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Common Fixes for Sluggish Computers

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About This White Paper

Slow or underperforming computers can lead to thousands, if not millions, in lost productivity annually. Our guide, *Common Fixes for Sluggish Computers*, is a simple but powerful way to identify, troubleshoot, and solve problems affecting your PCs in house.

Use our free guide to solve common problems that can cause your computers to slow down over time. Learn the tricks and trade secrets that our technical staff uses and get your office productivity up to speed. Contact us with any questions or for assistance in getting your computers' performance back on the "fast" track.

Topics covered in this white paper:

- The most common causes of slow PC performance
- Simple solutions that save you time and money
- How to protect your computers from future threats

Common Fixes for Sluggish Computers

It's easy to look at a company's IT program and quantify the losses caused by massive failures and downtime, even across the entire economy (It was estimated at \$26.5 Billion in 2011¹). Much more difficult, yet at least as large a problem, is downtime and inefficiencies from poorly operating computers. In fact, the problem is so common that it's simply assumed by most people that computers are supposed to slow down as they get older - that poorer performance is simply a byproduct of aging.

This is, of course, a myth. While computers may show some signs of aging, either by not keeping up with the performance needs of modern software or through natural hardware degradation, these problems generally take a long time to manifest - definitely upwards of 5 years. IT professionals and technicians, however, report that many of the computers brought in for slow performance are in their first five years of age. So what is causing all of these performance issues, and what can be done to avoid them?

Finding information on the root causes of computer slowdowns can be a daunting task. Finding solutions to those problems is even more so. There are a lot of potential reasons why a computer can be performing below its peak, and several possible solutions for each cause. Things become even more muddled because of misconceptions and myths that spread from user to user. Some are completely incorrect, and grew out of a poor understanding of computers. Others began as good advice, but have lost relevance because of the rapidly changing world of computer hardware and software.

This white paper is organized into sections based on the severity and likelihood of potential issues. If you're experiencing PC slowdowns, start with the first section and work your way down in a methodical manner. If your PC does not respond to any of these fixes, consider upgrading your machine or visiting an IT or computer repair technician, since the issue is most likely related to hardware and will need expert diagnosis and repair.

Serious Issues

These three issues represent not only the majority of all problems with slow PCs, but also the problems most likely to cause major harm to a computer or the files stored within it.

Viruses, Spyware, and Other Malware

Experts in computer and information security estimate that anywhere between 30%² to as much as 90%³ of all computers worldwide are infected with some form of malware. While the definition of malware may change slightly depending on who is asked and who is asking, a rough definition can be "any piece of software that seeks to damage a computer without the users' permission". This catch-all covers viruses, spyware, trojans, worms, and many other categories of malicious code.

¹ <http://www.informationweek.com/storage/disaster-recovery/it-downtime-costs-265-billion-in-lost-re/229625441>

² <http://www.infoworld.com/t/cyber-crime/malware-infests-30-percent-of-computers-in-us-199598>

³ http://www.cs.auckland.ac.nz/~pgut001/pubs/malware_biz.pdf

Besides poor or sluggish performance, signs of a malware infestation include an unusual number of pop-ups while browsing the web, pop-ups appearing even while the web browser is closed, unexplained changes to the default search provider or the browser homepage, and even include the computer not functioning at all or fraudulent credit card charges.

Viruses and other malware usually originate from shady internet sites and downloads. Many are hidden inside torrents or other downloadable content, while others disguise themselves as games and helpful apps. What's most insidious, though, is recent trends that allow malware to enter a computer system without any user action whatsoever other than visiting a site with suspect ads or content⁴, many launching from ads displayed on major and reputable websites.

The first step to recovering from a potential malware infestation is to run your antivirus software. Many modern viruses actively block antivirus scans, or edit the virus database to disguise themselves, however, so simply running the installed antivirus may not clear up the infection. If there are any doubts, it's best to double-check using a web-based antivirus program. Follow this up with a leading installed anti-malware or anti-spyware program of your choice. If running the software doesn't locate any malware, or if performance doesn't improve after a successful antivirus run, move on to the next section.

