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Remote workers can get a better experience by running applications locally with an Intel Core processor-powered laptop with Intel vPro technology

An Intel Core i7-10610U processor-powered laptop with Intel vPro technology delivered better responsiveness than an Intel quad-core processor-powered thin client

Choosing a device for remote work requires careful consideration of many factors. Organizations can provide thin clients (devices that can only run virtual desktop infrastructure (VDI) sessions), but you could get a better experience and productivity with an Intel® Core™ i7 processor-powered laptop with Intel vPro® technology. For example, critical applications for today's remote workers, such as tools for teleconferencing, require responsiveness that thin clients may struggle to deliver. An Intel Core i7 processor-powered laptop with Intel vPro technology can deliver the flexibility and performance that helps you improve your productivity while also offering features that help IT departments simplify device management and security.

At Principled Technologies, we compared user experiences on an Intel Core i7-10610U processor-powered Dell® Latitude® 5310 laptop running applications locally and an Intel quad-core processor-powered thin client running applications in a Windows Virtual Desktop (WVD) environment, which is a type of VDI session. In addition to running applications locally, the Intel Core i7 processor-powered laptop also ran applications in a WVD environment and delivered better video quality during videoconferencing than the thin client.

In addition, the Intel Core i7 processor-powered laptop could allow you to run VMs simultaneously. Supporting multiple environments at once could benefit freelancers and other users who need to run multiple corporate images for different clients or applications.

OPEN A LARGE DOCUMENT FASTER WHILE MULTITASKING

Up to 87% less time

GET BETTER QUALITY VIDEO CONFERENCING

Up to 8X the frames per second (FPS)

RUN MULTIPLE IMAGES AS VMS

Intel Core i7-10610U processor-powered Dell Latitude 5310 with Intel vPro technology

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Complete tasks in productivity applications faster with an Intel Core i7 processor-powered Dell Latitude 5310 with Intel vPro technology

We compared the responsiveness of the following two environments (the names in parentheses appear in Figures 1 through 4):

- An Intel Core i7-10610U processor-powered Dell Latitude 5310 laptop with Intel vPro technology running Windows 10 locally
- An Intel quad-core processor-powered Dell Wyse 5070 thin client hosting a WVD Windows 10 image using remote desktop protocol (RDP)

The 10th Generation Intel Core i7 processor that powered the Dell Latitude 5310 had four cores, an 8M cache, a base speed of 1.8 GHz, and Intel vPro technology. In terms of compute resources, the laptop with Intel vPro technology running applications locally was the more powerful of the two devices. Users can also access both the compute resources of a VDI session and local processing resources for multitasking with web or local applications.

For the thin client WVD session, we built a Microsoft Azure WVD desktop pool using the Azure portal. We followed the WVD VM-sizing recommendations,[1] and provisioned one VM with two vCPUs, 8 GB of RAM, and a Premium SSD operating system disk with 127 GB and 500 max IOPS for the WVD sessions. The thin client received compute resources from the server that hosted the session.

Using Intel vPro technology to boost security

According to Intel, vPro delivers "[h]ardware-enhanced security features to help IT respond to threats before, during, and after an attack."[2] Intel also claims that Intel Hardware Shield, which is part of the Intel vPro platform, "provides enhanced protections against attacks below the OS and advanced threat detection capabilities for increased platform security."[3] Hardware Shield could reduce the attack surface to malicious agents leveraging firmware-level attacks, in addition to offloading routine security functions that can affect user productivity. IT administrators could use Intel Active Management Technology, another part of the Intel vPro platform, to remotely remediate and recover an infected device.

To learn more about the security features of an Intel vPro platform as well as its manageability and stability features, visit https://www.intel.com/content/www/us/en/architecture-and-technology/vpro/what-is-vpro.html.

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Figures 1 and 2 show responsiveness for the two systems performing productivity tasks while Microsoft Outlook, Zoom, and a web browser with five open tabs ran in the background. The tabs contained the landing sites for Facebook, Google, Wikipedia, Amazon, and YouTube. We ran the applications simultaneously to simulate a user multitasking. The Intel Core i7 processor-powered laptop with Intel vPro technology was faster than the thin client in all our responsiveness tests. For more information on how we tested and all our test results, see the science behind this report. By saving time in common productivity applications with an Intel Core i7 processor-powered laptop with Intel vPro technology, you can have a better experience and complete more tasks in your workday.

TIME TO OPEN A LARGE DOCUMENT
Less is better

Laptop with Intel vPro technology running applications locally

1.5 sec

Thin client

11.7 sec

Up to
87%
less time to open a large document in Word

Figure 1: The time each device needed to open a 92MB Microsoft Word document while multitasking (in seconds). Lower is better. Source: Principled Technologies.

TIME TO RECALCULATE A SPREADSHEET
Less is better

Laptop with Intel vPro technology running applications locally

3.9 sec

Thin client

12.9 sec

Up to
69%
less time to recalculate a spreadsheet

Figure 2: The time each environment needed to recalculate a formula in a 94MB Microsoft Excel spreadsheet while multitasking (in seconds). Lower is better. Source: Principled Technologies.

