New AVG PC TuneUp®

Performance Test Whitepaper

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be
powered up

Contents

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Performance Test Whitepaper

Chapter 1 | Introduction

This document is meant to protocol performance tests for AVG PC TuneUp. It is important to know that these results were performed on sample machines and do not necessarily represent all laptops and PCs. Both older and newer devices were tested in order to give an accurate indication of potential results across a range of machines that are currently available on the market.

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Chapter 1 │ Introduction

1.1 Test Environments & Guidelines

1   The tested devices resided in an environment compliant with ECMA-383:

- Temperature: 23 degrees Celsius

- Relative humidity: 10 - 80 %

- Ambient light: 250 +/- 50 lux

2   The Power Plan has been set to "Balanced"

3   Wireless adapters have deliberately been enabled to recreate a typical user scenario

4   All tests were performed according to Microsoft® Developer Central Hardware guidelines:

- All machines have been used productively for 4 weeks

- The 'Rundll32.exe advapi32.dll,ProcessIdleTasks' command was used by internal testers to make Windows® perform file placement optimization tasks

- Windows Update was successfully run on all machines 24 hours prior to testing & the systems were each restarted five times. Windows Update was then disabled

- The Windows Experience Index was calculated

- Windows® 8's new "Automatic Maintenance" feature was first executed and then disabled

- The "SuperFetch" feature, which adapts to programs and Windows usage, was left enabled

- The Windows Search index was fully built

- Scheduled Tasks have been performed

5   We ran each benchmark test three times and used the average in our results

6   All the devices were fully charged to 100% and ran down until 1%

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Chapter 1 | Introduction

1.2 What PCs did we test? And why?

In this year's benchmarking roundup. We decided to test the effects of AVG PC TuneUp on two very differently equipped devices:

Desktop PC (Core 2 Duo)
Medion Akoya (2008)
Running Windows 7 | Service Pack 1

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

Why was it chosen? This PC was selected as it represents a typical desktop PC common in many households. It was specifically chosen because it was used by a family for 6 years and never cleaned up or optimized. It was in a particularly "bad" situation as over 230 programs, games, toolbars and adware were collected over the years and the performance of this device was significantly impacted by the amount of desktop applications.

Ultrabook (Core i5)
Macbook Pro Retina 13" (2014)
Running Windows 8.1 | Update 1

Spec:
Core i5
2.7 GHz
4GB RAM
128GB
SSD
Intel® Iris 5100
Integrated Graphics

Why was it chosen? The 13" MacBook Pro® with Retina® Display (late 2013) ranks among the most popular and well-reviewed laptops of 2013 and 2014 that runs Windows (next to Mac OS X®, of course). Thanks to its Intel chipset, it is comparable to a high-end ultrabook.

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1.3 Preparing the machines

The more programs users download from the web or install from a DVD, the more additional load is put on the system. This load consists of:

This load consists of:
- Services
- Background processes
- Startup items
- Plug-Ins ad Explorer .exe hooks
- Drivers (some software products even install new drivers, e.g. virtual DVD drives.)

Additional back 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. Two factors are responsible for this loss in performance:

- 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 did not need to be prepared as more than 150 programs were installed on it over the course of several years.

Chapter 1 | Introduction

1.3 Preparing the machines cont...

This is a typical scenario to test the effects of AVG
PC TuneUp on systems with a high load. The experiment
helps evaluate a) how a high application load has an
effect on modern systems and b) whether AVG
PC TuneUp is capable of optimizing performance.
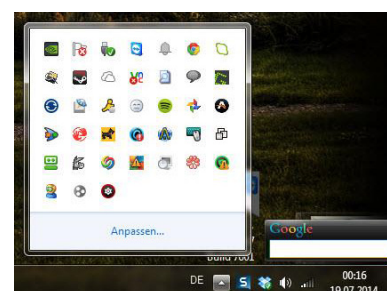
The following steps were performed on the Ultrabook only to simulate the high load:

Step 1   Testers prepared the test machine according to Microsoft® guidelines (see above).