Memory Leaks

Most software running on personal computers is designed to dynamically manage its memory load - that is they use more memory when they need it, and then clear it out when the process is done. Some programs, however, have small flaws that keep unused processes from emptying, clearing themselves from the system's memory. Individually, the chunks of space and processing power that these processes consume is small and often inconsequential. Over time, however, they build on each other until they bring a machine to a grinding halt.

The fastest, and easiest, way to determine if a memory leak is responsible for sluggish computer performance is to monitor the Windows Task Manager, accessed by pressing the ctrl+alt+delete keys and selecting "Task Manager" from the menu. A piece of software or process leaking memory will show a steadily increasing number in the "Memory" column. While this issue likely won't destroy a computer, it will cause slow-downs to the point where the machine becomes impossible to use, and may require deleting commonly used apps, programs, or plugins.

There are only two real solutions, and one workaround to memory leak issues. The first one is to close the program causing the issue. In most cases, this will free up the memory that the process was using and will restore the computer to normal speeds, though occasionally a restart is also required. Sometimes, developers are aware of these problems and may have an update that fixes the issue, reinforcing the need to keep all software as up-to-date as possible.

The second possible solution is to turn off the troublesome software as a temporary solution; however, the problems will re-emerge the next time that software is run. Fortunately, most mainstream programs are checked for these types of problems, and issues are really only common in programs by smaller developers or in less mainstream plugins and apps. To ensure the problem doesn't come back, the best course of action is to uninstall the offending program,

⁴ <http://www.wired.com/techbiz/media/news/2007/11/doubleclick>

app, or plugin. If that's not possible, the only workaround is to use the software only when absolutely required and turn it off as soon as it is no longer needed.

Bad Hardware

It is very rare for computer hardware to break from old age - most hardware issues are usually caused by some combination of negligence or damage by the user. The one major exception to this rule is hard drives, which can actually wear out with age and require replacement or upgrade. Still, the lifespan of even an average hard drive is about 5 years⁵, and a good brand-name drive should last far longer. Checking for a faulty hard drive is as easy as running the command "chkdsk c: /r" from the command prompt.

The rest of the components inside your system should make it significantly longer than your hard drive, unless they run into some pressing circumstances. The number one cause of failure in computer internals is a poorly made part or a part that came defective from the factory. There is nothing the average user can do to prevent this, however often these parts are under warranty, and can be replaced quickly and easily. The second biggest cause of failure, however, is heat, and that is something most users have control over.

Overheating is caused by two main issues - a broken or clogged fan or a broken fan controller. The latter is usually the result of a faulty thermostat on the motherboard, though it can also be software or cable related. Most likely, it requires replacing the motherboard to repair, though in many cases it is cheaper to simply purchase a new computer. The former can be a result of poor cleaning and maintenance, broken cables, or something broken with the fan assembly itself. Replacing a fan is often cheap, and simple enough to do without bringing the computer to a shop, though it might be more difficult in certain specialized applications, such as in a unibody ultrabook.

Besides sluggish performance, overheating issues are easy to detect. There are many free and paid software options to monitor internal temperatures, many of them open source or freely available online, or in many cases the high temperatures are detectable by touch. Either way, any temperature irregularities should be dealt with immediately. Leaving them alone can seriously damage every component inside a computer system, up to and including warping motherboards and causing processors and other chips to separate from the boards.

Minor Problems

While these issues are classified as minor problems, they can still cause headaches, lost productivity, and lost revenue. Most, however, have quick, easy fixes that can be performed by the end user with little chance of getting anything wrong. Moreover, none of the issues in this section are likely to cause any serious or long-term damage to either the hardware or the software in a computer.

Excessive Tasks/Programs/Services Running

One of the most common and easiest to fix causes of slow or sluggish PC performance is having too many tasks, programs, or services running at one time. This isn't simply a problem

⁵ <http://www.livedigitally.com/2005/02/digital-shoebox.html>

for power-users juggling 20 windows, but can come up for regular users who may not even be aware of all the apps they're using. This is especially true for novice and intermediate computer owners who may not realize that every plugin they have, such as the ever-popular internet browser toolbars or the Windows tray weather information app, are actually discrete programs that require separate processing power and RAM from the main program they are attached to.

