AVG Business

AVG PC TuneUp for Business

Whitepaper

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06.01.2016 | Version 1.0

Empowering over
200 million active users.

Be Yourself

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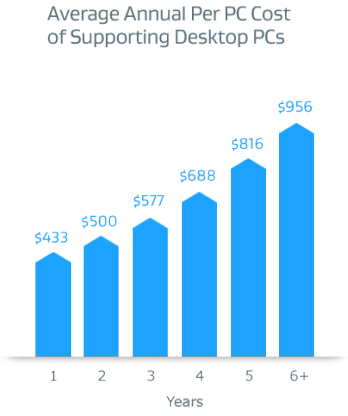
Chapter 1 | PC & Laptop Performance in 2015. Why is it still an issue?

PC workstations and laptops have made huge leaps in terms of performance and mobile power consumption, but so have the demands of software and your business.

In this whitepaper, we'll explore the problems with today's PC clients in small business environments and why we developed **AVG PC TuneUp for Business** to help address these exact challenges.

Over time, the Total Cost of Ownership (TCO) for your fleet of desktops and laptops are likely to skyrocket: Performance, reliability and total lifespan of your devices will deteriorate under daily usage as new software, updates, drivers and more get installed and used. You'll soon hear complains about. . .

- **Reduced overall performance** from even the simplest office suite to highly complex Adobe Creative Suite® tools
- **Crashes and cryptic error messages** leading to an increase in support costs and reliability concerns
- **Low battery life**, high power consumption and thermal issues



According to a Wipro and Intel study, the average annual cost of supporting and maintaining desktop PCs ranges between $433 for the first year and $956 for the fifth year, for laptops it's $716 in the first and up to $1623 in the second.

Solution

To keep support costs down, you need a solution like AVG PC TuneUp for Business which helps you reduce support costs and employee complaints and increases productivity at the same time.

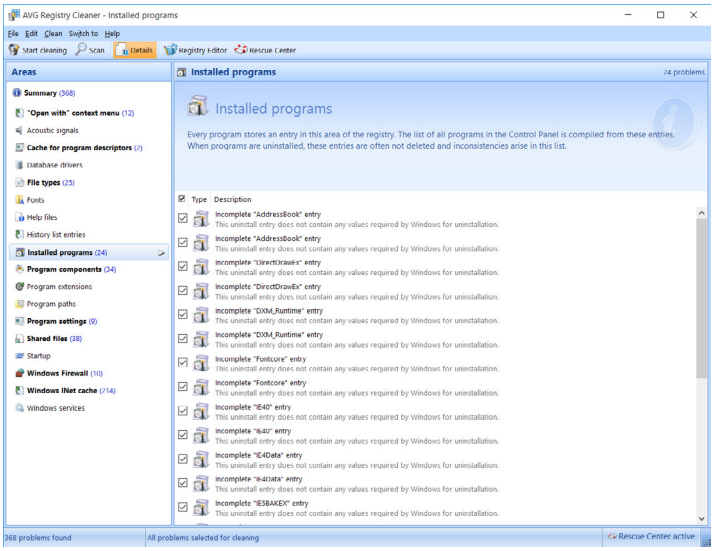
Chapter 2 | PC Maintenance: Five TCO Problems, One Solution.

Windows 7, 8, and 10 devices suffer from one thing: the more you use these PCs, reliability goes down.

Typical symptoms include increased crashes, error messages, and unexpected slowdowns which in turn can lead to a rise of support and maintenance costs. AVG PC TuneUp for Business sports two features, **Automatic Maintenance (run in the background)** and **1-Click-Maintenance (run by the user)**, which take care of various maintenance steps regularly that help improve reliability and that do not require elevated privileges, so you can roll them out to your PC clients easily and safely. The maintenance features perform the following tasks:

Task 1 Repairing Windows® Registry Errors

Installing programs, using programs, uninstalling programs – these three factors are just one of the roots for Windows® registry issues.



AVG PC TuneUp for Business screenshot showing registry issues related to program installations that could lead to reliability errors when setting up or removing applications

Chapter 2 | PC Maintenance:
Five TCO Problems, One Solution.

Task 1 Repairing Windows® Registry Errors *cont..*

According to a Microsoft blog, fixing Registry errors is a crucial part of any administrators job:

"Registry cleaners have always been popular, but I never paid much attention to them. I originally thought that there might be valid reasons for their existence, but over time changed my mind, only to recently recognize that even today they can help maintain Registry hygiene."

As the registry plays a critical role of any Windows® operating system, registry issues likely result in program crashes and error messages. The following registry-related issues tend to occur frequently:

- **Invalid startup entries:** These leftover entries may cause startup errors
- **Incorrect file type references:** Causing files to be opened by the wrong program
- **Incorrect uninstaller entries:** These leftover entries may cause startup errors
- **Incorrect file type references:** Such entries lead to errors when installing or uninstalling applications
- **Missing fonts:** Causes fonts to not show up in programs
- **Invalid ActiveX and COM component pointers:** may lead to error messages when running applications

Chapter 2 | PC Maintenance: Five TCO Problems, One Solution.

