-off since the inception of the laptop.

However, the problem with SSD's has always been a lack of storage space and price. Based on footprint, memory chips were not able to hold as much data as a standard hard drive, and they were expensive to manufacture. With advancements in memory chip technology, and thanks to mass manufacturing, SSD drives have become mainstream, dropping prices exponentially. The storage offerings of SSD's has also increased substantially, making them more viable as desktop and laptop replacements. At the time of this writing, SSD's are extremely cost effective as prices are falling pretty quickly. A 250GB SSD is about \$50-\$70 and a 500GB SSD is about \$100-\$140. There are different SSD technology types and speeds, so pricing varies, but the pricing I have provided is based on the most reasonable speeds from the more reliable manufacturers. Most large name manufacturers charge a premium, but we found that there aren't any real benefits from sticking with a well-known manufacturer when most of them just rebrand the same SSD's in a different case.

The main claim to fame for solid state drives though is speed. The physical speed barrier is broken when moving to memory technology. Retrieving data from spinning platters and read/write arms takes a lot longer than retrieving from memory chips. With the most recent advancements in hardware and memory technology, new SSD's perform 10x (or more) faster than a standard hard drive, with less than half the power consumption. That's a big deal when starting, shutting down, and restarting your system, using applications, or installing software.

So, while we are truly dealing with memory chips here... we can now use them for long-term storage. But don't let it confuse you, we still refer to it as 'hard drive space' when we configure and sell systems.

### Uninstall that app!

It may seem like an obvious thing to do, but you should uninstall any applications that you won't ever use. Most applications on your system have components that run in the background even when you aren't using that application. They are typically used by the manufacturer to automate a task, perform automatic updates in the background, and provide other features. This is perfectly normal, but all of these background components use memory when they are running, even though you can't see them. So simply put, you should uninstall any applications that you don't want or need. Doing so guarantees that background components for those applications will no longer use resources on your system. It also

frees up more space on your hard drive, which means you can back up your data faster and you have more space for other programs and data in the future.

There is a common misconception that freeing up hard drive space by uninstalling applications makes your computer faster. This is only true if your computer has almost no space available, otherwise you won't see much of a difference. The real reason your computer gets faster is because you are removing applications that are using resources in the background. Therefore, even though you uninstall an application, your computer might not get any faster. Also keep in mind that most background applications use only a small amount of resources. You might not see a considerable increase in performance until after uninstalling at least a few applications.

The problem we are often faced with is: which applications should we, or can we, uninstall? That is a tough one and I recommend that you involve your IT provider in that decision. There are many applications that enable your computer to function that must run in the background. These applications include video drivers, audio drivers, antivirus and antimalware software to protect you, and many small components vendors install to allow you to interact with their software. If you are going to uninstall software from your system yourself without the help from your IT provider, make sure you follow these steps before removing any applications or making changes to your system:

1. Back up your system
2. Perform a test restore to make certain it is a good backup and that you know how to restore the backup in case you need it
3. Local all of the license keys and installation media (if applicable) for any software you are uninstalling in case you need to reinstall it

If you don't and you select a wrong option or uninstall an application that impacts the functionality of your system negatively, what may have only taken your IT provider 15-30 minutes to help you with could turn into hours or days for you to fix on your own. Or worse yet, you have to pay them to fix it anyway.

Just note, not all software applications have background processes that use resources on the system. Many applications only use resources when they are running, so keep this in mind when you are 'cleaning house'. You might not be helping yourself by removing all of the applications on your system, specifically if you need to use the application from time-to-time. If this sounds like a problem, read the next trick...

### Turn off auto-start features

We all have software that we want on our systems, but we rarely use. Should we uninstall it or just leave it and let it use resources? We have another alternative: turn off automatic startup for any of the services or software components that it uses.

Near the system clock, you may notice a lot of different icons that show up after your system starts and while your system is running. Most of the time, you can make changes to these applications by selecting these icons and opening the application or settings windows that go with them. You will often find settings related to automatically starting when the system starts. You can change the settings to meet your needs and only start when you want to use them.

Remember though, don't turn off your antivirus or antimalware software. If they aren't running the background, you won't be protected!

### Get it right the first time

It's easy to be led astray from targeted advertising and promises of incredible deals. Heed the old adage: if it is too good to be true, it probably is. Contact your local IT provider for help and advice on what to buy and when. There are different times of the year when pricing is better, and it usually isn't when you think it is — December is a really bad time to buy.

Buying the right thing the first time is important. It can save you a lot of money in the long run by avoiding necessary upgrades in the future. You should also know what software you are getting with the system. ALL computers that you buy online or in a store come with trialware and they are often loaded with a lot of extra software applications that you don't need and will never use. Companies that sell these computers use these applications as a sales pitch. Manufacturers also use these applications as a line item in the system's sales materials to appear to show more value or differentiate themselves from their competitors. They are often paid by the manufacturers of the software to bundle free software or trial software with their systems. These applications are called 'bloatware' and they only make the system slower than it should be. They fatten the system up like a Thanksgiving turkey, but they rarely add value.

At CDS, we wipe every new system that comes in from the manufacturer and reinstall Windows and all of the drivers from scratch. This is actually part of our sale price. We don't charge more for this service. We consider this our competitive advantage. On average, we see a 20%-40% increase in speed over the 'as-is' shipped system from the manufacturer and it helps to drastically increase the longevity of the system.

Wiping and reinstalling the operating system also makes it more compatible with our customers' software and networks. The more software you have loaded on the system, the more problems or conflicts that can occur. By only having the necessities and a customer's preferred software, we are also greatly reducing their overall support costs long-term by avoiding software conflicts.

On average, we size computers for a 5-year lifespan. This is the perfect mix between the latest and greatest technology and the most economical ends of the spectrum. So, the next time you are looking to buy a desktop, laptop, or even a server, contact Computer Development Systems, LLC to go over your options. This is what we do.