Windows 10 Troubleshooting

Learn to Troubleshoot and Repair Windows 10 Problems Like the Pros Do

—

Second Edition

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Mike Halsey, MVP

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For my parents, James and Margaret, who got me started with computers when I was 11 years old and were always supportive and encouraging, and especially for my mother who gave me the push I needed to start a career as an author. This will be my 20th book, so I raise a glass to you both… with thanks!

Table of Contents

About the Author

Mike Halsey has been a Microsoft MVP (Most Valuable Professional) awardee since 2011 and is a recognized technical expert. As the author of Windows 7, 8, and 10 troubleshooting books and associated video courses, he is well versed in the problems and issues that PC users, IT pros, and system administrators face when administering and maintaining all aspects of a PC ecosystem.

Mike understands that some subjects can be intimidating for some people and that everybody is different, so he approaches each subject area in straightforward and easy-to-understand ways.

Mike is originally from the United Kingdom, but now lives in the south of France with his rescue border collies, Evan and Robbie. You can contact Mike on Twitter at `@MikeHalsey`.

About the Technical Reviewers

Carsten Thomsen is a back-end developer primarily but working with smaller front-end bits as well. He has authored and reviewed a number of books and created numerous Microsoft Learning courses, all to do with software development. He works as a freelancer/contractor in various countries in Europe, using Azure, Visual Studio, Azure DevOps, and GitHub as some of his tools. Being an exceptional troubleshooter, asking the right questions, including the less logical ones, in a most logical to least logical fashion, he also enjoys working with architecture, research, analysis, development, testing, and bug fixing. Carsten is a very good communicator with great mentoring and team-lead skills, and great skills in researching and presenting new material.

Laurent Gébeau works in IT since 1994, where he discovered Windows at Microsoft. Laurent worked as an IT manager in various companies and decided to join Axeperf as co-owner in 2012. Axeperf is an IT company, mainly helping small businesses to move to modern IT (infra, security, and cloud applications).

Laurent is a Microsoft Certified Professional since 1995 and also Microsoft Most Valuable Professional since 2004. He has been awarded for his website and blog, has written some books, and spoken at some public conferences about various Microsoft products.

Introduction

A couple of years ago, I moved from the United Kingdom to the south of France and bought a house in the countryside. This house came with a gîte, which is a guest outhouse that is very common in France. I decided this gîte would become my office, so with the help of a very talented friend and some antique wood found in a neighbor's barn, I set about creating an appropriate desk space in what would be both an office and my own personal computer museum.

This museum contains all of the computers I have used and loved throughout my life, including an original IBM 5150 PC and lots of home computers from Sinclair Research in the 1980s and handhelds from Psion in the 1990s. Among the collection though is an original, shrink-wrapped box containing the floppy disk (both 3.5 inch and 5.25 inch) installers for Windows 3.1.

It's astonishing just how far Windows has come since those shaky, flaky times of 16-bit code. I remember how frustrating Windows 98 was to use, and how utterly unreliable Windows Me could be. When Microsoft released Windows 2000, however, everything started to change.

Yes, XP could still be unreliable and reinstalling it from fresh once a year was always considered good practice if you had the time and resources, but it worked, was stable, and came with some handy extras such as System Restore.

Windows Vista and Windows 7 added even more of these useful tools including the User Account Control (UAC), the Reliability Monitor, and the truly excellent Steps Recorder that was originally only supposed to be a debugging tool for the Windows 7 Beta, but was so popular it remains in Windows to this day.

Throughout all of these feature additions for troubleshooting, diagnosis, and repair, the versions of Windows they shipped with became ever more reliable, in what I call an interesting dichotomy perhaps best expressed by the graph in Figure 1.

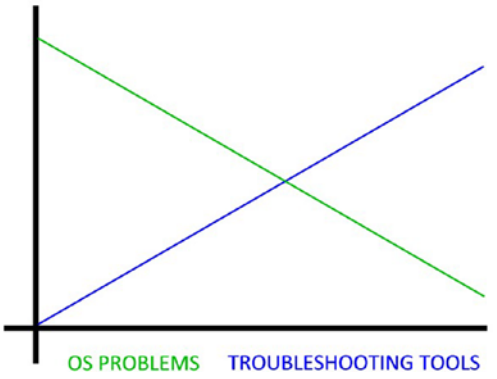

Figure 1. *OS problems vs. troubleshooting tools graph*

For as reliable as Windows 10 is however, and it has been a very, very long time since I have needed to reinstall a Windows OS once a year, problems still arise. This is primarily because of two things: firstly, the sheer volume of third-party software, drivers, and hardware, and secondly, the need to support legacy code dating all the way back to that IBM 5150 PC which was released in 1981.

These included tools and utilities however do allow us to troubleshoot and repair problems much more effectively, and much more quickly than we were ever able to before. This is doubly important in this post-pandemic world where the workplace has been fragmented outward into the homes of employees. Perhaps then this is where this second edition becomes most prophetic, with a heavy focus being placed on supporting those workers, who are very likely using their own computers, and making sure that downtime is minimized and productivity can remain high.

I hope you find this book helpful, educational, and informative. It is designed in such a way as to allow you to dip into and find the information you need fairly quickly, and to see that information at different levels of complexity as your own skills grow and expand. It's certainly been a fun book to write.