Task 2 Cleaning up hidden data and browser residues

The problem: Windows® and its programs produce an enormous amount of data residue. Both the operating system as well its programs continuously generate logs in the background, create history lists, and store temporary files. This results in issues such as:

- **Installation problems:** If data residue is left behind after numerous installations, this can block future setups
- **Crashes:** Many programs (and even the Windows® system) forget to delete temporary files after using them, which can lead to stability issues
- **Insufficient disk space:** PCs can become quite unstable and slow when the device is running out of disk space

These problems can be solved by AVG Disk Cleaner which is run automatically and cleans up the following types of files:

Crash reports ("memory dumps")	When PCs crash ("blue screen" appears), Windows® generates a so called memory image. In addition to information about the crash, this image can also contain personal user information.
Windows® error reporting	When programs crash, Windows® creates a report that contains not only information on the error that caused the crash, but also personal user information (e.g. files that were open in the program that crashed).
Lost clusters	Repair programs (such as Microsoft®'s own Check Disk) search for lost blocks of data (clusters) on the hard disk and store these as files. However, it's generally not possible to reconstruct usable data from these files.
Leftover installation files	Residue from MSI (Microsoft® Installer) installations. Many programs make use of the MSI installation routine but often leave behind traces afterwards.
Temporary system files	Many programs and Windows® functions create files for interim storage (e.g. TMP files) that are required for program execution. Programs often "forget" to delete these temporary files later and sometimes leave behind personal user information.

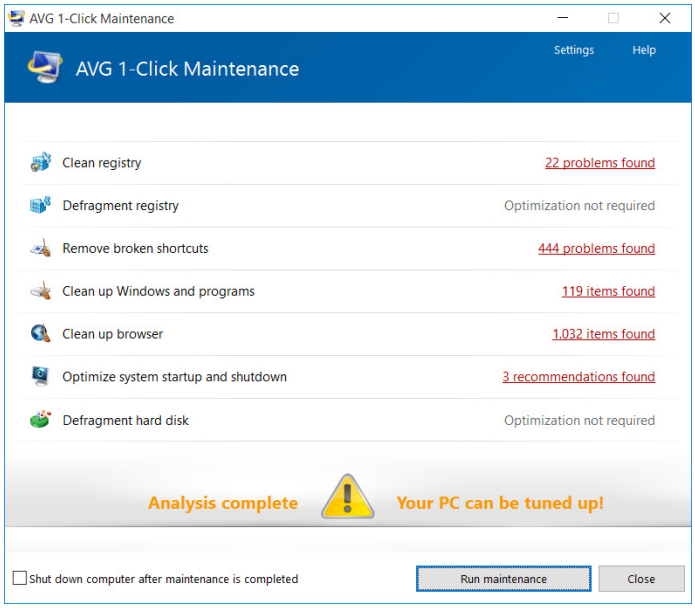
Chapter 2 | PC Maintenance: Five TCO Problems, One Solution.

Task 3 Reduces System Startup and Shutdown Delays

Unsupported applications are an issue in all SMB environments, even with software restriction policies in place, and a major cause for a startup and shutdown delays. Automatic Maintenance checks PCs for such non-essential programs against a regularly maintained database and turns them off.

Task 4 Prevents Fragmentation

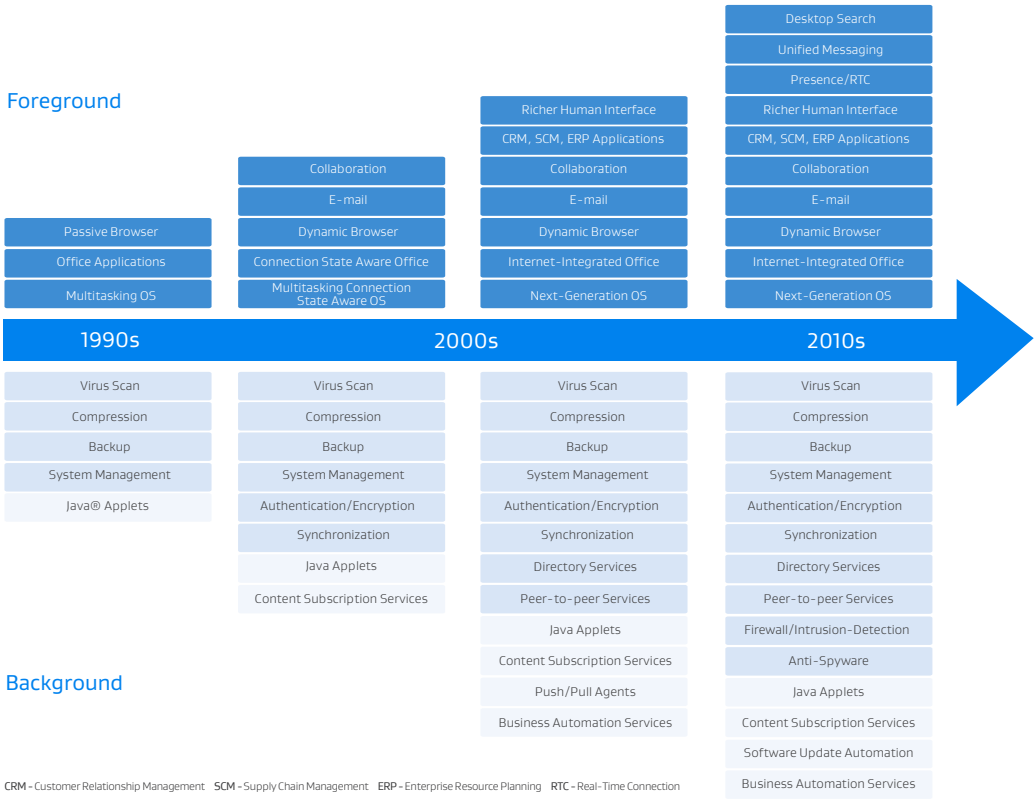
By (un)installing and running programs or just by performing file operations (moving, copying, deleting), data clusters on hard disks are spread across the entire hard disk – this is called Fragmentation. This leads to an increase in access times and file I/O performance. Automatic Maintenance takes care of defragmenting all hard disks by moving frequently used files to faster areas of the disk to reduce access times.



