



The science behind the report:

Get a handle on higher-education projects with a laptop powered by an Intel Core processor

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 [Get a handle on higher-education projects with a laptop powered by an Intel Core processor](#).

We concluded our hands-on testing on July 12, 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 July 5, 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 timed-task testing.

Task	HP ProBook x360 11 G7 EE with Intel® Pentium® Silver N6000 processor	HP Pavilion x360 14t-dy000 with Intel Core™ i3-1125G4 processor	HP Pavilion x360 14t-dy000 with Intel Core i5-1135G7 processor	Core i3 vs Pentium	Core i5 vs Pentium	Core i5 vs Core i3
Scenario #1						
Median sum of all tasks in Scenario #1	88.6	53.1	48.6	39.5%	45.1%	8.5%
Zoom Cloud Meetings						
Launching the application	4.7	2.7	2.4	42.6%	48.9%	11.1%
Launching a meeting	8.8	4.4	3.7	45.5%	58.0%	15.9%
Microsoft OneDrive						
Opening a PDF	5.3	3.5	3.0	18.9%	43.4%	14.3%
Print-previewing a PDF	6.0	4.2	4.0	16.7%	33.3%	4.8%

Task	HP ProBook x360 11 G7 EE with Intel® Pentium® Silver N6000 processor	HP Pavilion x360 14t-dy000 with Intel Core™ i3-1125G4 processor	HP Pavilion x360 14t-dy000 with Intel Core i5-1135G7 processor	Core i3 vs Pentium	Core i5 vs Pentium	Core i5 vs Core i3
Microsoft Excel						
Opening an Excel spreadsheet	3.9	2.6	2.6	25.6%	33.3%	0.0%
Creating a chart	18.7	8.0	7.4	53.5%	60.4%	7.5%
Opening an Excel spreadsheet in Google Sheets	17.8	12.6	11.4	28.1%	36.0%	9.5%
Microsoft PowerPoint						
Opening a presentation	5.5	3.3	3.1	36.4%	43.6%	6.1%
Pasting an Excel chart into a presentation	17.9	11.8	11.0	33.5%	38.5%	6.8%
Scenario #2						
Median sum of all tasks in Scenario #2	42.5	28.6	26.4	30.6%	37.9%	7.7%
Microsoft PowerPoint						
Copying a chart from Excel and pasting it into a presentation	14.7	10.4	9.6	27.2%	34.7%	7.7%
Print-previewing a presentation	3.7	2.0	1.8	27.0%	51.4%	10.0%
Beginning a presentation	14.5	9.3	7.9	34.5%	45.5%	15.1%
Microsoft OneDrive						
Opening a link to a shared image	6.1	5.3	5.5	0.0%	9.8%	-3.8%
Microsoft PowerPoint						
Inserting an image into a presentation	3.5	1.6	1.6	28.6%	54.3%	0.0%
Scenario #3						
Median sum of all tasks in Scenario #3	1203.2	393.6	340.7	67.2%	71.7%	13.4%
Windows Desktop						
Unzipping 100 .DNG photos	58.3	38.3	34.3	34.3%	41.2%	10.4%
Adobe® Lightroom®						
Importing 100 .DNG photos	65.4	17.1	14.9	73.4%	77.2%	12.9%
Batch-processing 100 .DNG photos	125.8	44.3	41.4	64.4%	67.1%	6.5%
Exporting 100 .DNG photos as .JPGs	774.0	228.1	197.1	70.4%	74.5%	13.6%
Adobe Photoshop®						
Performing a content-aware photo merge of six images	179.7	65.8	53.0	62.9%	70.5%	19.5%

Task	HP ProBook x360 11 G7 EE with Intel® Pentium® Silver N6000 processor	HP Pavilion x360 14t-dy000 with Intel Core™ i3-1125G4 processor	HP Pavilion x360 14t-dy000 with Intel Core i5-1135G7 processor	Core i3 vs Pentium	Core i5 vs Pentium	Core i5 vs Core i3
Benchmarks - Score, higher is better						
WebXPRT 3 - Microsoft Edge Web Browser	151.00	218.00	243.00	30.7%	37.9%	10.3%
Speedometer 2.0 - Microsoft Edge Web Browser	78.61	103.00	115.60	23.7%	32.0%	10.9%

System configuration information

Table 2: Detailed information on the system we tested.

