The science behind the report:

Get a better user experience by upgrading to the new HP EliteBook 840 G9

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 better user experience by upgrading to the new HP EliteBook 840 G9.

We concluded our hands-on testing on August 30, 2022. 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 August 23, 2022 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 benchmark testing.

	HP EliteBook 840 G9 with an Intel® Core™ i7-1280P processor	HP EliteBook 840 G9 with an Intel Core i7-1265U processor	HP EliteBook 840 G8 with an Intel Core i7-1165G7 processor
BAPCo® CrossMark™ overall score	1,676	1,519	1,339
BAPCo SYSmark® 25 overall score	1,454	1,471	1,310
UL Procyon® Office Productivity Benchmark overall rating	6,845	6,908	6,313
UL Procyon Photo Editing Benchmark overall rating	7,015	5,965	5,925
UL Procyon Video Editing Benchmark overall rating	2,253	2,037	1,742
WebXPRT 4 overall score	269	260	216

System configuration information

Table 2: Detailed information on the systems we tested.

System configuration information	HP EliteBook 840 G9	HP EliteBook 840 G9	HP EliteBook 840 G8
Processor			
Vendor	Intel	Intel	Intel
Model number	Core i7-1280P	Core i7-1265U	Core i7-1165G7
Core frequency (GHz)	3.6 – 4.8	3.6 – 4.8	2.8 – 4.7
Number of cores	14	10	4
Memory			
Amount (GB)	16	16	16
Type	DDR5 4800MHz	DDR5 4800MHz	DDR4-3200MHz
Graphics			
Vendor	Intel	Intel	Intel
Model number	Intel Iris® Xe Graphics	Intel Iris Xe Graphics	Intel Iris Xe Graphics
Storage			
Amount (GB)	512	512	512
Type	NVMe®	NVMe	NVMe
Connectivity/expansion			
Wireless internet	Intel Wi-Fi 6E AX211	Intel Wi-Fi 6E AX211	Intel Wi-Fi 6 AX201
Bluetooth	5.3	5.3	5.0
USB	2 x Thunderbolt 4 with USB4 Type-C (USB Power Delivery, DisplayPort™ 1.4) 2 x SuperSpeed USB Type-A	2 x Thunderbolt 4 with USB4 Type-C (USB Power Delivery, DisplayPort 1.4) 2 x SuperSpeed USB Type-A	2 x Thunderbolt 4 with USB4 Type-C (USB Power Delivery, DisplayPort 1.4) 2 x SuperSpeed USB Type-A
Battery			
Type	Integrated Lithium-polymer	Integrated Lithium-polymer	Integrated Lithium-polymer
Rated capacity (Whr)	51	51	53
Display			
Size (in.)	14	14	14
Resolution	1,920 x 1,200	1,920 x 1,200	1,920 x 1,080
Touchscreen capability	No	No	No
Operating system			
Vendor	Microsoft	Microsoft	Microsoft
Name	Windows 11 Pro	Windows 11 Pro	Windows 11 Pro
Build number or version	21H2 Build 22000.856	21H2 Build 22000.856	21H2 Build 22000.856

System configuration information	HP EliteBook 840 G9	HP EliteBook 840 G9	HP EliteBook 840 G8
BIOS			
BIOS name and version	HP U71 Ver.01.02.11	HP U71 Ver.01.02.11	HP T37 Ver.01.10.00
Dimensions			
Height (in.)	0.76	0.76	0.70
Width (in.)	12.42	12.42	12.71
Depth (in.)	8.82	8.82	8.46
Weight (lbs.)	2.99	2.99	2.50

How we tested

Setting up the systems

Creating and updating the OEM Windows 11 Pro Image

1. Boot the system.
2. To complete installation, follow the on-screen instructions, using the default selections when appropriate.
3. In the bottom right-hand corner, click the battery icon, and adjust the Windows Power mode (plugged in) to Best Performance.
4. Set DPI scaling to 100%, and set Screen and Sleep options to Never.
5. Right-click the desktop, and select Display settings:

    • Under the Scale and layout section, for the Change the size of text, apps, and other items option select 100%.
    • From the left column, select Power & Sleep.
    • For all power options listed under Screen and Sleep, select Never.

6. Disable User Account Control notifications:

    • Select Windows Start, type `UAC`, and press Enter.
    • Move the slider control to Never notify, and click OK.

