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Avast[®] Cleanup Premium Performance Benchmarks

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A Introduction

In 2017 and even with the advent of faster PCs and laptops, performance and disk space continues to remain an issue for hundreds of millions of users. Caused mostly by 3rd party applications, this whitepaper showcases the effects on performance these programs have on older, mid-range and even newer PCs.







A Introduction Why is PC Performance Still an Issue?

PCs and laptops have made huge leaps in terms of performance, resources and disk space, but at the same time applications, web browsing and especially games are becoming more demanding.

On top of that, with every day you use your PC, its performance, reliability and even lifespan will deteriorate as you install and use new software, browse the web, and update drivers. You will see some of the following symptoms:

Reduced performance

The lack of responsiveness when doing the simplest tasks, such as opening Microsoft Explorer windows or working in Microsoft Office. More demanding applications like games or multimedia editing tools also experience noticeable slow down and overall heaviness in performance.

Crashes and freezes

Lack of maintenance also introduces reliability issues, such as error messages and unexplained crashes.

Lack of disk space

With hard disks averaging between 256 GB (SSDs) and 512 GB (for mechanical HDDs) in size, disk space is still an issue.

"Bloatware" you don't need

From day 1, some PC and software makers install trials, ads, toolbars and other programs you rarely need which show annoying pop-ups and impact performance.

We're effectively targeting and eliminating the roots of these symptoms - and fixing them for the user.







A Introduction Test Environments & Guidelines

The test systems were preloaded with 75 of the most used programs to determine the impact of 3rd party applications on PCs old and new.

To simulate a realistic environment, we downloaded and installed the most commonly used applications based on internal telemetry, top download lists (CNET Download.com) and other rankings of most popular PC software and then prepared the test machines.

STEP 1 - Testers prepared the test machine according to Microsoft guidelines:

- Tested devices resided in an environment with a constant 23 degrees Celcius, an air humidity of 50% and ambient light of 250 lux (+/- 50 lux)
- The Windows power plan in default modes were set to "Balanced"
- Wi-Fi connection was disabled, the stable Ethernet connection was used
- All machines were installed with 75 programs and used productively for 14 days to ensure that all post-install operations and updates were completed

- All programs were run at least once to ensure that all post-setup operations were run and all services/ startup items/scheduled tasks set up
- Windows Update was run and then disabled to ensure zero interference by background operations
- Windows Search index was fully built and all scheduled tasks were performed
- Windows SuperFetch was enabled & trained
- Every benchmark was run three times and averaged; in case where benchmarks produced abnormal spikes, the tests were repeated 5 times
- This state will be referred to as the "Before" state in the graphs below

STEP 2 - After the installation was completed, all programs were started at least once on all three test devices to determine their functionality or set them up.

STEP 3 - The system was then rebooted 15 times over the course of 3 consecutive days. This rules out most of the post-installation background activities applications tend to perform. The state of the PCs and laptops after these steps were performed is referred to as "Before". An image tool was used to perform complete system images.

STEP 4 - All benchmarks below were performed according to the Microsoft[®] guidelines.

STEP 5 - After Avast Cleanup was installed the following performance optimization steps were performed.

- All maintenance tasks performed
- Programs put to sleep using Sleep Mode
- Disk & Browser Cleaner features used to clean up
- Software Cleanup recommendations followed





A Introduction What PCs Did We Test & Why?

To test the effects of our own PC optimization and maintenance tool Avast Cleanup Premium, we used both older and newer machines running Windows 7 and Windows 10 to determine the impact on performance.

We've picked devices that match the profile widely used in the PC landscape, where according to data from our own 155 million users a majority run PCs that are between 3 and 7 years old, with almost 30% being older than 2009.. To get a broad view, here's what we used:

Desktop PC (Core 2 Duo) Medion[®] Akoya (2008) Running Windows 7

Spec: Core 2 Duo, 2.66 GHz, 4GB RAM 500GB, 7200rpm HDD GeForce® 8600



Gaming PC (Core i7) Alienware[™] X51 (2012) Running Windows 7

Spec: Core i7, 3.4 GHz, 8GB RAM 1 TB Hard Disk, 7200rpm HDD GeForce® 660 GTX



Ultrabook Surface Book (2017) Running Windows 10

Spec: Core i7, 2.66 GHz, 8GB RAM 256GB, SSD GeForce® 965M







A Introduction Preparing the Machines

The more programs users download and use, the more additional load is put on the system.

This load consists of:

- Services
- Background processes
- Startup items
- Plug-Ins ad Explorer.exe hooks
- Drivers (some software products even install new drivers)

Additional background activity puts strain on a user's machine, as it needs to assign a certain amount of resources to the newly installed programs which reduces performance as well as battery life.

Three factors are responsible for this loss in performance:

- 1 Less memory is available for active processes
- Higher stress causes more heat and requires energy consumption
- Windows[®] needs to distribute resources (CPU time, handles) on these background tasks

The system becomes slower with each program that gets installed. In this experiment, a large (but not unusual) amount of applications is being installed on the Ultrabook to see the effects on the performance.