Step 2   Image of the clean install was taken using Microsoft®'s built-in "recimg".
To revert to this clean state, Windows® 8's "Refresh" feature could be used.

Step 3   To simulate workload, the machine was equipped with approx. 150 additional
popular programs. This is not an uncommon scenario for IT pros and beginners.
A list of installed programs is available (contact Sandro Villinger, see info below).

Identifying programs: Testers selected these 150 based on the most used programs
on Wakoopa (a software usage tracker), the top downloads at downloads.com, from
various "Top 10 Programs you need" lists and from personal experience of what
users often install. Also the popular Ninite installer was used: http://ninite.com.
This tool installs 50+ popular applications silently (double software was unchecked).
It is an even mixture of very popular and huge software suites—such Microsoft Office®
or Nero® - and useful freeware applications such as Skype® and Opera®.

Installation process: Installers were run using the "Standard" options, which in
many cases installed additional toolbars or downloads. This causes an additional
load on the machine.

Chapter 1 | Introduction

1.3 Preparing the machines cont...

Step 4   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 5   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 states of the Ultrabook after these steps as well as the Desktop PC at this point is referred to as "Before". An image tool was used to perform complete system images.

Step 6   All benchmarks below were performed according to the Microsoft® guidelines.

Step 7   AVG PC TuneUp was installed on these devices and the following performance optimizing steps were performed:

- 1-Click-Maintenance: Run with default settings.

- Increase Performance Assistant: Profile set and all recommendations accepted

- Fix Problem Assistant: All problems were fixed.

- Turbo Mode: Enabled.

- Program Deactivator: All Programs were turned off (two reboots were necessary).

- Startup Manager: All remaining startup entries were turned off.

- Live Optimization: Enabled.

- Registry Defrag: Performed.

This optimized state is referred to as "After".

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Chapter 2 │ The Benchmarks in Detail

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.

2.1 PC Startup Time

For "boot time" tests, we used Microsoft's "Windows® Performance Toolkit", part of the Windows Assessment Toolkit: The assessment results are used to diagnose potential problems, so that the hardware and software that you develop are both responsive and have a minimal impact on battery life, startup performance, and shutdown time.

The same assessments are available for OEM partners, ISV/IHV partners, enthusiasts, and other members of the community, to establish a common framework to measure, compare, and review aspects of quality." This kit performs extensive boot traces and covers the entire boot process: From UEFI/BIOS initialization to the last service is run. It gives an indication of the impact of 3rd party software on the boot process.
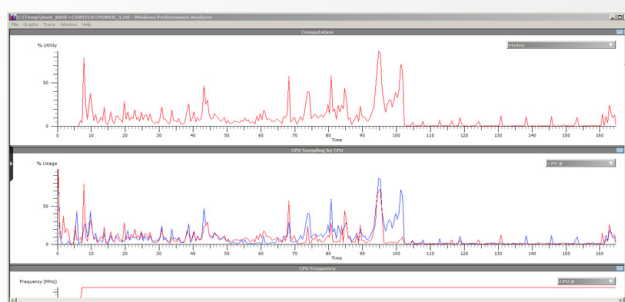
Shot of the Windows performance toolkit running its trace. The spikes show at what stage during the boot process the various programs loaded. As you can see, even after a couple of minutes after pressing the power button, the PC is still busy. In our test, we measure the total boot time.

On the ultrabook, testers used the "Fast Startup" check which measures the Hybrid Boot feature found on Windows 8.1. On the desktop PCs, testers were forced to perform a full boot which is similar to the boot experience found on Windows 7 and earlier versions.

2.2 Gaming

If you're playing games you want to make sure that nothing is going on in the background, otherwise the frame rate will suffer and loading times will increase. To evaluate the impact of AVG PC TuneUp on both bogged down machines, we measured the performance using the automated "Tomb Raider" benchmark which is part of the game. Tomb Raider was released in 2012 and has quite heavy requirements on the GPU, CPU and RAM.