All of these steps can be performed either automatically using Automatic Maintenance on all your PC clients or even manually by the IT admin using 1-Click-Maintenance.

Chapter 3 | Performance & Power Consumption - Keys to Productivity and Cost Saving

Back in the 1990s, PCs had little more to do than run basic Office applications, simple browsing or graphic tasks. In today's business, the areas cover far more than that – which take its toll on your devices performance and battery life.



This graph was inspired by an Intel study conducted a few years ago which lists the applications run in modern business environments in the 90s up until now.

The number of active (top part of the graph) and background (bottom) processes rises as business requirements and demands increases. Even modern PCs suffer from this massive amount of parallel operations, resulting in a noticeable performance hit and waning productivity of your co-workers. The following sections detail how AVG PC TuneUp for Business achieves the best IT overall efficiency thanks to its performance tools and built-in mechanisms.

Chapter 3 | Performance & Power Consumption - Keys to Productivity and Cost Saving

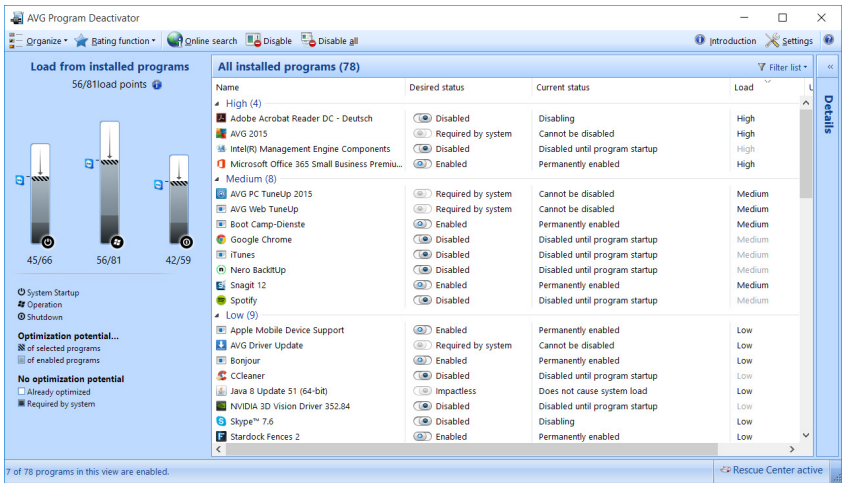
3.1 Overview of Performance Tools in AVG PC TuneUp for Business

AVG Program Deactivator

Background processes, Windows services and scheduled tasks installed in connection with many programs use up a PC's resources needed for performance. These program components are often still active even when the corresponding program isn't being used.

The benefits

- RAM isn't tied down & CPU resources are conserved
- Hard disk activities are reduced
- PC/notebook power consumption drops
- Annoying info messages and splash screens (e.g. during Windows® startup) disappear



AVG Program Deactivator solves this issue by putting components to sleep and re-enabling them when needed: Program Deactivator recognizes those program components that will load a PC down and can deactivate them completely.

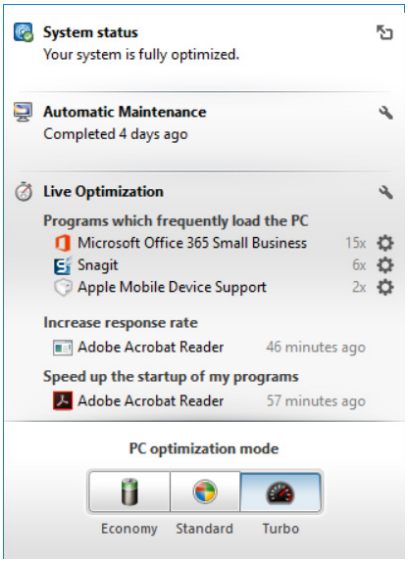
Chapter 3 | Performance & Power Consumption - Keys to Productivity and Cost Saving

3.1 Overview of Performance Tools in AVG PC TuneUp for Business

AVG Live Optimization

When background tasks consume CPU cycles, applications that you're using in the foreground can slow down tremendously. AVG Live Optimization is the solution: it works silently in the background and improves process prioritization of all running applications. An advanced algorithm observes the computer's load in real-time and balances resources more effectively. The results:

- **Programs start faster:** If the user launches a program under heavy usage, it gets a sudden priority boost. This speeds up the launch noticeably
- **Performance of running programs increases:** CPU-intense processes, which are not actively used, get a lower CPU priority. All programs the user actually works with get higher priority



Live Optimization automatically decreases priority for inactive processes and focuses PC performance instead on processes the user is actually working with.