PART I

Getting Started with Windows Troubleshooting

CHAPTER 1

Introducing Troubleshooting in Windows 10

The landscape of computing has changed considerably in just the last few short years, and with Windows as much as any other embedded or installable operating system. Since Windows 10 was first released in 2015, we've not seen any operating systems that could genuinely be classed as "new and innovative" but instead have begun to see the signs that the future of computing will be extraordinarily different to its past. Take Windows 10X for example. This was initially announced as a variant of Windows 10 for dual-screen devices, but in fact was far more interesting than that.

Windows 10X was designed by Microsoft to be a direct competitor to Google's Chrome OS, to which Microsoft was losing out in the education market, with Chromebooks also making strong inroads into the business market. Microsoft changed its pitch, instead saying that Windows 10X was designed for frontline workers, i.e., those people who sit or stand with terminals having direct contact with customers, suppliers, and so on, as well as also being designed with the education market in mind.

What made Windows 10X so different, and interesting, was its completely new architecture; it was designed not to run on the PCs and with the software we use today but instead was designed to run the apps and on the hardware we'll use in the future.

Gone was any ability to run the legacy Win32 software that Microsoft had built the huge success that was Windows on top of for so many years, and in its place was a different architecture based entirely on virtualizing apps and streaming them from the Internet.

Microsoft's cloud service, Azure, was also being upgraded and expanded to cope with this bright new future. In essence it revolved around two important technologies,

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Progressive Web Apps (PWAs) and Windows Virtual Desktop (WVD). This would allow a PC in any form factor to either install apps built as websites and run them locally (such as Microsoft's Office web apps of Word and Excel) or use Azure to host and run the installation of older Win32 software that could then be streamed to the device in real time.

All of this sounds wonderful, but it's not without its problems, the first of which is that both of these technologies, and in particular Virtual Desktop, rely on the PC having a permanent and fast connection to the Internet. Technologies such as 5G and fiber broadband help with this, but only really in cities and large conurbations. As I write this, I'm in the middle of a farmland in central France where my nearest neighbor is a cow. I have a spectacular ADSL connection that reaches the heady heights of 3.5Mb/s, and though fiber is being rolled out to my neighborhood this summer, far more people around the world are not so lucky.

France made the decision a few years ago to roll out fiber broadband to every single business and home in the country, no matter how remote they are. It was a bold plan and, so far, one that appears to be working. France is the anomaly, however, with the United Kingdom, the United States, and most other countries failing to provide even basic Internet connections to rural areas.

Why is this a problem when most businesses, especially the large ones, will reside in major towns and cities you ask. The problem comes with our changing work habits. The unfortunate world events of 2020 (if only there was a phrase we could have used to describe seeing that coming) have changed work practices forever, with far more people now working from home on a permanent, or semipermanent, basis. The global pandemic also created a strong desire for many people to move out of the large towns and cities to more rural locations where the air was cleaner and large throngs of people, all rammed together in busy streets, just didn't exist.

You can see where I'm coming from here, can't you, that while technologies such as Windows 10X and Virtual Desktop are fantastic, great for security, stability, the updating of systems, and so on, they're not yet ready for prime time and won't be for many years yet. At least, they won't be able to become the dominant desktop experience for a considerable time.

This leaves us with the venerable old Windows 10 which really hasn't changed very much in the years since its first launch. The reasons for this are many, but primary among them is a need by business to have the underlying technologies and interfaces remain intact, so they don't have to implement large and expensive changes to their

workflows or infrastructure. Sure, many businesses have already ditched their on-premises servers and moved to cloud-based servers instead such as Azure, but the venerable desktop PC will be with us for some time yet.

This brings with it a new set of problems, not the least of which is the changing way we work, and the changing places in which we work today. There's a new need to support remote users, and workers have also started using their own PC hardware (which presents additional security and stability challenges for organizations) and also means that any hope of maintaining uniformity of hardware across any business or organization is now officially a pipe dream.

Windows is a complicated beast, still able to run DOS software from 1985 and some early Windows programs too. When you look at the operating system as a whole, it's amazing really that it works at all. Windows Update is a good example with updates being rolled out on a regular basis to literally billions of different combinations of hardware and software. If you think your laptop is just the same as many others, think again. There's no other laptop like yours anywhere else in the world, with its unique combinations of printer, peripherals, and installed software.

We also need to support older hardware in Windows because many manufacturing processes and even critical infrastructure demand it. We've had USB for decades now, so long in fact that it's gone through many changes and interactions itself. Originally though, it brought an exciting new technology with it, Plug and Play. This allowed the operating system to identify the device that was being plugged in just by interrogating it.

Before this technology came about, however, things were very different. Serial and parallel devices had to be identified and configured manually using setup files, settings tweaks, and scripts. Just getting a serial device to be identified at all could be a challenge that would sometimes occupy a couple of hours.

When it came to the desktop, things weren't that much better. Differences in processor and other technologies from what we use today frequently caused memory leaks, Blue Screens of Death, and crashes. If you were using Windows 95 or 98, there was no easy way to repair the operating system, as even System Restore didn't appear until Windows Me, and that operating system brought its own unique bugs and instabilities that even today cause people to break out in a cold sweat.

With Windows Vista, Microsoft set out to fix all of this. They created a new hardware driver model to reduce, and even eliminate, instabilities and crashes, and completely reengineered the operating system to make it robust, resilient, and reliable. Even today, a Windows Vista system is pretty good to use, and Windows 7, 8, 8.1, and 10 continued to build on that reliability.