7. Disable Virtualization Based Security:

    • Select Windows Start, type `Group Policy`, and press Enter.
    • Select Computer Configuration→Administrative Templates→System→Device Guard
    • Double-click Turn on Virtualization Based Security.
    • Select Disabled, click Apply, and click OK.

8. Run Windows Update, and install all updates available.
9. Launch the Windows Store app, and install all Store app updates.
10. Launch each vendor proprietary utility app installed on each system, and update any drivers or BIOS files.
11. Run the HP Support Assistant utility.
12. Verify the date and time are correct, and synchronize the system clock with the time server.
13. Disable Automatic Windows Update:

    • Right-click the Windows Start button.
    • Select Computer Management.
    • Select Services and Applications.
    • Select Services.
    • Scroll down, and double-click Windows Update.
    • Click Stop.
    • From the Startup type drop-down menu, select Disabled.

Capturing an image

1. Connect an external HDD to the system.
2. Open Control Panel, and click the All Control Panel Items arrow.
3. Click Backup and Restore.
4. Click Create a system image.
5. Verify that the external HDD is selected as the save drive, and click Next.
6. Verify that all drives are selected to back up, and click Next.
7. Click Start backup.
8. At Do you want to create a system repair disc, select No, and close the dialogs.

Restoring an image

1. Connect an external HDD to the system.
2. While restarting the system, press and hold the Shift key.
3. Select Troubleshoot.
4. Select Advanced options.
5. Select See more recovery options.
6. Select System image recovery.
7. At the Restore system files and settings screen, select Next.
8. Verify that the external HDD is selected, and click Next.
9. Once the recovery is complete, click Finish.

Measuring performance

BAPCo CrossMark benchmark

Setting up the test

1. From the Microsoft Store, download and install CrossMark.
2. Launch CrossMark.
3. At the license agreement screen, click Accept.
4. Click Settings.
5. Click Restore Purchase.
6. At the Success screen, click OK, and close CrossMark.
7. Follow the instruction found inside the BAPCo CrossMark user guide, and make the following system configuration changes.

   - Disable User Account Control (UAC):

     - Click the Windows start icon, type `regedit` in the search field, and, to open the Registry Editor, press Enter.
     - Go to HKEY_LOCAL_MACHINE→SOFTWARE→Microsoft→Windows→CurrentVersion→Policies→System.
     - Double-click EnableLUA, type `0` in the value data field, and click OK.
     - Double-click ConsentPromptBehaviorAdmin, type `0` in the value data field, and click OK.

   - Set Power Plan Type to High Performance:

     - Press the Windows key + X and select Windows Powershell (Admin).
     - Type `powercfg.exe -SETACVALUEINDEX SCHEME_CURRENT SUB_NONE 245d8541-3943-4422-b025-13a784f679b7 1` and press Enter.
     - Close Windows PowerShell.

   - Disable WinSAT service:

     - Click the Windows start icon, type `task scheduler` in the search field and, to open the Task Scheduler, press Enter.
     - Click Task Scheduler Library→Microsoft→Windows→Maintenance, right-click WinSAT, and select Disable.

   - Disable Windows Update:

     - Click the Windows start icon, and select Settings→Update & Security→Windows Update.
     - Select Advanced Options, and turn off the following:

       - Receive updates for other Microsoft products when you update Windows.
       - Download updates over metered connections.
       - Restart this device as soon as possible when a restart is required to install an update.
       - Show a notification when your PC requires a restart to finish updating.

   - Disable Windows Search, Diagnostic policy service, and SysMain service:

     - Click the Windows start icon, type `services` in the search field, and press Enter.
     - Right-click Diagnostic policy service, and select Stop.
     - Double-click Diagnostic policy service. From the Startup type drop-down menu, select Disabled, click Apply, and click OK.
     - Right-click Windows Search service, and select Stop.
     - Double-click Windows Search service. From the Startup type drop-down menu, select Disabled, click Apply, and click OK.
     - Right-click SysMain service, and select Stop.
     - Double-click SysMain service. From the Startup type drop-down menu, select Disabled, click Apply, and click OK.

- Disable Windows Security Center:
    - Click the Windows start icon, type `regedit` in the search field and, to open the Registry Editor, press Enter.
    - Go to HKEY_LOCAL_MACHINE→SYSTEM→CurrentControlSet→Services→SecurityHealthService.
    - Double-click Start, type `4` in the value data field, and click OK.
    - Go to HKEY_LOCAL_MACHINE→SYSTEM→CurrentControlSet→Services→wscsvc.
    - Double-click Start, type `4` in the value data field, and click OK.