Chapter 3 | Performance & Power Consumption - Keys to Productivity and Cost Saving

3.1 Overview of Performance Tools in AVG PC TuneUp for Business

Startup Manager – Detect and Disable Unnecessary Startup Programs

Installing unsupported applications on business PCs and laptops introduces issues: These additional processes lead to significant boot times and lower day-to-day performance. Admins usually take steps to prevent 3rd party programs from being installed, but in many situations such restriction policies are not possible due to the clients need for flexibility.

Common IT tools for disabling startup applications – such as msconfig or Autoruns – are not capable of highlighting recently added entries. By using **AVG StartUp Manager**, your IT staff finds all new and non-standard applications entries easier than ever.

Turbo Mode

To prevent your business applications from such performance hits, IT admins should consider turning off operating system features that might not be necessary in their environment. **Turbo Mode**, part of AVG PC TuneUp Business Edition, takes care of that. It turns off more than 70 services, scheduled tasks and processes – of course, admins decide what they need or don't need in their environment.

Economy Mode

In spite of the latest developments in personal computing like power-saving CPUs and SSDs, the power consumption of PCs and notebooks still leaves something to be desired. AVG Economy Mode addresses this by introducing a more fine-tuned power management system:

- **Switching off dynamic processor clocking:** AVG Economy Mode makes sure that a processor in energy saving mode runs continuously at its lowest clock pulse – regardless of the load applied
- **Controlling screen brightness:** A notebook's screen is set to a lower level of brightness when TuneUp Economy Mode is launched
- **Energy-saving measures** for hard disks, slide shows, wireless adapter settings, and screen settings – for both battery and power supply operation modes

Chapter 4 | Test Results

The plethora of performance tools in AVG PC TuneUp for Business can have quite a significant effect on performance. In this chapter, we will document all performance and power management improvements introduced by the tools mentioned above.

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.

Chapter 4 | Test Results

4.1 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 and 10's new "Automatic Maintenance" feature was first executed and then disabled
- The "SuperFetch" feature 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 run down until 1%

Chapter 4 | Test Results

4.2 What PCs did we test? And why?

In this year's benchmarking roundup, we decided to test the effects of AVG PC TuneUp on a broad spectrum of devices out there. We used brand-new machines running Windows 10 as well as old laptops and desktops running Windows 7:

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

High-End Business & Productivity Ultrabook (Core i7)

Asus Zenbook™ UX-501 (2015)
Running Windows 8.1

Spec: Core i7, 3.6 GHz
16GB RAM, 100 GB SSD
1 TB HDD (7200rpm)
GeForce 960M GTX

Laptop (AMD APU)

Sony VAIO® YB3V1E/S (2011)
Running Windows 7

Spec: AMD APU , 1.53 GHz
4GB RAM, 450GB
5400rpm HDD

Thin Ultrabook/Tablet (AMD APU)

HP™ Spectre x360 (2015)
Running Windows 10

Spec: AMD APU, 1.53 GHz
4GB RAM, 450GB
5400rpm HDD

Chapter 4 | Test Results

4.3 Simulating High Workload

This experiment, a large (but not unusual) amount of applications is being installed on the PCs and laptops to see the effects on performance. The experiment helps evaluate a) how a high application load has an effect on modern systems and b) whether AVG PC TuneUp for Business is capable of optimizing performance.

The following steps were performed on all the machines to simulate a high load:

Step 1 Testers prepared the test machine according to Microsoft® guidelines (see Section 4.1).

Step 2 Image of the clean install was taken using Microsoft®'s built-in "recimg".

Step 3 To simulate workload, the machine was equipped with approx. 150 additional popular programs.

Step 4 - After the installation was completed, all programs were started at least once.

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.

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

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

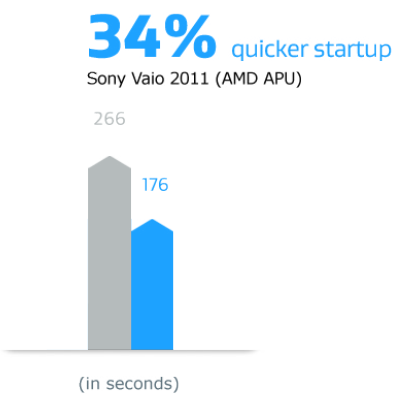
- **1-Click-Maintenance**: Run with default settings
- **Turbo Mode**: Enabled
- **Program Deactivator**: All Programs were turned off (two reboots were necessary)
- **Startup Manager**: All remaining startup entries were turned off
- **Live Optimization**: Enabled

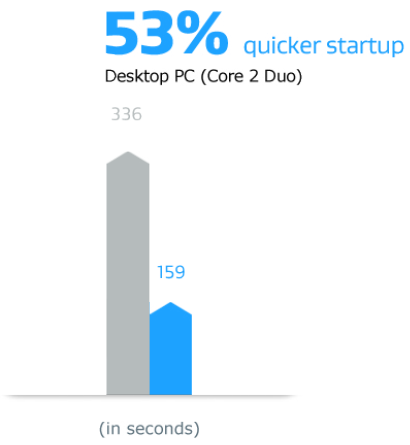
This optimized state is referred to as "After".