System	HP ProBook x360 11 G7 EE	HP Pavilion x360 14t-dy000	HP Pavilion x360 14t-dy000
Processor	Intel Pentium Silver N6000	Intel Core i3-1125G4	Intel Core i5-1135G7
Max processor frequency (GHz)	3.30	3.70	4.20
Processor cores	4	4	4
Memory (GB)	8	8	8
Storage model and size (GB)	256GB KIOXIA KBG40ZNV256G	256GB SK Hynix® BC711	256GB SK Hynix BC711
Bluetooth	5	5	5
USB	1x USB 3.1 Type-C, 2x USB 3.1 Gen 1	1x USB 3.1 Type-C, 2x USB 3.1 Gen 1	1x USB 3.1 Type-C, 2x USB 3.1 Gen 1
Battery type	Lithium-ion	Lithium-ion	Lithium-ion
Battery capacity (Wh)	48	43	43
Display	11.6" 1366x768	14" 1920x1080	14" 1920x1080
OS (version)	Windows 10 Pro 20H2	Windows 10 Pro 20H2	Windows 10 Pro 20H2
System weight (lbs.)	3.16	3.33	3.33

How we tested

For each scenario, we downloaded and installed the requisite apps to each Windows device under test. For applications that required accounts or authentication, we created test profiles and logged in the users on each device. For each scenario, we connected the devices to a three-way Zoom video meeting and left the meeting running for the duration of the testing. We tested each task for a given scenario sequentially. After one run of a given scenario, we reset the laptop and performed two additional test runs for a total of three.

Scenario #1

Testing with Zoom Cloud Meetings

Launching the application

1. From the Windows desktop, press the Windows key. In the search bar, type `zoom`
2. Simultaneously start the timer and click Open.
3. When the Zoom Cloud Meetings application opens, stop the timer.

Launching a meeting

1. From the Zoom application menu, simultaneously start the timer and click New Meeting.
2. When the Join Audio menu appears, stop the timer.

Testing with Microsoft OneDrive

Opening a PDF

1. To open the File Explorer, press Windows key + E.
2. Navigate to the OneDrive folder.
3. Locate the test document. To open the context menu, right-click the document.
4. Simultaneously start the timer and click Open.
5. When the document has fully loaded in the Edge browser PDF viewer, stop the timer.

Print-previewing a PDF

1. From the Edge browser PDF viewer, to open the print menu, simultaneously start the timer and press Ctrl + P.
2. When the print preview has fully loaded, stop the timer.

Testing with Microsoft Excel

Opening an Excel spreadsheet from OneDrive

1. From the OneDrive file explorer, locate the test document. To open the context menu, right-click the document.
2. Simultaneously start the timer and click Open.
3. When the document has fully loaded in Microsoft Excel, stop the timer.

Creating a chart

1. Select four columns of data from the test document. From the ribbon menu, click Insert.
2. In the ribbon menu, in the Recommended Charts section, click the drop-down icon for Combo chart.
3. Simultaneously start the timer and click to select the Clustered Column - Line chart.
4. When the chart has fully loaded in the document, stop the timer.

Opening an Excel spreadsheet in Google Sheets

1. From Excel, save the updated test document with the newly created chart.
2. Open the Edge browser, and navigate to <https://drive.google.com>.
3. Upload the Excel document to the test account's Drive folder.
4. From Google Drive, right-click the document, and hover over the option for Open with.
5. Simultaneously start the timer and select Google Sheets.
6. When Google Sheets fully loads the test document, stop the timer.

Testing with Microsoft PowerPoint

Opening a presentation

1. From the OneDrive file explorer, locate the test presentation. To open the context menu, right-click the document.
2. Simultaneously start the timer and click Open.
3. When the PowerPoint presentation has fully loaded in Microsoft PowerPoint, stop the timer.

Pasting an Excel chart into a presentation

1. To refocus Microsoft Excel, press Alt + Tab.
2. Click to select the chart element from the test document.
3. To copy the chart, press Ctrl + C.
4. To refocus Microsoft PowerPoint, press Alt + Tab.
5. Select the first slide from the PowerPoint presentation.
6. Simultaneously start the timer and press Ctrl + V to paste the chart into the presentation.
7. When the chart fully loads, stop the timer.

Scenario #2

Testing with Microsoft PowerPoint

Copying a chart from Excel and pasting it into a presentation

1. From File Explorer, open the OneDrive folder.
2. Open the test documents in Microsoft Excel and PowerPoint.
3. Click to select the chart element from the test document in Microsoft Excel.
4. To copy the Excel chart, press Ctrl + C.
5. To refocus Microsoft PowerPoint, press Alt + Tab.
6. Click to select the first slide from the PowerPoint presentation.
7. Simultaneously start the timer and press Ctrl + V to paste the chart into the presentation.
8. When the chart fully loads, stop the timer.

