The science behind the report:

Get more choices and better benchmark scores with the Microsoft Surface Book 3

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 more choices and better benchmark scores with the Microsoft Surface Book 3.

We concluded our hands-on testing on October 1, 2020. 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 September 16, 2020 or earlier. Unavoidably, these configurations may not represent the latest versions available when this report appears.

Our results

Table 1: Results of our testing

	Microsoft Surface Book 3 with Intel® Core™ i5-1035G7	Apple MacBook Pro® with Intel Core i5-8257U	Percentage advantage with Surface Book 3
GeekBench 5.2.3 Pro (higher is better)			
CPU Benchmark–Single Core	1,142	1,021	11.85%
CPU Benchmark–Multi Core	4,398	4,038	8.92%
Compute Benchmark–OpenCL, integrated graphics	10,102	7,812	29.31%
Compute Benchmark–Vulkan/Metal, integrated graphics	9,681	7,036	37.59%
WebXPRT 3 (higher is better)			
WebXPRT 3	196	157	24.84%
Timed task (seconds, lower is better)			
Open applications (Microsoft Outlook, Slack, and a web browser) and files (Microsoft Excel workbook and PDF)	19.7	24.8	20.5%

Feature comparison standouts	Microsoft Surface Book 3	Apple MacBook Pro
Hardware specs		
Ports	2 x USB-A 1 x USB-C 3.5mm headphone jack 2 x Surface Connect ports Full-size SDXC card reader	2 x Thunderbolt 3 (USB-C) 3.5mm headphone jack
Display	Detachable, touchscreen PixelSense display 13" 3,000 x 2,000 15" 3,240 x 2,160	Non-detachable, non-touchscreen Retina display 13" 2,560 x 1,600 15" 2,880 x 1,800
Camera	5MP front-facing camera 8MP rear-facing camera	720p front-facing camera

System configuration information

Table 2: Detailed information on the system we tested.

System configuration information	Microsoft Surface Book 3	2020 Apple MacBook Pro
Processor		
Vendor	Intel	Intel
Model number	Core i5-1035G7	Core i5-8257U
Core frequency	1.20 (3.70 Turbo)	1.40 (3.90 Turbo)
Number of cores	4 (8 threads)	4 (8 threads)
Cache (MB)	6	6
Memory		
Amount (GB)	8	8
Type	LPDDR4x	LPDDR3
Speed (MHz)	3,733	2,133
Integrated graphics		
Vendor	Intel	Intel
Model	Iris Plus Graphics	Iris Plus Graphics 645
Storage		
Amount (GB)	256	256
Type	SSD	SSD
Connectivity/expansion		
Wireless internet	Intel AX201	AirPort Extreme
Bluetooth	Bluetooth Wireless 5.0	Bluetooth Wireless 5.0
USB	2x USB-A 3.1 Gen 2 1x USC-C 3.1 Gen 2	N/A
Thunderbolt	N/A	2x Thunderbolt 3
Battery		
Type	Lithium-ion	Lithium-polymer
Size	Integrated	Integrated
Rated capacity (Wh)	69.0	58.2
Display		
Size (inches)	13.5	13.3
Type	PixelSense	LED-backlit with IPS
Resolution	3,000 x 2,000	2,560 x 1,600
Touchscreen	10 point multi-touch G5	None

System configuration information	Microsoft Surface Book 3	2020 Apple MacBook Pro
Operating system		
Vendor	Microsoft	Apple
Name	Windows 10	macOS®
Build number or version	Home	Catalina
Dimensions		
Height (inches)	0.51	0.61
Width (inches)	12.3	11.97
Depth (inches)	9.14	8.36
Weight (pounds)	3.38	3.1

How we tested

On each device, we ran three tests: GeekBench 5, WebXPRT 3, and a hand-timed series of tasks involving opening applications. We configured each device with default options, except we turned off customer feedback and data reporting. We updated each operating system to the latest version and turned off all screensaver and display shutoff options. On the Surface Book 3 device, we changed the Windows power management policy from Best Battery Life to Best Performance. (The MacBook Pro device had no equivalent setting.) We tested each device with its AC power adapter plugged in and its battery fully charged. All tests were conducted side by side by an engineer equally experienced with PCs and Apple laptops.

Measuring overall performance with GeekBench 5

We installed GeekBench 5.2.3 onto each device and ran each test in the suite (Single-core CPU, Multi-core CPU, Compute with OpenGL, and Compute with Metal/Vulkan).

Downloading GeekBench 5
1. Download the appropriate installer for the operating system from https://www.geekbench.com/download/.
2. On the Surface Book 3 device, run the installer, and accept all defaults.
3. On the MacBook Pro device, drag the GeekBench 5 icon into Applications.

Running GeekBench 5
1. Power on the device, and log in.
2. Allow the device to idle for 10 minutes to clear out any background startup activity.
3. Open GeekBench 5.
4. Select the desired benchmark, and click Run.
5. Repeat steps 1 through 4 two more times for a total of three runs, and identify the median score.

Measuring web-browsing performance with WebXPRT 3

WebXPRT 3 runs inside a web browser and measures HTML and JavaScript handling, as well as tasks such as photo manipulation and face detection. We used the default web browser for each device, Microsoft Edge on Surface Book 3 and Safari on MacBook Pro.

Running WebXPRT 3
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://www.principledtechnologies.com/benchmarkxprt/webxprt/.
4. Click Run WebXPRT 3.
5. Click Continue.
6. Click Start.
7. Repeat steps 1 through 6 two more times for a total of three runs, and identify the median score.

Measuring time to open multiple applications

We also tested device performance by hand, measuring the time required to open a set of common applications. We opened each application in sequence, without waiting for each individual application to load, and stopped the timer when the last application finished loading.

Setting up the tasks

1. Download and log into the latest version of Microsoft Outlook and Slack desktop applications.
2. Download Microsoft Excel.
3. Download Adobe Acrobat Reader DC, and set it as the default PDF viewer.
4. Open the laptop's default web browser, and configure the default home pages to be the following tabs:

   - MSN.com
   - C-SPAN.org
   - Gmail.com
   - Weather.com
   - Facebook.com
   - Twitter.com
   - Reddit.com
   - YouTube.com

5. Log into Gmail, Facebook, Twitter, Reddit, and YouTube, and ensure the applications save your credentials.
6. Download Intel Power Gadget, and collect a log for 10 minutes to produce an approximately 8MB CSV file.
7. Download the PDF located at https://www.hq.nasa.gov/alsj/a17/A17_FlightPlan.pdf, and save it to the desktop.

Timing the tasks

1. Power on the device, and log in.
2. Clear any background startup activity by allowing the device to idle for 10 minutes.
3. Start the timer and open the following applications in order:

   - Microsoft Outlook
   - Slack desktop app
   - Microsoft Edge (on Surface device) or Safari (on Apple device)

4. Open the 8MB CSV file in Microsoft Excel.
5. Open the large PDF in Adobe Acrobat Reader DC.
6. When the PDF is viewable in Acrobat Reader, stop the timer.
7. Repeat steps 1 through 6 two more times for a total of three runs, and identify the median score.

Read the report at http://facts.pt/bHpxeRV ▶

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