Chapter 2 | The Benchmarks in Detail

2.3 Work & Play Benchmarks

In these tests, we use PC Mark 8, an industry standard testing suite for both performance and battery life. The suite automates standard processes such as working with Microsoft Office®, Adobe® products, games, browsing and more to simulate a day-to-day workload. It performs various tasks, such as editing a video and then converting it, and measures how fast the PC was able to handle these operations down to the millisecond.

To measure performance, we used the "Home" benchmark which includes the following tests:

Web Browsing	This test automatically launches a web browser to load a generated social media site using Internet Explorer ActiveX® controls. It renders various images, scrolls up and down pages, opens up pages, performs searches and uploads data to the site while measuring both the frame rate and the speed of the operation.
Writing	The writing benchmark opens up a large (50+ MB) document, saves it, pastes massive amounts of content (text+images) and copies content from one document into another.
Casual Gaming	This test performs a series of 3D gaming scenarios using DirectX 9 and ShaderModel 2.0 which are equal to the stress many casual games or some older 3D games cause on PCs.
Photo Editing	This test involves batch-editing photos by adjusting brightness, gamma and contrast as well as using complex Gaussian blur algorithms on several high-resolution photos.
Video Chat	This test involves the capturing and rendering of two 720p video streams simultaneously which simulates the typical workload caused by a video chat conversation (through Skype, for example).

Chapter 2 | The Benchmarks in Detail

2.4 Working with Office 2013 tests

These tests simulate heavy usage of Microsoft Word®, Excel®, and PowerPoint®.
For example, the Excel workload involves manipulation of 75,000 cells and extensive formula calculation whereas the PowerPoint test simulates adding photos and text elements to a PPT presentation and converting the file into PDF format.

2.5 Battery Life Tests

Our final three tests focus solely on the battery life improvements that can be achieved with AVG PC TuneUp's Economy Mode as well as Flight Mode. We ran our test laptop through three common test scenarios and measured how long it took for the battery to run dry:

Working	We used PCMark's "Home" benchmark (see 1.3) again, but let it run on a continuous loop until the battery was fully depleted. This represents a typical workload for both home users and business workers as it involves editing word documents, video chats and casual gaming.
Gaming	If you're gaming on the go, the battery drains far quicker due to the constant stress on both the CPU and the GPU so it's essential to have a good power management system in place which enhances battery life while at the same time not impacting the frame rate of the game as much.
Watching Movie	Another common scenario, especially when the user is on longer flights or train rides, is to watch a movie. To see how long the battery lasts, testers put on a 1080p movie on constant loop until the battery runs dry.

All battery life tests were performed three times in order to rule out any interfering factors. The results were then averaged for the purpose of this test.

Chapter 3 | The Results

This chapter contains all the results from our lab testing and should give readers an impression of the performance of both devices in their original state as well as after the optimization with AVG PC TuneUp was complete.

3.1 Test Results Disclaimer

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 self-maintenance 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.
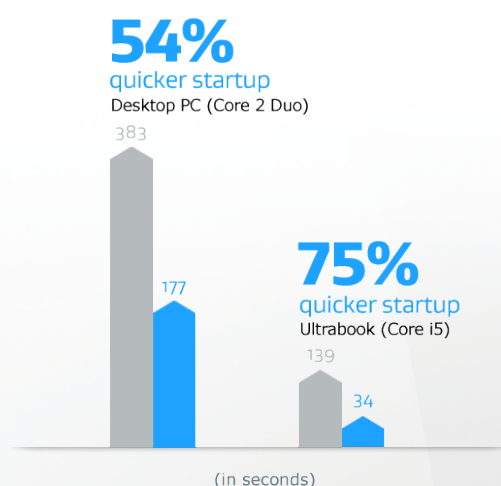
Still, the results represent a close to real representation of systems under high load and how an optimization product is capable of solving these problems.