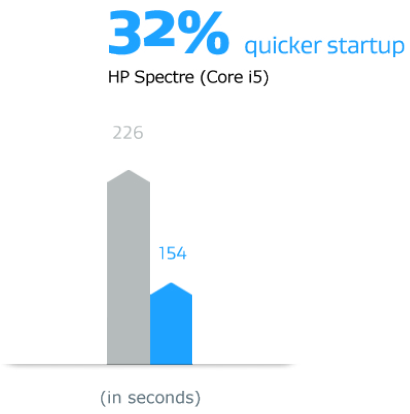
Chapter 4 | Test Results

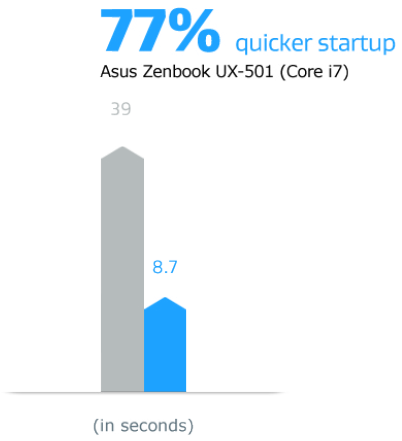
4.4 PC Startup Time

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. The results:







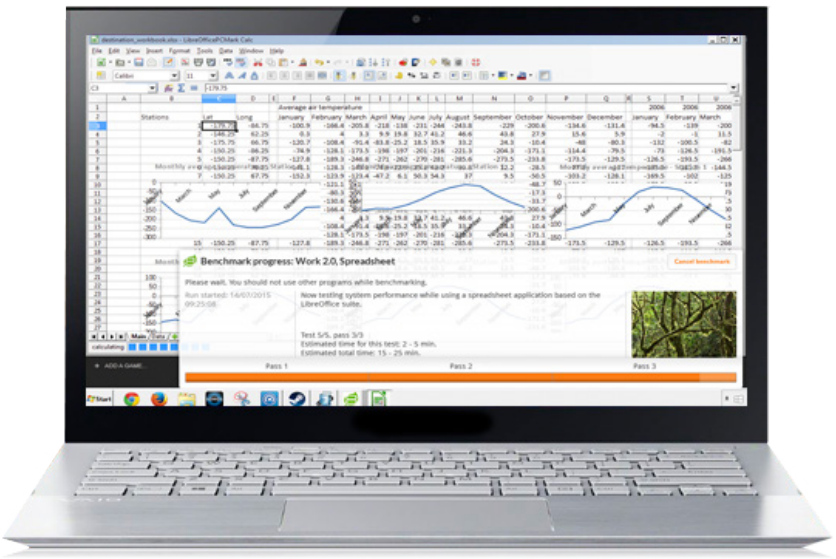


Chapter 4 | Test Results

Under the load of more than 150 applications, even the more powerful PCs and laptops had to suffer as countless startup items, services, drivers and scheduled tasks were loaded and made the machine barely usable in the first couple of minutes. It's worth noting that the Windows desktop, the taskbar and all icons were visible within one minute on all devices, but weren't usable or very slow: That's why we measured total boot time until the very last program was loaded and the PCs or laptops were actually usable. After we optimized the PC using all the various performance tools included in the 2016 release of AVG PC TuneUp, boot up time dropped between **32-77%**.

