Analysis of Windows 10 versus Windows 7 Performance Implications with Office 365
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Introduction

We first published this paper during the initial launch of Windows 10. Lakeside Software was invited to be a launch partner for the Microsoft 10 and Office 365 Enterprise Launch event series called “Ignite Your Business.” At each event, we had the opportunity to interact with hundreds of IT professionals. The most popular question we heard by far was "How does Windows 10 performance compare to Windows 7?"

This question drove us to do an initial investigation into performance implications of moving from Windows 7 to Windows 10. We turned to Community data derived from thousands of anonymous physical and virtual endpoints using Lakeside’s analytics engine, SysTrack. The SysTrack agent sits directly on the endpoint, providing an analytics solution that provides complete insight into any environment by exposing all facets of technology which impact and control end user experience. Since publication, we have heard increased interest from our clients about the performance implications of a Windows 10 transformation specific to Office 365. To build on our earlier discussion, this paper now includes additional analysis of Office 365 based on the latest data from SysTrack.

If you are getting started with a Windows 10 transformation, we invite you to try our site: Win10assessment.com. This free assessment generated by SysTrack provides you with a detailed report on your environment’s current use and performance as well as its fit with Windows 10.

Assessing with Real versus Synthetic Users

Before we begin to explore the performance implications of a Windows 10 transformation, there’s one caveat we feel obliged to discuss: Many IT professionals are attempting to analyze Windows 10 purely based on system performance through simulated user sessions. We know from experience that these exercises rarely capture actual system performance under actual usage and often lead to user experience deterioration. We strongly advise measuring performance impact by quantifying real user impact. The most successful transformation pilots enlist groups of volunteer users who represent a valid swath of:

- Workstyles (i.e. HR, Finance, Sales)

3 For more information on SysTrack Community or how our user experience scoring is calculated and normalized, please refer to our white papers “Comparative Analytics with the SysTrack Community” and “How SysTrack Works”.
- Geographies (i.e. HQ, Branch, Remote, Mobile)
- Devices (i.e. Desktops, Laptops, Tablets)

Our Metrics

Our test focused on three primary metrics, which we will later use to inform our hardware suggestions for different user segments, as defined by Gartner\(^2\). These metrics were:

- System boot times
- Office application performance (Word, Excel, and Outlook)
- SysTrack health scoring

We filtered out any Office products older than 2010. In most of our analysis, we did not control for more specific versions of Office products because our goal was to focus on the performance of the applications relative to the OS. If this data is interesting to your organization, we would welcome you to join SysTrack Community and participate. The overall results imply a dramatic increase from older version of Windows (XP and Vista) to Windows 7 with a slighter overall increase with Windows 10.

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Figure 1: Overall boot times for the analyzed versions of Windows (lower is better)

Figure 2: Overall application startup times for Office suite components (lower is better)
Figure 3: Overall SysTrack health scoring by OS version without hardware analysis (higher is better)

This implies that across our sample set the average service quality for users of Windows 10 increased slightly overall (from around 84% to 87%). We’ll focus more on breaking out this increase and do some further segmentation based on our observations of performance based on hardware.

Hardware Specifications

Controlling for hardware specifications at this scale is very difficult, however we can make some general recommendations based on our user segmentation analysis. Since approximately 21% of our Windows 10 endpoints are virtualized, we believe we have a large enough sample set to draw some conclusions and provide some recommendations for VDI deployments, however we’ll begin with certain physical deployment baselines.

In this physical realm, we segment user classes into four segments which align to Gartner best practices:
Deskbound

This segment includes equipment used by people who spend their working day in a single location, such as an office. Users who fit this workspace well are those who have very limited mobility requirements. Examples of users in a deskbound workspace include receptionists, service desk personnel, computer-aided design (CAD) designers, administrators, and finance and HR professionals. Note that this is “Deskbound” not “Desktop-bound” – thus this segment refers more to workstyles than hardware preference.

Deskbound users often have one primary corporate issued computing device. Increasingly, deskbound workspaces include laptops as the primary computing device. We find that laptops are quickly displacing deskbound devices and are becoming a mainstream option for users with very limited mobility requirements, such as those who attend internal meetings or work in space-constrained environments. 59% of systems running Windows 10 with processors inferior to i5, a HDD (including hybrid HDD/SSD configurations), and less than 4GB of RAM showed significant user experience deterioration (where we define “significant” as greater than 5% over our normalized user experience index) for boot times and office workloads compared to equally configured Windows 7 desktops. Since neither the average nor median Deskbound Windows 7 desktop in SysTrack Community meets these three criteria, we recommend tethering a hardware refresh to any Windows 10 transformation project.