The desktop PC (Medion Akoya MD8332) did not need to be prepared as more than 150 programs were installed on it over the course of several years. This is a typical scenario to test the effects of Avast Cleanup Premium on systems with medium to high load.

The experiment helps evaluate:

- How a high application load has an effect on modern systems
- Whether Avast Cleanup Premium is capable of optimizing performance







3.1

GHZ

3.0 GHz

29 GHZ



B Benchmark ResultsSetting the Benchmark

To provide accurate test results, testers had to perform several steps and follow a specific flow. Both an automated and a manual approach were used to get precise results.

The following test results were performed under a highly controlled environment, in accordance to industry standards, and with professional measurement software which was previously only used by Microsoft engineers (WPT was an internal Microsoft tool to measure OS performance).

The tests were done with care and repeated several times. However, the testers cannot guarantee that these performance tests are absolutely accurate and can be reproduced on other machines. While performance testing on "clean" PCs is straightforward, the installation of several programs introduces factors that cannot be controlled – these include sudden interferences by update mechanisms or selfmaintenance tasks that the installed programs perform after a certain time or when triggered.

These variances were reduced to a minimum by several reboots and days of uptime – however, they cannot be eliminated. It is possible that the results were impacted due to the high load that was put on the system. Still, the results represent a close to real representation of systems under high load and how an optimization product is capable of solving these problems.







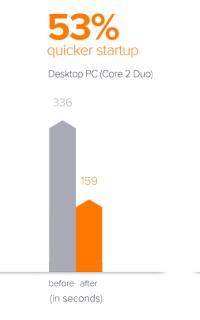
B Benchmark Results PC Startup Time

Boot time is one of the main criteria for many users & showcases the effect that programs have on the entire boot process.

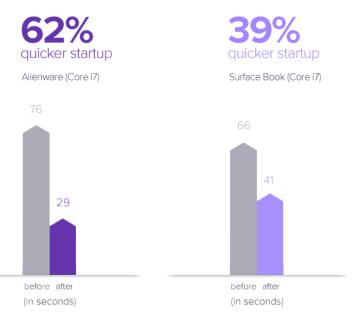
To see how much Avast Cleanup was able to help, we used Windows Performance Analyzer (part of the Windows Advanced Toolkit) to determine overall startup time until the desktop visible and all critical post-boot services are launched. Lower numbers mean better results.

RESULTS:

The load introduced by 3rd party applications made even the faster Alienware and the Surface Book suffer from major delays in startup time, as services, startup items and scheduled tasks were loaded. Even post boot, the PCs were not immediately responsive. Once optimized with Avast Cleanup, startup times dropped noticeably - up to 62% in the case of our Alienware.







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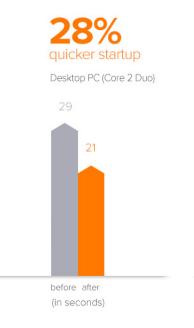
B Benchmark Results Application Startup Time (PhotoShop)

Working with your PC means closing and opening applications all the time. If that takes ages, it's an annoyance to the user and a sign of sluggishness.

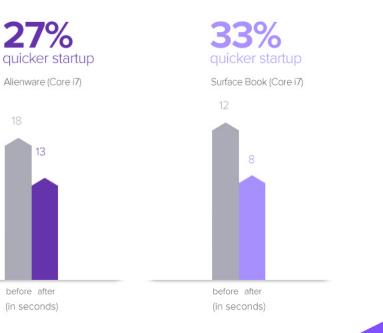
Having a PC under load from countless background applications usually impacts application startup times, too. To evaluate the impact and benefits from using all of Avast Cleanups performance features, we used Passmarks AppTimer tool to see the impact on application launch times.

RESULTS:

All systems benefitted from having the 3rd party load lifted, resulting in an improvement of 27% to 33% in application startup times. This is something the user will feel during a day of launching and closing applications.











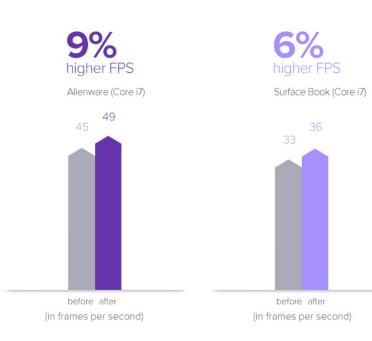
B Benchmark Results Gaming Performance (Far Cry Primal)

Next on our test list is Far Cry Primal, a recent blockbuster gaming title developed by Ubisoft. This game utilizes the CPU/GPU to the fullest (99%+ in our tests).

On the Alienware gaming PC, we ran the game at 1080p resolution and High Detail settings. On the significantly weaker Microsoft Surface book, we used the more modest 720p setting at Low Quality, while the older Core 2 Duo had to be left out as it's not capable of running the game at all. The in-game benchmark was used and results were measured in average FPS (frames per second). Higher is better.

RESULTS:

Even though games are mainly GPU driven, the CPU impact of the 3rd party applications we installed was severe enough to reduce average frames per second by 6 and 9% respectively. Once we optimized the PCs, things went back to normal.