These little apps and tasks can quickly add up to drain all available resources away from the programs that users are trying to actively load, bringing the entire machine to a crawl. The only way to tell for sure if excessive apps and programs are causing sluggishness is to open up the Task Manager and check your memory and CPU usage. If the memory or processing power used regularly goes over 50% during regular computer use (not while running power-intensive applications like graphics or video processing), it might be time to consider getting rid of some unnecessary drains on the computer's resources.

Cleaning up sluggishness caused by an excessive number of apps or programs is usually a simple matter of uninstalling any programs that aren't necessary. Usually a thorough review of the Add/Remove Programs screen can dramatically increase performance. If, however, there are programs that take up too many resources but are still necessary on a regular basis, it's better to just make sure that they're only active while being used, and don't automatically run at startup. To accomplish this, a user would need to go through the "Startup" menu. This menu is found in the Task Manager on Windows 8 machines, and under the "System Configuration" icon in the "Administrative Tools" section of the Control Panel on earlier Windows versions. Deselecting any programs that aren't essential to the functioning of the computer will usually result in very noticeably improved performance, while still leaving the programs available to use when needed.

Disorganized Registry

While this item is put in the minor problems section, it can just as easily go in the misconceptions part of this white paper. The main reason it's included here is because on older versions of Windows, this may still be an issue.

The registry is an indexed list that contains references for commonly used software, common settings for those programs, and other bits of information that act as bookmarks for Windows, making software easier to load for Windows. On older versions of the operating system, the registry could get cluttered, fragmented, and disorganized over time, with many entries pointing either to outdated information or simply taking up space. In years past, on machines running a Windows version before Vista, it was recommended that the registry be cleaned regularly to speed up the computer.

That said, on anything more recent than Windows Vista, cleaning the registry is unnecessary. Not only do you always run the risk of damaging your computer when messing with registry keys, it actually won't help at all on a modern computer. The reasons for this are simple: First, the registry contains thousands (and sometimes hundreds of thousands) of entries. Eliminating a tiny fraction of them won't have nearly enough impact to be noticeable. Second, the registry is actually loaded directly into RAM when a computer starts up. Accessing information directly from RAM is incredibly fast, much more so than accessing information from a hard drive. This was an issue on older machines that had less than a gigabyte of RAM, where a growing registry would take up progressively more memory space. On modern machines with 2, 4, 6 or more gigabytes of RAM, though, these keys are barely noticeable.

Overfull Hard Drive

This section is short, since there is little to be said about this particular issue. If your hard drive is over 85% full regularly, it's a good idea to either move some of the less-used files to a backup drive, delete unnecessary files, or upgrade to a bigger hard drive. Otherwise, replacing a hard drive with a bigger one will not yield any performance gains. Replacing a hard drive with a FASTER one, however, is one of the simplest, cheapest, and most effective methods of improving computer performance.

Out of Date Software

One of the most common and easiest to fix issues behind a slow computer is simply out of date software. Updating programs to the newest version will almost always have positive performance impact, along with a slew of additional benefits like improved functionality, greater security, and an overall more efficient use of resources.

There is one major caveat to this rule, however. Updating software on older computers (those over 4 or 5 years old) can actually slow machines down. The new versions of the programs may be optimized for the speed and power of modern machines, and may be too much for an older PC to handle. Still, the security benefits alone are usually worth the update, and older machines might need upgraded internal components to handle the new stress load.

Tune-Up Misconceptions and Myths

Technology changes at an incredible speed. Unfortunately, information on the care, upkeep, and repair of technology rarely keeps pace. There is a lot of misinformation floating around about how to properly diagnose and fix a sluggish computer, and this section seeks to clear some of it up.