Our minimum recommended system spec for a Deskbound Windows 10 endpoint is:

- Intel Core i5
- SSD Storage
- 4GB RAM

Non-Deskbound

This segment includes users who spend part or all of their working time in multiple locations or have a job that requires them to be a mobile worker. It is the most diverse of the four foundational workspaces. A non-deskbound user’s time may be spent roaming a campus or plant site, in meeting rooms, driving, regularly working from home a few days a week, traveling by air, standing, and all other work-on-the-move scenarios.

A growing range of use cases fits the non-deskbound definition, including knowledge workers and nonroutine, creative workers. Examples include executives, and marketing, legal, and sales professionals. For mobile users, laptops have been the primary computing devices among SysTrack community non-deskbound users, although scenarios

3 8GB RAM for CAD and Graphic Intensive applications
where laptops are being replaced by a hybrid devices or tablets are emerging. Elements that dictate the exact choice include working style, and application and performance requirements. SysTrack Community data indicates that over 70% of Non-Deskbound users have more tabs open in browsers and a greater propensity for utilizing non-sanctioned (aka “Shadow IT”) applications than their Deskbound counterparts. Therefore, while our processor and storage recommendations for systems running Windows 10 are identical to the Deskbound segment when compared to Windows 7 desktops, we have upped our RAM recommendation to 8GB for this segment.

The big caveat here is that there are many users in the Deskbound segment who are using a laptop and would be in the “comfort zone” with 4GB of RAM. Further, we find that some verticals, such as Finance, have a much lower likelihood for non-sanctioned applications on Non-Deskbound users, and such would also see improved user experience over Windows 7 in Deskbound (i5 + SSD + 4GB) system configurations.

Our minimum recommended system spec for a Non-Deskbound Windows 10 endpoint is:

- Intel Core i5
- SSD Storage
- 8GB RAM

**Shared**

This segment refers to users in a communal work environment. Devices are not allocated to named users but are shared by multiple workers. Examples of shared environments include a hospital ward, call center, travel agency, kiosks, hotels, and warehouses.

With stand-alone solutions, the main computing device can be a desktop PC, thin client, or mobile device, and the communication device is often a desk phone. In some cases, tablets and laptops are also shared by multiple users. The use of desktops or thin clients (with applications delivered through virtual or shared desktops) in non-allocated desks, where users can log onto their work environment, also can be included in the shared workspace, and some insights on those users Windows 10 vs Windows 7 experience can be garnered from the VDI section below.

Shared workspaces can be designed to complement other workspaces, typically non-deskbound workspaces, for users working in multiple environments. This would be the case with hot desk spaces in offices equipped with power cables, wired or wireless network connectivity, desk phones and external monitors, and can be shared by occasional visitors equipped with their own laptops and/or tablets (their primary

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4 As mentioned in the summary, in some cases 4GB may be sufficient. The estimates herein are based on user experience score assessments from SysTrack Community as do not represent an absolute quantity.
deskbound workspace). For shared workspace, we do not make RAM recommendations at all because we see no consistency in experience improvement or deterioration between Windows 10 and Windows 7, even down to the 1GB. We do maintain our processor (i5) and storage (SDD) recommendations, although we did witness performance improvements in some use cases (locked down endpoints running only Office and a browser) in which inferior processors and non-solid-state hard disks did not deteriorate Windows 10 user experience when compared to equivalent Windows 7 workloads, however, these represented only 12.4% of SysTrack Community Shared segment workloads.

Our minimum recommended system spec for a Shared Windows 10 endpoint is:

- Intel Core i5
- SSD Storage

**Industrial**

This segment refers to devices allocated to users who have predictable “locked down” workflows. These scenarios can involve more environmental factors, such as light, dust and extreme temperatures, and devices can be semi-ruggedized or ruggedized. Many of these devices do not have open access to the internet and are aligned with Microsoft’s Long Term Servicing Branch. Examples include ATMs, retail tills, field service, manufacturing plant, gas and utilities, construction, and military personnel. Because of the sparse connectivity afforded to this segment, it is vastly underrepresented in SysTrack Community and as such we cannot draw any meaningful comparative data from Industrial segments running Windows 10.

**Assessment Summary**

We feel obliged to add the additional caveat that we have targeted scenarios in which Windows 10 performance improvements were significantly better (rather than equal) to equivalent Windows 7 workloads. SysTrack Community data indicates that in some cases (such as the “locked down” case in the Shared segment above) Windows 10 devices with 1GB and 2GB of RAM, lesser processors than i5, and non-SDD storage vastly outperform their Windows 7 counterparts, so your mileage may vary – we encourage you to accept no substitutes for your own enterprise data.