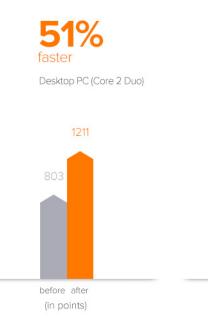
B Benchmark Results Responsiveness & Productivity

The following test combines overall system responsiveness and raw speed of Microsoft Office 2013 (productivity) applications.

Using PCMark 8 the products Microsoft Word, Excel and PowerPoint were run using automated scripts that automatically generate text, create presentations and calculate complex formulas. The results are displayed in a score, which is being calculated by PCMark 8 based on the time it takes to process the scripted tasks. Results in points (higher is better).

RESULTS:

The older and weaker the machine, the higher the impact on productivity and office performance. But even working with the more modern Surface Book and Alienware computer resulted in an improvement of performance. The one thing that these benchmarks don't get across is how much "snappier" everything felt when actually working the machine and the programs.







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B Benchmark ResultsMultimedia & Video Editing

Another set of PCMark 8 benchmarks focused on the multimedia performance on these PCs before and after optimization with Avast Cleanup.

These tests include video editing, video conferencing, photo editing and audio cutting. The results, again, are being outputted into points (higher is better).

RESULTS:

The GPU based rendering of videos and other multimedia files shows that the 3rd party apps did have an effect on performance. Once optimized with Avast Cleanup, performance grew between 7 and 35% across our test machines.

7% 35% 8% faster faster faster Desktop PC (Core 2 Duo) Alienware (Core i7) Surface Book (Core i7) 3755 4108 1212 before after before after before after (in points) (in points) (in points)









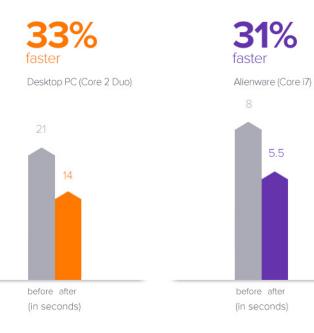
B Benchmark Results File Handling

The File Handling assessment provides an automated way to exercise common file operations and capture metrics.

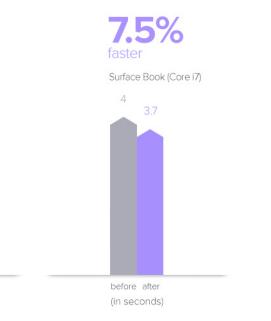
This assessment measures durations and throughput while copying, moving, compressing, extracting, and deleting files and folders on your computer. The results help you understand how well the computer performs during these operations. Lower values mean better performance.

RESULTS:

Even on the SSD-based Surface Book, Avast Cleanup Premium was able to decrease file transfer times by 7,5%, which we attributed to the reduction of overall system activity by Sleep Mode. On the other HDD based machines the impact was much bigger, with an improvement in performance between 31 and 33% respectively.







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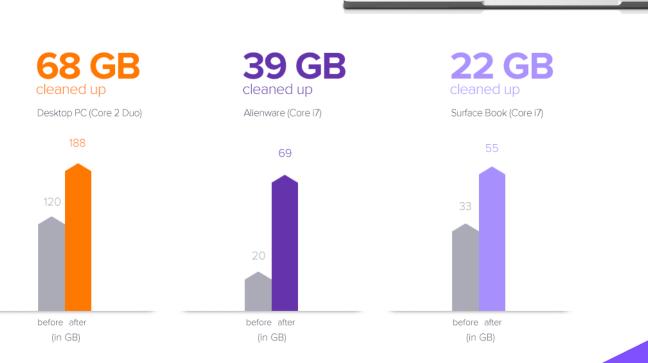
B Benchmark Results Cleaning

Calculating the total amount of temporary files and browsing caches to be cleaned with Avast Cleanup Premium.

The next test involved calculating the total amount of temporary files and browsing caches to be cleaned up by all cleaning features implemented in Avast Cleanup Premium.

RESULTS:

On the older machine, more than 40 GB of ageold system restore points were found that no one needed at that point. In addition even more temporary files from Windows and programs were removed which amounted to 28 GB on top. It wasn't quite as bad on the newer machines, but having 10% of your shiny new laptop (Surface Book) taken up by digital crud can be quite an annoyance if you need more disk space for personal data or programs.



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Maintenance

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Results Storage



C Benchmark Summary

It's been clear throughout that in many cases using Avast Cleanup Premiums functionality was able to lift the background load of 3rd party programs quite drastically.

It was specifically noticeable in areas like boot time and productivity performance, but even multimedia and gaming benefitted from the optimizations performed.

The moment the CPU wasn't constantly being occupied with background processes that

kept its usage between 5-30% with some spikes into the 99% area, the system didn't just perform better in our tests, it felt far more responsive. In addition, heat went down as the machine was able to enter lower idle power states, which in turn had an effect on battery life and power consumption.







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Customer support

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Contact D

The contact information below is provided in case you have a question on the product and reviewing it. Please contact: Sandro Villinger - Global Consumer Marketing Manager - sandro.villinger@avast.com