Chapter 3 | The Results

3.2 PC Startup Time

Boot time is one of the main criteria for many users and showcases the effect that programs have on the entire boot process. To see how much AVG PC TuneUp was able to help, we measured startup times down to the second using Microsoft's Performance toolkit:

54%
quicker startup
Desktop PC (Core 2 Duo)

383

177

75%
quicker startup
Ultrabook (Core i5)

139

34

(in seconds)

Desktop PC   Our desktop needed 383 seconds after pushing the power button until it completely booted up. While the desktop was visible after about 60 seconds, the system was not usable due to a variety of services and other startup programs loading automatically, constantly occupying the PC. Once AVG PC TuneUp was used to optimize the system, the boot time dropped to 177 seconds – however, the desktop PC was usable after about 30-45 seconds, even though many desktop apps were still loading in the background.
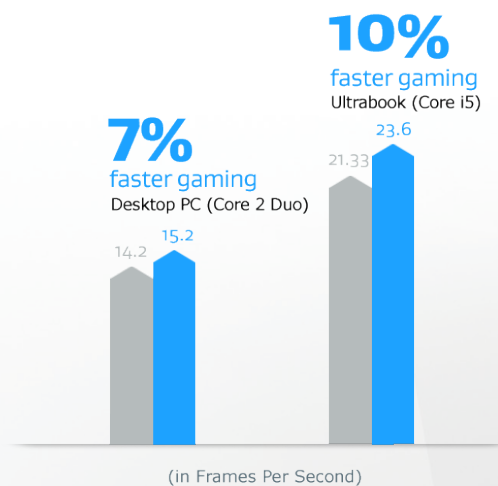
Ultrabook   With 200 programs installed, the complete startup took 139 seconds. Once optimized, though, startup time plunged to a mere 34 seconds. The desktop, however, was visible after only about 10 seconds and instantly usable.

Chapter 3 | The Results

3.3 Playing 3D Games

Games benefit the most from and a perfectly tuned system and can be severely impacted by background processes using up free RAM.

10%
faster gaming
Ultrabook (Core i5)
23.6
21.33

7%
faster gaming
Desktop PC (Core 2 Duo)
14.2   15.2

(in Frames Per Second)

Desktop PC Tomb Raider ran at a low 14.2 frames per second as the PC wasn't really able to handle the graphics, but there was a slight increase to 15.2 FPS after using AVG PC TuneUp. Not a huge jump, but 7% is still something every gamer can enjoy.
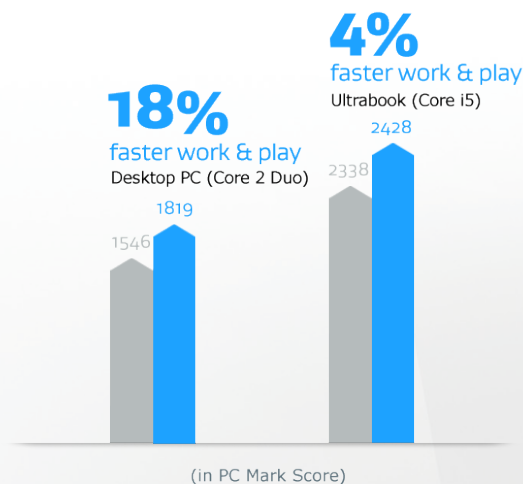
Ultrabook Tomb Raider ran at an almost smooth 21.33 FPS with all the bogged down software installed. Once all performance options of AVG PC TuneUp were used, the game ran at 23.66 FPS – an almost 11% boost. Some gamers buy graphic cards just to achieve that.

Chapter 3 | The Results

3.4 Working & Playing with the PC

In our next test, we used the benchmarking tool PC Mark 8 to test daily user tasks such as web browsing, writing, photo editing, video chat and casual gaming

4%
faster work & play
Ultrabook (Core i5)
2428

18%
faster work & play
Desktop PC (Core 2 Duo)
1819
2338

1546

(in PC Mark Score)

Desktop PC While performing all of the daily tasks in its original condition, the old PC scored 1,546 points in PC Mark 8. Once optimized, daily tasks such as browsing or photo editing performed 18% faster – it now scored 1,819 points overall.