- Disable Tamper protection
    - Click the Windows start icon, and select Settings→Update & Security→Windows Security.
    - Under Virus & Threat Protection settings, click Manage settings.
    - Turn off Tamper protection.

- Disable Windows Defender
    - Select Windows Start, type `Group Policy`, and press the Enter key.
    - Select Computer Configuration→Administrative Templates→Windows Components→Microsoft Defender Antivirus
    - Double-click Turn off Microsoft Defender Antivirus.
    - Select Enabled, and click Apply and OK.

- Reboot the system for the changes to take effect.

Running the test

1. Boot the system.
2. Select Windows Start.
3. Type `cmd`, and press Ctrl+Shift+Enter.
4. Type `Cmd.exe /c start /wait Rundll32.exe advapi32.dll,ProcessIdleTasks.` Do not interact with the system until the command completes.
5. After the command completes, wait five minutes before running the test.
6. Launch CrossMark.
7. Click Settings.
8. For Number of Iterations, choose 1.
9. Enter a valid email address, and click Back.
10. Click Run Benchmark.
11. Record the result, and shut down the system.
12. Repeat steps 1 through 11 twice more, and record the median result.

BAPCo SYSmark 25 benchmark

Avoiding antivirus software conflicts

SYSmark 25 is not compatible with any virus-scanning software, so we uninstalled any such software present on the notebook PCs before we installed the benchmark.

Avoiding pre-installed software conflicts

SYSmark 25 installs the following applications, which its test scripts employ:

Productivity
- Adobe® Acrobat® Pro DC
- Audacity 2.3.2
- AutoIT 3.3.15.2
- Corel WinZip 24 Enterprise
- Google® Chrome®
- Microsoft Excel 2019
- Microsoft Outlook 2019
- Microsoft PowerPoint 2019
- Microsoft Word 2019
- Shotcut v19.09.14

Creativity
- Adobe Lightroom® Classic CC 2019
- Adobe Premiere® Pro CC 2019 v20.0.6
- Adobe Photoshop® CC 2019 v13.1.5

Responsiveness
- Adobe Acrobat Pro DC
- Adobe Lightroom Classic CC 2019
- Adobe Premiere Pro CC 2019
- Adobe Photoshop CC 2019
- Google Chrome
- Microsoft Excel 2019
- Microsoft Outlook 2019
- Microsoft PowerPoint 2019
- Microsoft Word 2019

If any of these applications already exist on the system under test, they could cause problems with the benchmark due to software conflicts. To avoid any such issues, we uninstalled all conflicting pre-installed software applications—including different versions of any of the programs SYSmark 25 uses—before we installed the benchmark.

Using the SYSmark built-in configuration tool

This tool supports three levels of configuration:

1. Only makes changes that are REQUIRED for the benchmark to run.
2. Additionally, makes changes that are RECOMMENDED for repeatable results.
3. Additionally, makes OPTIONAL changes that help ensure best results.

The configuration tool makes the following configuration changes at each of the three levels:

Level 1 – Required

- Disables User Account Control (UAC)
- Set DPI Scaling to 100%
- Disables Low Battery Actions
- Disables Network Proxies
- Disables System Sleep and Hibernate
- Disables Windows Update
- Disables the WinSAT service

Level 2 – Recommended

- Disables User Account Control
- Set DPI Scaling to 100%
- Disables Low Battery Actions
- Disables Network Proxies
- Disables System Sleep and Hibernate
- Disables Windows Update
- Create BAPCo power scheme
- Set Power Plan Type to High Performance
- Set CPU High Performance
- Disables Disk Defrag
- Disables Windows Error Reporting
- Disables Windows Lock Screen
- Disables Windows Pop-ups
- Disables Screen Saver and Monitor Timeout
- Disables Windows Sidebar/Gadgets
- Disables Desktop Slideshow
- Disables Windows Defender
- Disables Windows Firewall
- Set Font Smoothing

Level 3 – Optional

- Disables Hard Disk Timeout
- Disables System Restore
- Ignores Laptop Lid Close
- Enables Dark Mode

We chose the official BAPCo "Run Benchmark" default as outlined in the BAPCo SYSmark 25 User Guide (https://bapco.com/wp-content/uploads/2020/09/BAPCo_SYSmark25_user_guide_v1.4.pdf), which runs the benchmark using the Required and Recommended options.