Defragging

In the days of small hard drives, space for files was often at a premium. It was rare that the system would be able to find spare blocks of memory in which to add to a file that had recently expanded in size (like a Word document that had been added to, for instance). This led to pieces of a single file being scattered across the physical hard drive wherever they could be made to fit, a phenomenon known as fragmentation. This in turn caused the hard drive to have to do a lot of work to find the individual pieces of the file and access them together. Remember, unlike most computer components, traditional hard drives are mechanical in nature, using a magnetic head on a moving arm to read data off of spinning plates (much like a record player reads a record). All of the work the hard drive had to do to find the pieces added up to severe slowdowns in system performance, and could only be fixed with a defragmenter utility - a piece of software that would seek out file pieces and arrange them next to each other for easier access.

Hard drives have grown in size, however, and modern hard drives will often have plenty of empty storage blocks that are close to a file being expanded. Add to this the increases in

technology that make modern drives orders of magnitude faster than hard drives from even a decade ago, and defragmenting the drive is at best only minimally useful, and at worst simply a waste of time. If you are running Windows Vista or later, you even get an automatic defragmentation utility that runs every week in the background, making the need to do a defrag obsolete. At the end of the day, it can't hurt, but don't expect any kind of serious performance gains.

Editing the Registry

We talked about this a little earlier. On older machines, it may do some good, but more likely than not there will be no noticeable performance gains. In fact, there's a risk of editing or deleting the wrong registry key, which can cause the entire system to simply stop working. Always back up all of the registry keys before doing anything with them or running any kind of automated registry cleaner.

Malware Masquerading as Performance Tools

There are a lot of viruses and other pieces of malware that masquerade as performance tools. In fact, we would strongly suggest that no user ever install any piece of software claiming to improve their system performance from any kind of ad anywhere on the internet. The couple of pieces linked to in this white paper have been vetted by hundreds of thousands of IT professionals over a decade, and are reliable and useful. Otherwise, the risk of infection is high. Particularly troubling is a new breed of virus which causes PCs to become nearly inoperable while launching pop-ups advertising either an anti-virus product or a system cleanup tool. Do NOT under any circumstances attempt to purchase these tools - they will not work to eliminate the virus, but will instead likely result in your credit card being stolen.

Upgrading Components

At the end of the day, all the software tweaks in the world can only bring your computer back to performing about as well as it did the day it was built. Meanwhile, computer software is constantly evolving and changing, bringing greater loads on systems with every new iteration. At some point, usually within about five years, the biggest bottleneck to performance will be the components inside your system needing to be replaced.

RAM

This is only really useful if the system in question has less than 2 gigabytes, or if it is used for memory-heavy applications like video editing or batch photo processing. Most users should not need more than 4 gigabytes, while power users might want to go for 6 or 8.

Graphics Card

If the system has no discrete graphics card, adding even a cheap one can drastically aid performance. Once the realm of gamers and videographers, graphics cards are now used by everything from web browsers to Windows to improve performance.

Hard Drive

For the ultimate speed boost, nothing can beat a solid state hard drive (SSD). Prices continue to fall, and are expected to be on par with conventional hard drives within a few years. Meanwhile, switching to a conventional drive with higher spin speeds (RPMs) or read speeds will immediately make a difference.

Other Component Replacement

It may be tempting to try to replace motherboards and CPUs to speed up aging systems, but the cost is almost never worth the improvement. With modern mid-range computer towers selling in the \$300-\$400 range, and mid-range laptops starting at \$600, it is usually far more effective to simply buy a new machine than to make major changes to the internals.

Conclusion

The trouble with computers is that while they have become ubiquitous in daily life, and absolutely essential to most business, they are still poorly understood by many people. Often, asking ten co-workers or colleagues about fixing a sluggish computer will result in ten different answers, with most of those being either untrue or not terribly effective.

If the diagnostic and repair steps in this document do not yield any increase in performance, the next recommended step is to take the device to a computer technician or a trained IT professional for diagnostics. Slow speeds may seem like a minor annoyance, but can be the symptom of a much more sinister problem that can result in large costs for businesses. Remember, most people would rather pay a professional to change the oil in their car rather than do it themselves, and a computer is much more complicated than a vehicle.