Print-previewing a presentation

1. With the PowerPoint presentation open, to begin the test and enter the print menu, simultaneously start the timer and press Ctrl + P.
2. When the print preview has fully loaded, stop the timer.

Beginning a presentation

1. If you have not already done so from the previous test, exit the print menu.
2. From the ribbon menu, click Slide Show.
3. Simultaneously start the timer and click From Beginning to begin the PowerPoint presentation.
4. When the first presentation slide has fully loaded, stop the timer.

Testing with Microsoft OneDrive

Opening a link to a shared image

1. From the OneDrive file explorer, right-click the test image, and click Share.
2. From the share menu, click Copy link.
3. Open the Edge browser, and paste the link into the URL bar.
4. To begin the test and navigate to the shared image URL, simultaneously start the timer and press Enter.
5. When the image has fully loaded in the Edge browser, stop the timer.

Testing with Microsoft PowerPoint

Inserting an image into a presentation

1. From the Edge browser, right-click the shared image, and select Copy Image.
2. To refocus Microsoft PowerPoint, press Alt + Tab.
3. Click to select the first slide from the presentation navigation menu.
4. To begin the test and paste the image into the presentation, simultaneously start the timer and press Ctrl + V.
5. When the image has fully loaded, stop the timer.

Scenario #3

Testing with Windows Desktop

Unzipping 100 .DNG photos

1. Using File Explorer, navigate to the test archive.
2. Right-click the test archive, and click Open.
3. Create a new folder to house the uncompressed contents of the archive.
4. To select all photos from the archive, press Ctrl + A.
5. Click and drag the contents of the archive to the folder you just created.
6. Simultaneously start the timer and release the mouse button on the newly created folder.
7. When the extraction completes, stop the timer.

Testing with Adobe Lightroom

Importing 100 .DNG photos

1. From the Adobe Creative Cloud® application, open Adobe Lightroom.
2. From the navigation menu, click Add Photos.
3. Navigate to the test folder, and click Review for Import.
4. Simultaneously start the timer and click Add 100 Photos.
5. When the progress bar completes, stop the timer.

Batch-processing 100 .DNG photos

1. Click to select the first photo in the newly uploaded album.
2. To expand the Edit menu, click the Edit icon.
3. To apply the automatic image adjustment, click Auto.
4. Click the drop-down menu, and select Choose Edit Settings to Copy.
5. From the Copy Settings menu, under the Select category, ensure each box is checked, and click Copy.
6. To navigate back to the photo album, click the library icon. To select all photos in the album, press Ctrl + A.
7. To paste the settings to all images, press Ctrl + V.
8. From the alert menu, to begin the test and the batch processing, simultaneously start the timer and click OK.
9. When the progress bar completes, stop the timer.

Exporting 100 .DNG photos as .JPGs

1. From the Lightroom photo library, to select all photos, press Ctrl + A.
2. Click File, and select Export...
3. Click the File Type drop-down menu, and change the selection to .JPG. Leave the default .JPG export settings.
4. Simultaneously start the timer and click Export 100 Photos.
5. When the progress bar completes, stop the timer.

Testing with Adobe Photoshop

Performing a content-aware photo merge of six images

1. From the Creative Cloud application, launch Adobe Photoshop.
2. Select File→Automate→Photomerge...
3. From the Photomerge menu, click Browse...
4. Select the six test images, and click OK.
5. Leave the default Layout, and check to enable the following options under Source Files:
 - Vignette Removal
 - Geometric Distortion Correction
 - Content Aware Fill Transparent Areas
6. Simultaneously start the timer and click OK.
7. When the photo-merged panorama has fully loaded, stop the timer.

WebXPRT 3

Running WebXPRT 3

1. Power on the device, and log in.
1. Allow the device to idle for 10 minutes to clear any background startup activity. 3. Open the default web browser, and navigate to <https://www.principledtechnologies.com/benchmarkxpvt/webxpvt/>.
2. Click Run WebXPRT 3.
3. Click Continue.
4. Click Start.
5. When the test completes, record the score.

Speedometer 2.0 - BrowserBench

Running Speedometer 2.0

1. Power on the device, and log in.
2. Allow the device to idle for 10 minutes to clear any background startup activity. 3. Open the default web browser, and navigate to <https://browserbench.org/Speedometer2.0/>.
3. Click Start Test.
4. When the test completes, record the score.

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