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See higher-quality video while video conferencing with an Intel Core i7 processor-powered Dell Latitude 5310 with Intel vPro technology

In addition to measuring responsiveness, we captured the average rate of frames per second (FPS) each system delivered during a Zoom call. We used the same system configurations from the responsiveness testing, and we enabled screen sharing on both systems during the calls. We captured the inbound FPS data first as participants and then outbound FPS data as hosts (i.e., sharing each system's screens).

Figures 3 and 4 show the average FPS during the Zoom calls. The Intel Core i7 processor-powered laptop with Intel vPro technology delivered more FPS than the thin client in each of the three scenarios. Higher-quality video during video conferencing can contribute to a better experience because you can focus on meeting content. In days full of business calls, a higher-quality experience can make a real positive difference in your day.

INBOUND ZOOM VIDEO FRAME RATE
More is better

Laptop with Intel vPro technology running applications locally

27 fps

Thin client

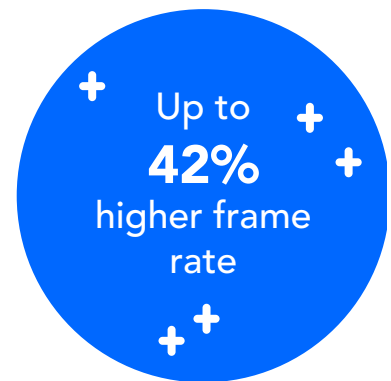**19 fps**

Up to
42%
higher frame rate

Figure 3: The average incoming frame rate each system supported while acting as a participant in a video conferencing call. Higher is better. Source: Principled Technologies.

OUTBOUND VIDEO FRAME RATE WHILE SCREEN SHARING
More is better

Laptop with Intel vPro technology running applications locally

21 fps
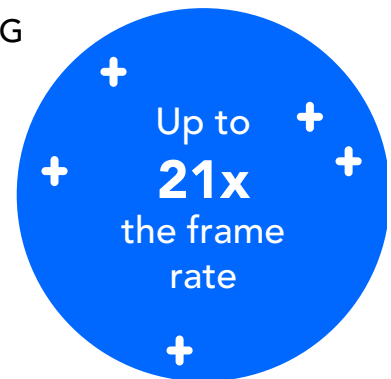
Thin client

1 fps

Up to
21x
the frame rate

Figure 4: The average outgoing frame rate each system delivered while acting as a host and sharing its screen in a video conferencing call. Higher is better. Source: Principled Technologies.

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Local virtualization and freelancing in the gig economy

An additional benefit of the Intel Core i7 processor-powered laptop with Intel vPro technology is that it can support more than one VM, which could allow you to run multiple corporate images at once—one on each VM. This could prove particularly useful if you're a freelance knowledge worker, media content creator, or developer. For example, you could run different corporate images from your clients simultaneously and possibly reduce the time you spend waiting for the images to fully load, as well as your volume of logins overall. Additionally, working from a single Intel Core i7 processor-powered laptop with Intel vPro technology that can run multiple VDI sessions could potentially simplify your workday, too, because you wouldn't need to charge and use multiple devices.

Bonus: Have local compute resources ready to run applications while video conferencing in a VDI session

Video conferencing in a VDI environment comes with limitations,[4] and using the services in this way can frustrate IT admins as well as end users. After testing the responsiveness and video inbound and outbound frame rate of the Intel Core i7-10610U processor-powered Dell Latitude 5310 laptop with Intel vPro technology, we set up a WVD VDI session on it and ran it through the same Zoom meeting scenarios. We found that in these scenarios, the laptop delivered similar responsive results and image quality to the thin client, but it still had local compute resources available for other productivity applications to use without impacting performance. With these resources, Intel Core i7 processor-powered laptop users could perform tasks locally while attending a virtual meeting.

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Conclusion

Working remotely can present plenty of distractions that affect productivity. Your system shouldn't be one of them. In our tests, running applications locally on an Intel Core i7-10610U processor-powered laptop with Intel vPro technology resulted in better responsiveness and more FPS than running applications in a WVD session on a thin client. These performance benefits can translate to a better user experience with the Intel Core i7 processor-powered laptop while enabling users to complete tasks faster. In addition, the Intel Core i7 processor-powered laptop with Intel vPro technology can run different images virtually, which could make it easier for users to work with multiple organizations.

1   Microsoft, "Virtual machine sizing guidelines," accessed January 26, 2021,
    https://docs.microsoft.com/en-us/windows-server/remote/remote-desktop-services/virtual-machine-recs.

2   Intel, "What Is the Intel vPro® Platform?," accessed October 29, 2020,
    https://www.intel.com/content/www/us/en/architecture-and-technology/vpro/what-is-vpro.html.

3   Intel, "What Is the Intel vPro® Platform?," accessed October 29, 2020,
    https://www.intel.com/content/www/us/en/architecture-and-technology/vpro/what-is-vpro.html.

4   Microsoft, "Teams for Virtualized Desktop Infrastructure," accessed January 26, 2021,
    https://docs.microsoft.com/en-us/microsoftteams/teams-for-vdi.

Read the science behind this report at http://facts.pt/XEoGVtT ▶

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