Ultrabook The newer device didn't suffer as much from the performance problems, but we still got an increase from 2,338 to 2,428 points when using all of AVG PC TuneUp's performance features.

Chapter 3 | The Results

3.5 Working with Microsoft Office 2013

In our dedicated Office 2013 test, we measured how long it takes to insert photos or animations into PowerPoint and perform complex calculations in Excel.

11%
faster
Ultrabook (Core i5)
1848   2043

42%
faster
Desktop PC (Core 2 Duo)
1306
923

(in PC Mark Score)
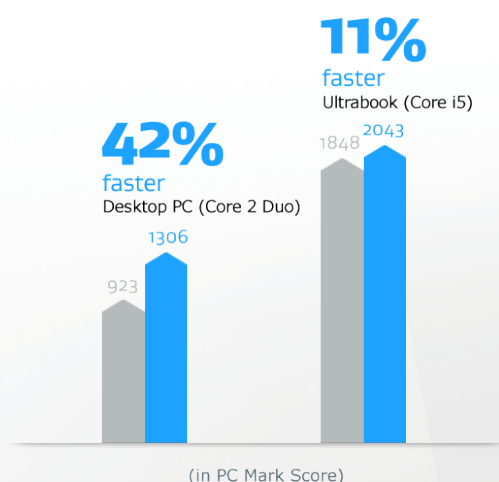
Desktop PC   All basic tasks in Microsoft Word took a long time to complete, mainly because of the many installed programs slowing the PC down. It achieved just 923 points in the Office performance test before our optimizations, and 1,306 after – an improvement of 42%!

Ultrabook   The Ultrabook saw an uplift in performance of 11% as it jumped from 1,848 to 2,043 points with particularly larger Office documents, such as PowerPoint presentations and Excel spreadsheets, being opened and handled a lot faster.

Chapter 3 | **The Results**

3.6 Battery Life when Working & Playing

Our professional test tool, PC Mark 8, performed a series of tests such as video chat, web browsing, writing, photo editing and casual gaming until the battery ran dry. The results were impressive:

59%
longer battery life
Ultrabook (Core i5)

327

206
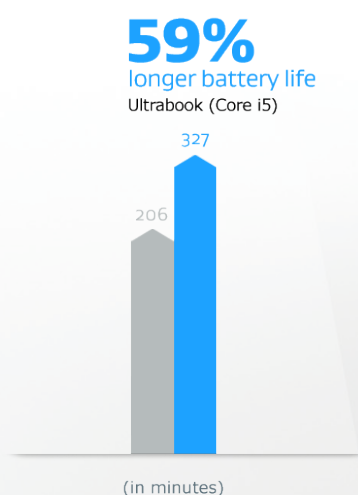
(in minutes)

Results   Thanks to AVG PC TuneUp's Economy Mode and Flight Mode, battery life went up 59% percent – from 3 hours 26 Minutes to 5 hours and 27 minutes. This increase was achieved by effectively throttling the power-hungry CPU and turning off unnecessary hardware.

Chapter 3 | The Results

3.7 Battery Life when Playing 3D Games

Gaming is one of the most taxing tasks for any PC or laptop, so power consumption goes up drastically when playing 3D games. However, our power-saving features in AVG PC TuneUp were able to reduce energy consumption without significantly reducing game speed

90%
longer battery life
Ultrabook (Core i5)

175

92
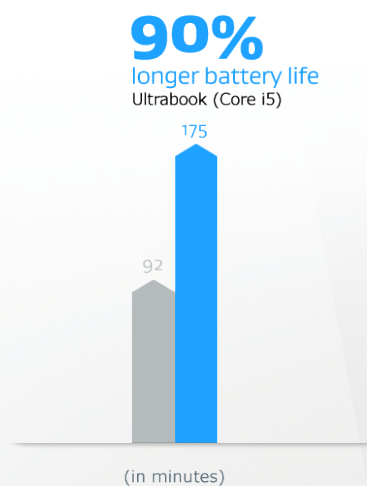
(in minutes)

Results   As expected, playing Tomb Raider drained our machine rather quickly: after only 1 hour and 32 minutes. However, by effectively throttling the CPU, turning off WiFi®, Bluetooth® and many resource-hungry Windows features, battery life nearly doubled to 2 hours and 55 minutes.

