



The science behind the report:

Give your Chrome OS users fast and simple access to Windows apps with Parallels Desktop for Chrome

This document describes what we tested, how we tested, and what we found. To learn how these facts translate into real-world benefits, read the report [Give your Chrome OS users fast and simple access to Windows apps with Parallels Desktop for Chrome](#).

We concluded our hands-on testing on November 30, 2021. During testing, we determined the appropriate hardware and software configurations and applied updates as they became available. The results in this report reflect configurations that we finalized on October 26, 2021 or earlier. Unavoidably, these configurations may not represent the latest versions available when this report appears.

Our results

To learn more about how we have calculated the wins in this report, go to <http://facts.pt/calculating-and-highlighting-wins>. Unless we state otherwise, we have followed the rules and principles we outline in that document.

Table 1: Results of our testing

Parallels functionality	Lenovo® ThinkPad® C13 Yoga® Gen 1 Chromebook	HP Pro c640 G2 Chromebook Enterprise	Google Pixelbook™	CTL Chromebox CBx2	Notes
Parallels features					
Internal camera and microphone passthrough	✓	✓	✓	N/A	CTL Chromebox has no internal camera or microphone
External camera and microphone passthrough	✓	✓	✓	✓	
Printer and network printer passthrough	✓	✓	✓	✓	
USB passthrough	✓	✓	✓	✓	
Automatic resolution adjustment	✓	✓	✓	✓	
Shared file manager	✓	✓	✓	✓	
Windows key combinations	✓	✓	✓	✓	

Parallels functionality	Lenovo® ThinkPad® C13 Yoga® Gen 1 Chromebook	HP Pro c640 G2 Chromebook Enterprise	Google Pixelbook™	CTL Chromebox CBx2	Notes
Windows application testing					
Opening a large Microsoft Word document from the Microsoft Windows VM	✓	✓	✓	✓	
Opening a large Word document from Google Chrome OS to the Windows VM	✓	✓	✓	✓	
Copying and pasting text from Chrome OS to Word in the Windows VM	✓	✓	✓	✓	
Dragging and dropping text from Chrome OS to Word in the Windows VM	✓	✓	✓	✓	
Opening a large Microsoft Excel document from the Windows VM	✓	✓	✓	✓	
Opening a large Excel document directly from Chrome OS to the Windows VM	✓	✓	✓	✓	
Running a macro in Excel	✓	✓	✓	✓	
Creating a chart in Excel	✓	✓	✓	✓	
Opening a large Microsoft PowerPoint presentation from the Windows VM	✓	✓	✓	✓	
Opening a large PowerPoint presentation directly from Chrome OS to the Windows VM	✓	✓	✓	✓	
Copying and pasting text from Chrome OS to the PowerPoint in the Windows VM	✓	✓	✓	✓	
Dragging and dropping text from Chrome OS to the PowerPoint in the Windows VM	✓	✓	✓	✓	
Presenting the large test PowerPoint	✓	✓	✓	✓	
Opening a test document in Microsoft OneNote from the Windows VM	✓	✓	✓	✓	
Adding notes to the test document in OneNote	✓	✓	✓	✓	
Opening a test image in Adobe® Photoshop®	✓	✓	✓	✓	
Editing a test image in Adobe Photoshop	✓	✓	✓	✓	
Exporting an edited test image from Adobe Photoshop	✓	✓	✓	✓	
Importing photos into Adobe Lightroom®	✓	✓	✓	✓	
Applying preset edits to imported photos in Adobe Lightroom	✓	✓	✓	✓	

Parallels functionality	Lenovo® ThinkPad® C13 Yoga® Gen 1 Chromebook	HP Pro c640 G2 Chromebook Enterprise	Google Pixelbook™	CTL Chromebox CBx2	Notes
Exporting edited images in Adobe Lightroom	✓	✓	✓	✓	
Opening a test video file in Adobe Premiere®	✓	✓	✓	✓	
Applying color grading adjustments to a test video in Adobe Premiere	✓	✓	✓	✓	
Render and export an edited test video in 720p in Adobe Premiere	✓	✓	✓	✓	
Opening a Zoom call	✓	✓	✓	✓	
Opening a Microsoft Teams call	✓	✓	✓	✓	
Using the built-in computer microphone and webcam with passthrough in a Zoom call	✓	✓	✓	N/A	CTL Chromebox has no internal camera or microphone

System configuration information

Table 2: Detailed information on the system we tested.

System	Lenovo ThinkPad C13 Yoga Gen 1 Chromebook	HP Pro c640 G2 Chromebook Enterprise	Google Pixelbook	CTL Chromebox CBx2
Processor	AMD Ryzen™ 5 3500C	Intel® Core® i5-1145G7	Intel Core i5-7Y57	Intel Core i7-10510U
Processor frequency (GHz)	2.10 – 3.70	2.60 – 4.40	1.20 - 3.30	1.80 – 4.90
Processor cores	4	4	2	4
Memory (GB)	8	8	8	32
Storage (GB)	128	64	256	2 TB
Bluetooth	5	5	4.2	5.1
USB	2 x USB 3.2 Gen 1 Type-A, 2 x USB 3.2 Gen 1 Type-C	2 x USB 3.2 Gen 1 Type-A, 2 x USB 3.2 Gen 1 Type-C	2 x USB Type-C	4 x USB 3.0, 1 x USB Type-C
Battery type	Lithium-Ion	Lithium-Ion	Lithium-Ion	N/A
Battery capacity (Wh)	51	58	41	N/A
Display	13.3" 1920 x 1080	14.0" 1920 x 1080	12.3" 2400 x 1600	N/A
OS (version)	94.0.4606.124	94.0.4606.124	94.4606.124	94.0.4606.124
System Weight (lbs.)	3.30	3.26	2.45	1.5