4.5 Browsing, Writing & Video Chat Performance

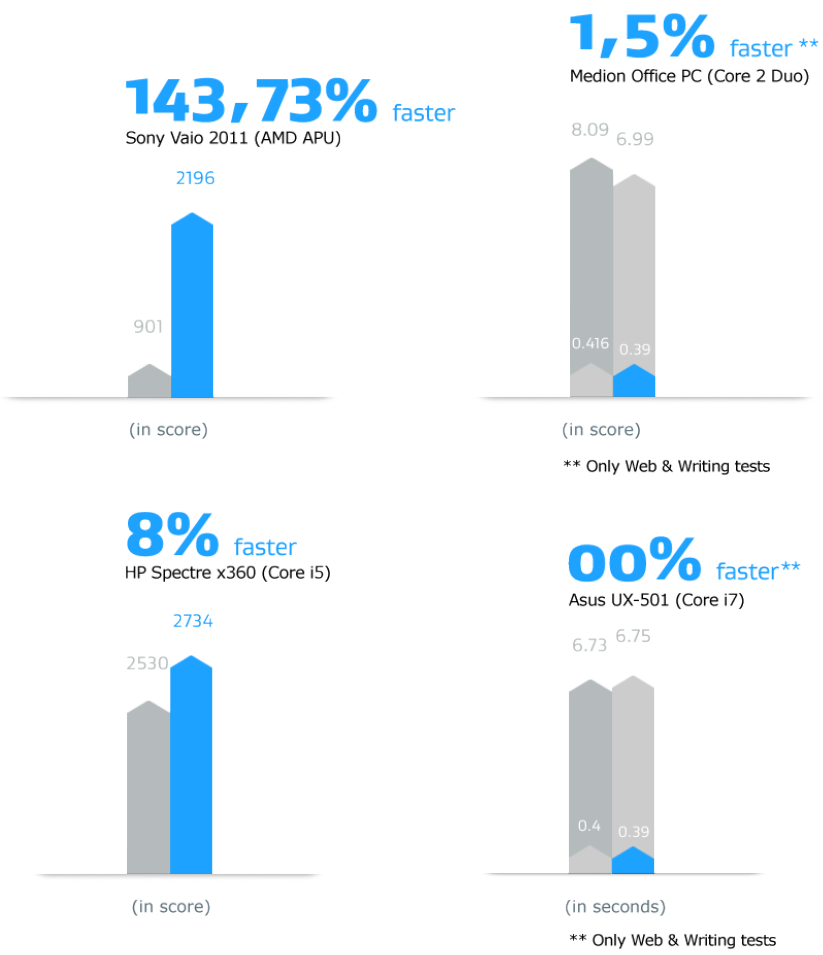
The next test involved the benchmarking tool PCMark 8 which uses real-life scenarios such as browsing the web, Office 2013, Adobe Creative Suite and other tools to recreate a typical home and business scenario. In this scenario we used their "Work" test which measures the exact time it takes to complete tasks or the rendering performance of browsing the web, writing and video conferencing down to the millisecond:



PCMark 8 performs complex calculations and measures the time to complete them

Chapter 4 | Test Results

The low-end processor of our Sony Vaio test devices suffered from the load of 150+ applications as it was barely able to complete the benchmarks. However, once we used all tuning tools from AVG PC TuneUp, the overall score went from **901 to 2196**. In the other cases, performance improved as well between **1,5** and **8%**.

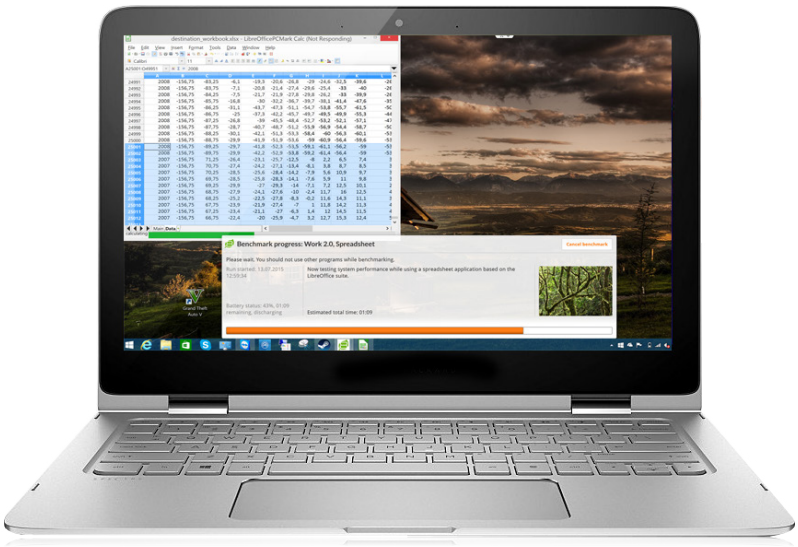


Chapter 4 | Test Results

4.6 Office 2013 Performance

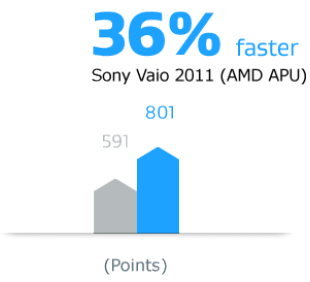
The next test involved PCMark running automated actions in Word, PowerPoint and Excel to measure performance:

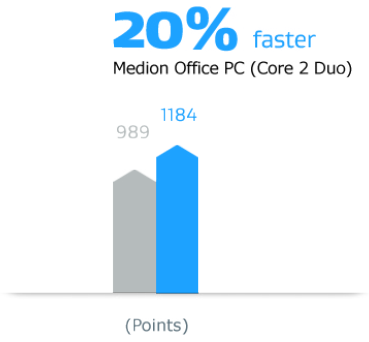
In these scenarios, which for example involved the calculation of thousands of data sets in Excel, the optimization with AVG PC TuneUp had an impressive effect on performance:

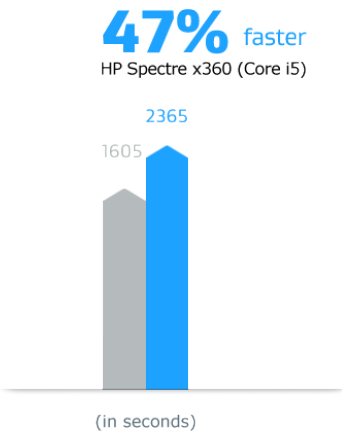


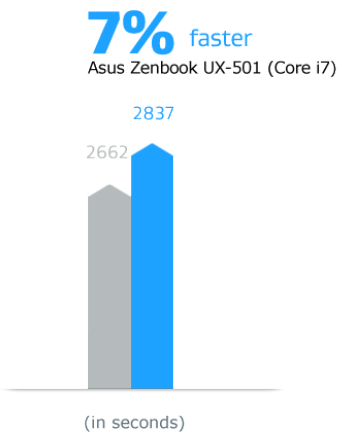
Chapter 4 | Test Results

An almost 50% increase while performing complex animations in PowerPoint, calculations in Excel or documents in word is a noticeable improvement. It also goes to show that the impact of 150+ popular applications can, in some cases, have quite an impact on speed.