Chapter 3 | The Results

3.8 Battery Life when watching HD Movies

If you like watching movies or TV shows while on a long flight or train ride, battery life is your priority. Thanks to the combined power-saving capabilities of Economy Mode and Flight Mode, battery life increased noticeably:

50%
longer battery life
Ultrabook (Core i5)

368

245
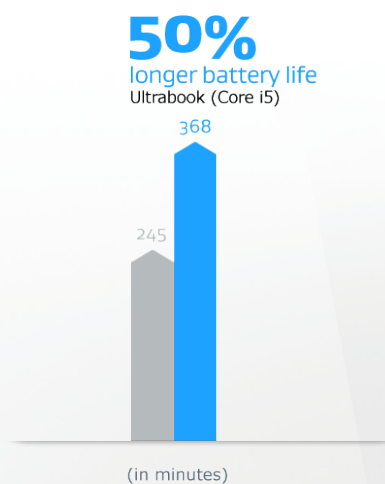
(in minutes)

Results: In its original state, our laptop died after 4 hours and 5 minutes – enough for 2 Hollywood blockbusters. However, once we used AVG PC TuneUp's battery savers, battery life went up to 6 hours and 8 minutes. That's enough time to watch another movie or 2 TV shows.

Chapter 3 | The Results

3.9 Cleaning Tests

The following cleaning tests were performed on both devices using AVG PC TuneUp's "Clean up" tab which includes Disk Cleaner, Browser Cleaner, Shortcut Cleaner as well as Windows features manager. The tool scans for wasteful temporary files, caches, logs, reports, cookies, thumbnails and other leftover data from Windows and installed applications. In total, more than 200 applications can now be individually checked by AVG PC TuneUp for such temporary data and can be cleaned up regularly.
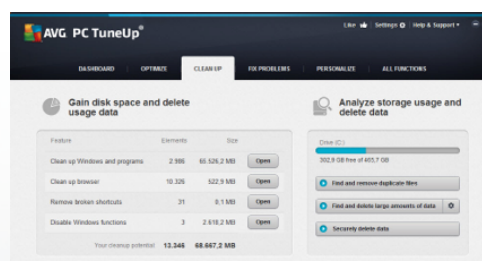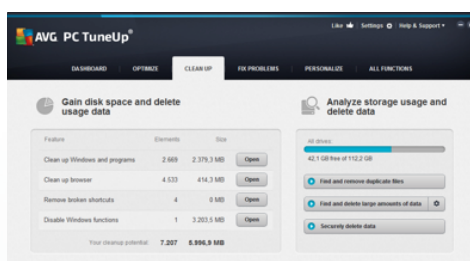
	Ultrabook	Desktop-PC
Leftover windows & program data	2,379 MB	65.526MB
Unneeded browser data	413 MB	523 MB
Broken shortcuts	0 MB	0.1 MB
Unnecessary windows features	3,204 MB	2.618,2 MB
Total	**5996 MB**	**68667 MB**

Results: The results of the scan show that after only several weeks of usage, roughly 6GB of wasteful data was found by AVG PC TuneUp. As the 6 year old Desktop-PC has never been cleaned before, a number of crashes and program installations have amounted to several Gigabytes worth of crash report files and old system restore points (which show up in the "Clean up Windows and programs" category) that are not needed anymore.

Chapter 4 | Contact Information

The contact information below is provided in case you are working with particular individuals or agencies on this review. If you have any questions around AVG PC TuneUp, please contact:

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