How we tested

Setting up Parallels Desktop for Chrome OS

Installing Parallels Desktop for Chrome OS and creating the base Windows 10 image

1. Ensure the devices under test are eligible for Chrome Enterprise enrollment and that they meet the minimum requirements for installing Parallels Desktop for Chrome OS. For more information on minimum requirements, visit <https://www.parallels.com/products/desktop/chrome/>.
2. To deploy and license the Parallels Desktop for Chrome OS application, you will need a Google Workspace™ account. In the Google Workspace Admin console, ensure the requisite licenses have been applied to the correct Organization Unit.
3. Simultaneously start the timer and log into the device under test with the Chrome Enterprise admin account to redeem the Parallels Desktop licenses.
4. Open the link provided by your Parallels Desktop provider, and, when prompted, click Redeem to add the licenses to your domain.
5. In the Google Admin console, navigate to Devices→Chrome→Devices.
6. From the drop-down menu, click Apps & extensions, and navigate to the App licensing tab.
7. Select the Organizational Units to which you would like to apply the Parallels Desktop for Chrome OS licenses, and select On under License for Parallels Desktop for Chrome OS.
8. Click Save.
9. Navigate to Devices→Chrome→Devices.
10. From the drop-down menu, click Settings, and search for the Parallels Desktop settings.
11. Next to Parallels Desktop, select Allow users to use Parallels Desktop from the drop-down menu. Click Save.
12. Download a Windows 10 .iso from the Microsoft website, and transfer it to the Downloads folder on the device under test.
13. To launch the crosh Terminal, launch Chrome browser, and press Ctrl + Alt + T.
14. Create the Windows 10 VM:

```
vmc create -p PvmDefault win10.iso
```

15. When the command completes, start the virtual machine:

```
vmc start PvmDefault
```

16. The Windows 10 installation media will launch in the virtual machine window. To install Windows 10, follow the installation wizard.
17. In the Windows 10 virtual machine, open File Explorer, navigate to This PC, and open the Parallels Tools CD drive.
18. Open the Autorun.exe file, and install Parallels Tools.
19. Restart the Windows virtual machine.
20. Install any applications required for the base image.
21. When creation of the Windows 10 base image is complete, shut down the virtual machine.
22. From the crosh Terminal, export the newly created virtual machine:

```
vmc export -d PvmDefault PvmDefault.zip
```

23. The virtual machine will export to a .zip file in the device's Downloads folder and include a hash. For our environment, we uploaded the .zip file to our user's Google Drive.
24. From the Google Workspace Admin Console, Navigate to Devices > Chrome > Settings > Users & Browsers.
25. Click the User & Browser Settings Tab, and scroll to the Parallels Desktop section.
26. Enter the URL to the shared .zip file containing the exported virtual machine, and enter the SHA-256 hash generated in the device's Downloads folder.
27. Click Save.
28. Log out, and log back into the device with the Chrome Enterprise test account.
29. After initial setup is complete, open the Parallels Desktop application.
30. The Windows 10 virtual machine image should automatically download and install to the test user's account. When this process is complete, stop the timer.

Testing the Parallels Desktop application

We installed Parallels Desktop for Chrome OS on four different Chrome devices and tested various features of the software as well as different native Windows applications to ensure compatibility. We verified that the programs were able to open and function as expected in various scenarios. We have listed the applications and tasks performed in each application below.

Microsoft Word

- Opening a large test Word document from the Windows VM
- Opening a large test Word document directly from Chrome OS to the Windows VM
- Copying and pasting text from Chrome OS to Microsoft Word in the Windows VM
- Dragging and dropping text from Chrome OS to Microsoft Word in the Windows VM

Microsoft Excel

- Opening a large test Excel document from the Windows VM
- Opening a large test Excel document directly from Chrome OS to the Windows VM
- Running a macro
- Creating a chart

Microsoft PowerPoint

- Opening a large test PowerPoint presentation from the Windows VM
- Opening a large test PowerPoint presentation directly from Chrome OS to the Windows VM
- Copying and pasting text from Chrome OS to PowerPoint in the Windows VM
- Dragging and dropping text from Chrome OS to PowerPoint in the Windows VM
- Presenting the large test PowerPoint

Microsoft OneNote

- Opening a test document in OneNote from the Windows VM
- Added notes to the test document using both the keyboard and touch screen

Adobe Photoshop

- Opening a test image in Photoshop
- Editing the test image
- Exporting the edited test image

Adobe Lightroom

- Importing photos into Lightroom
- Applying preset edits to the imported photos
- Exported the edited images

Adobe Premiere

- Opening a test video file in Adobe Premiere
- Applying color grading adjustments to the test video
- Rendered and exported the edited test video in 720p

Zoom

- Opening a test Zoom call
- Using the built-in computer microphone and webcam with passthrough

Microsoft Teams

- Opening a test Teams call
- Using the built-in computer microphone and webcam with passthrough

Parallels Desktop features

- Camera and microphone passthrough
- External camera and microphone passthrough
- Printer and network printer passthrough
- USB passthrough
- Automatic resolution adjustment
- Shared file manager
- Windows key combinations using the Keyboard icon in Parallels

We used the following devices to test external device passthrough:

- Logitech C920 webcam
- Blue Yeti USB Microphone
- Western Digital® 1TB external USB hard drive (WDBPCK0010BBK-03)
- Western Digital 1TB external USB hard drive (WDBUZG0010BBK-0B)
- SanDisk® 128GB USB flash drive
- Lexar® 64GB USB flash drive (LJDE031064G-BNJEU)
- Dell USB DVD drive (Dell DW-316)

Read the report at <https://facts.pt/3gc5jco> ►

This project was commissioned by Parallels Inc.



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