Chapter 4 | Test Results

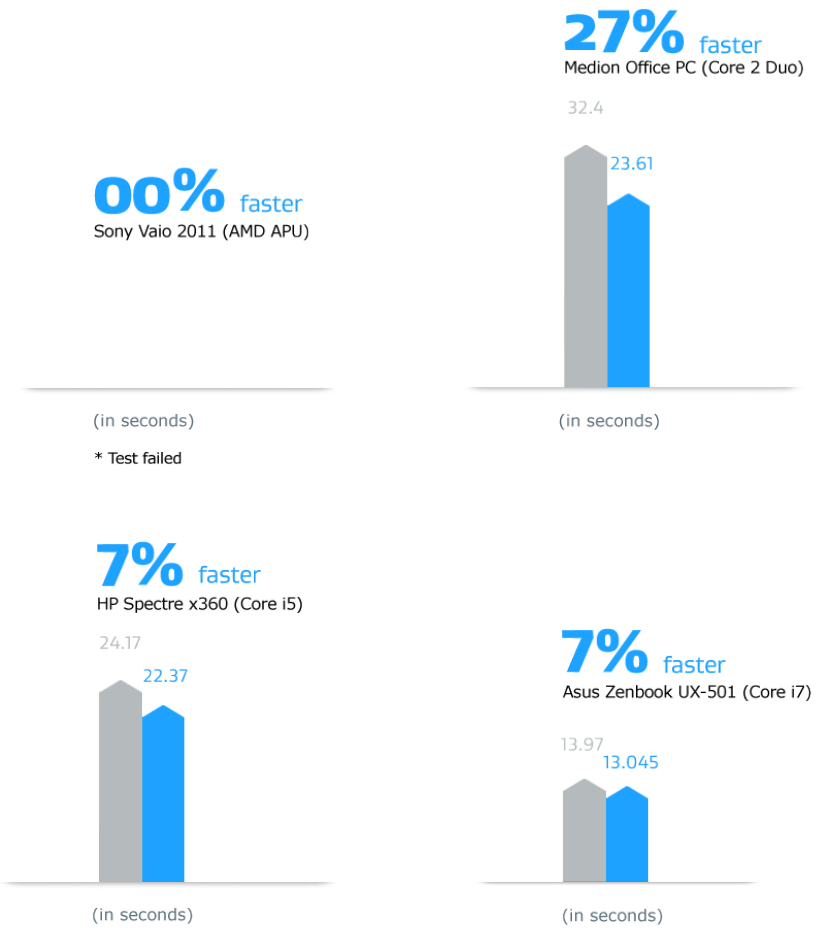
4.7 Adobe Creative Suite Performance

While the last couple of tests focused more on consumer activities, such as browsing the web or working with Office, particularly IT professionals have a need for snappy performance. One such example is Adobe's Creative Suite:

Working with huge Photoshop, InDesign or Illustrator files is hugely dependant on how fast the machine is and how much additional program load is draining its resources.

Chapter 4 | Test Results

The results were quite impressive: the time it took to complete tasks, such as applying filters to a huge PhotoShop image, or converting an InDesign file went down drastically. When translating this into actual work hours for employees waiting for a file to be loaded, this could save any business money.

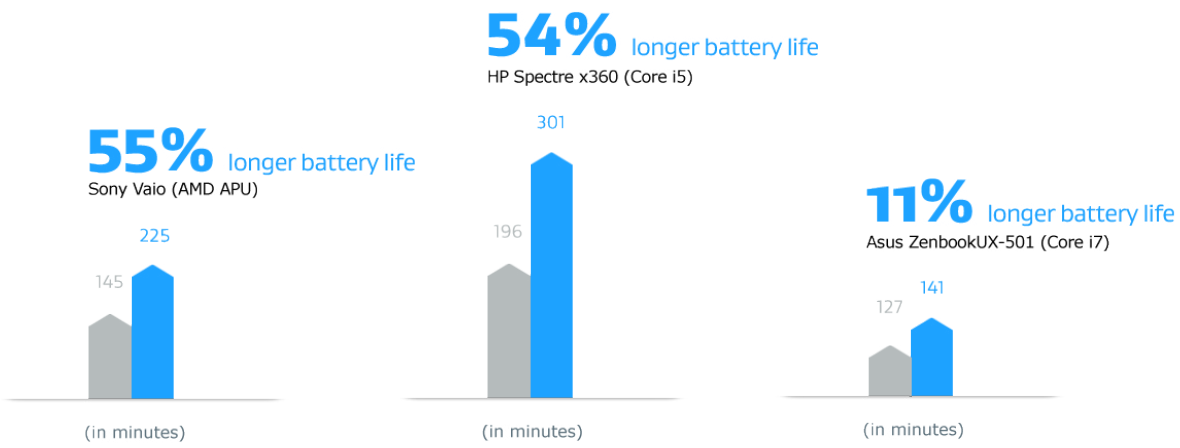


Note: Lower is faster

Chapter 4 | Test Results

4.8 Battery life while working

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:



Thanks to AVG PC TuneUp's Economy Mode and Flight Mode, battery life went up 55% percent on the Sony Vaio – **from 2 hours and 25 minutes to 3 hours and 45 minutes**. That could mean the difference of finishing an important client presentation on a long flight. Similar results were achieved on the more power-efficient HP Spectre x360 running Windows 10.

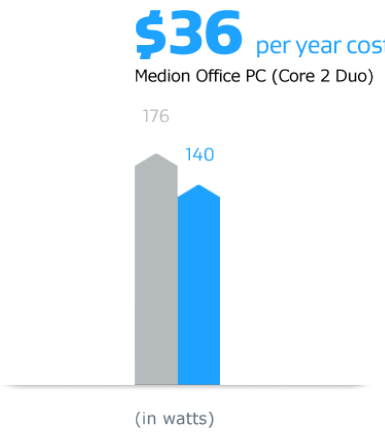
Again, this increase was achieved by effectively throttling the power-hungry CPU and turning off unnecessary hardware.

Chapter 4 | Test Results

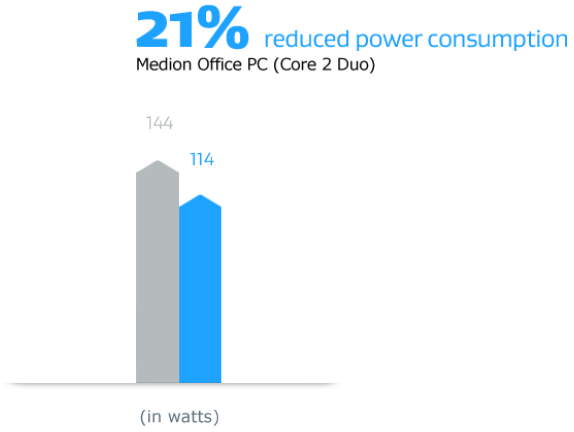
4.9 Power consumption during heavy Adobe PhotoShop work

While battery life matters on laptops and tablets, more powerful workstation or even regular office PCs tend to consume a lot of electricity with their massive power supplies. To calculate the yearly costs of a PC, the following calculation can be used:
*X watts * (8,760 hours per year) / 1000 = Y (kilowatt-hours)*

X stands for the average watt consumption of the PC, whereas Y is the result in kilowatt-hours. Next, you will need to know the price of kilowatt-hour in your area. Acording to the Bureau of Labor Statistics, in the United Statesthe average price per kilowatt hour averaged at around $14 cent in 2014.Next, you'd need to multiply the kilowatt hours with that average price divided by 100 cents per dollar. *Y kilowatt-hours * 14.28 cents / 100 = Z ($ cost per year)*



Energy consumption on the older Medion office PC dropped from an average of 144 Watts to 114 Watts when using AVG PC TuneUp's power saving technique Economy Mode. When using the calculation mentioned above, this equals to **1261,44** kilowatt-hours if the PC is being left on 24/7, which amounts to a total of **$176 per year**. When power saving mode is enabled the cost could go down to **$140**.



Chapter 4 | Test Results

4.10 Cleaning Tests

Performance and battery life isn't all when measuring the performance of a computer: over time, Windows, applications and browsers accumulate Gigabytes of data. Case in point: even on the newly purchased mobile workstation (Asus UX-501), the installation of 150+ programs and the upgrade from Windows 8.1 to 10 accumulated to roughly 38,5 Gigabytes of unnuecessary files. Even more, on a multimedia PC, there was more than 72 GB of Windows Upgrade files and Windows Update leftovers:

Chapter 5 | Summary

The lab tests and feature analysis provided in this whitepaper are a strong indicator how AVG PC TuneUp for Business can save your IT department some time, increase your employees productivity and take care of sensitive files – all by deploying it effectively and safely into your environment.

IT software distribution made quick and easy by our silent installer

AVG PC TuneUp for Business can be installed without user interaction using the "silent" mode setup. Your IT staff can easily deploy the package corporate wide and pre-configure its most important settings, such as enabling or disabling the update dialogue. For more information on our silent installer, please refer to our document "Silent Installation of TuneUp Utilities™ 2011".

Automatic Maintenance. Runs without administrative privileges.

Automatic Maintenance and Live Optimization fit in perfectly with your IT – both features work under limited user accounts and thus without the need for administrative privileges. Administrators decide in detail what maintenance should be performed and at what interval; they also choose If Live Optimization needs to be active or not. The result: your co-workers enjoy a well-maintained PC without even noticing the background maintenance at all.

Chapter 6 | 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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