In our findings, endpoints that met or surpassed the above criteria:

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5 In the Shared segment, locked down endpoints running only Office and a browser indicate Windows 10 performance improvements over Windows 7 starting at Intel Core i3
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- Windows 10 boot times are 29% faster than Windows 7
- Windows 10 Microsoft Office application start times are 7% faster than Windows 7
- Office 365 has best compatibility on Windows 10
- And most importantly: Windows 10 user experience scores significantly improved (>5%) over Windows 7

We therefore are comfortable going “on record” to state that as long as recommended hardware configuration and user segmentation best practices are adhered to, end user computing leaders should expect user experience and endpoint performance improvements with a Windows 10 transformation.

What about VDI?

Our friends at Project VRC (Virtual Reality Check) have written a comprehensive VDI analysis for Windows 10 transformation, we strongly recommend reading their “Windows 10 in VDI: first analysis and performance best practices” white paper. We also suggest reading our new white paper “Elevating User Experience through GPU Acceleration”. It dives into the details of Windows 10 growing necessities particularly with GPU.

Initial SysTrack Community data indicates that user experience deteriorates rather dramatically with Windows 10 VDI desktops (an average of 11% user experience deterioration compared to Windows 7 VDI desktops). Upon further research, we did find that a small subset of Windows 10 VDI desktops showed significant (>5%) improvement over Windows 7 VDI desktops. Digging deeper into the data indicates one item which we
believe to be a crucial consideration for upgrading a Windows 7 VDI environment to Windows 10:

- Dedicate 2.5x of your Windows VDI IOPS per Windows 10 VDI desktop

Naturally, every VDI implementation will vary particularly because every enterprise IT infrastructure is comprised of many different IT vendors. To comprehensively evaluate, measure, and tune IT solutions, we recommend using SysTrack MarketPlace, as a dynamic library of customized, vendor-specific reports that IT administrators can run anytime.

**Office 365 and Windows 10 as a Service**

Microsoft introduced Windows 10 as a new OS delivery model. Windows 10 updates take place more frequently and at a smaller scale than older operating systems, enabling more seamless usage as the OS slowly evolves. Office 365 operates on a similar "as-a-service" model, with cloud storage enabling easier file migration in Windows 10.

While more frequent updates have their benefits, any change to a system introduces the possibility of performance impact. To guarantee great user experience, IT needs to continuously monitor at the system and enterprise level to assess any changes related to application or OS updates. Our SysTrack product suite is the forefront of workplace analytics, offering real-time analysis of system performance as well as analytics in areas to improve end user experience as displayed in figure 5.
One the key pieces of the overall move to Windows 10 is the tighter integration with various components of Microsoft’s cloud portfolio. This led us to a more detailed investigation of differences between legacy office versions and Office 365. While it may seem that an office suite is relatively static in terms of performance characteristics, our two focus packages and options, Office 2013 and Office 365, do have some substantial differences. There are some overall logistical improvements, for example Office 365 handles licenses more efficiently overall than Office 2013 for most consumers. This is because Microsoft has moved to a more granular subscription model versus a physical code or product. This allows users to opt in and out of a subscription, promoting flexibility among companies who won’t have to deal with potential wasted licenses. The foundation of this is the improvements in methods of access of Office 365 resources. Due to its cloud first nature, not only can the applications be used everywhere on almost any device, the files can also be accessed everywhere. With previous iterations of Office, the application had to be downloaded and the files had to be stored or manually configured for outside availability. In addition to these improvements, the cloud encourages collaboration among users. Finally, the SaaS inspired update scheduling improves the overall security and user experience of managing the client applications by providing more frequent, smaller patches.

So, what does that mean for overall performance characteristics? In Figure 6 we see something quite interesting. O365 seems to consistently take a little longer to load than...
Office 2013. In most cases, this is driven by external connectivity and tying the user account context for O365 access to the application itself.

![Comparison of O365 and Older Office Versions](image)

Figure 6: A comparison of load times - O365 to Office 2013

But, what of overall application stability? Figure 7 shows that broadly speaking Windows 10 experiences fewer application faults for Office 365 components than Windows 7.
We’re Just Getting Started

We launched SysTrack Community to help IT professionals understand the state of their users’ experience and make better decisions through comparative analytics. In the coming months we’ll be publishing several SysTrack Community insight-driven research notes. If you’ve got a question you’d like us to dig into next, get in touch and let us know!
For More Information

Please visit www.lakesidesoftware.com to learn more.