Setting up the test

1. Install SYSmark 25 with the default options.
2. Install the latest patch, SYSmark25_Patch2_1.0.2.34 as of July 27, 2021.
3. Disable Windows Defender Antivirus

   - Select Windows Start, type `Group Policy`, and press the Enter key.
   - Select Computer Configuration➔Administrative Templates➔Windows Components➔Microsoft Defender Antivirus.
   - Double-click Turn off Microsoft Defender Antivirus.
   - Select Enabled, click Apply, and click OK.
   - Reboot the system for the changes to take effect.

Running the test

1. Boot the system.
2. Select Windows Start.
3. Type `cmd`, and press Ctrl+Shift+Enter.
4. Type `Cmd.exe /c start /wait Rundll32.exe advapi32.dll,ProcessIdleTasks.` Do not interact with the system until the command completes.

5. After the command completes, wait five minutes before running the test.
6. Launch SYSmark 25.
7. Click the Settings Gear icon.
8. Verify that the iterations are set to the default 1.
9. Verify that Conditioning Run is enabled.
10. Enter a name for the benchmark run.
11. To return to the main menu, click the Back button.
12. Click Run Benchmark.
13. When the benchmark finishes, record the SYSmark 25 benchmark results.
14. Repeat steps 1 through 13 twice more, and record the median results.

UL Procyon Office Productivity Benchmark

Setting up the test

1. Download and install Procyon.
2. Open Procyon.
3. Click Office Productivity benchmark.
4. Click Register.
5. Enter the license key for the Office Productivity benchmark, and click Register.
6. Before running the benchmarks, install licensed version of Microsoft 365.

Running the test

1. Boot the system.
2. Select Windows Start.
3. Type `cmd`, and press Ctrl+Shift+Enter.
4. Type `Cmd.exe /c start /wait Rundll32.exe advapi32.dll,ProcessIdleTasks.` Do not interact with the system until the command completes.
5. After the command completes, wait five minutes before running the test.
6. Launch Procyon.
7. Click Office Productivity benchmark.
8. Click Run.
9. When the benchmark is complete, record the results, and restart the system.
10. Wait 15 minutes before performing the next run.
11. Repeat steps 6 through 10 twice more, and record the median result.

UL Procyon Photo Editing Benchmark

Setting up the test

1. Download and install Procyon.
2. Open Procyon.
3. Click Photo Editing benchmark.
4. Click Register.
5. Enter the license key for the Photo Editing benchmark, and click Register.
6. Before running the benchmarks, install licensed versions of Adobe Photoshop 22.0 or higher and Adobe Lightroom Classic 10.0 or higher.

Running the test

1. Boot the system.
2. Select Windows Start.
3. Type `cmd`, and press Ctrl+Shift+Enter.
4. Type `Cmd.exe /c start /wait Rundll32.exe advapi32.dll,ProcessIdleTasks.` Do not interact with the system until the command completes.
5. After the command completes, wait five minutes before running the test.
6. Launch Procyon.
7. Click Photo Editing benchmark.
8. Click Run.
9. When the benchmark is complete, record the results, and restart the system.
10. Wait 15 minutes before performing the next run.
11. Repeat steps 6 through 10 twice more, and record the median result.

UL Procyon Video Editing Benchmark

Setting up the test

1. Download and install Procyon.
2. Open Procyon.
3. Click Video Editing benchmark.
4. Click Register.
5. Enter the license key for the Video Editing Benchmark, and click Register.
6. Before running the benchmark, install licensed version of Adobe Premiere 14.5 or higher.

Running the test

1. Boot the system.
2. Select Windows Start.
3. Type `cmd`, and press Ctrl+Shift+Enter.
4. Type `Cmd.exe /c start /wait Rundll32.exe advapi32.dll,ProcessIdleTasks.` Do not interact with the system until the command completes.
5. After the command completes, wait five minutes before running the test.
6. Launch Procyon.
7. Click Video Editing benchmark.
8. Click Run.
9. When the benchmark is complete, record the results, and restart the system.
10. Wait 15 minutes before performing the next run.
11. Repeat steps 6 through 10 twice more, and record the median result.

WebXPRT 4 benchmark (Microsoft Edge web browser)

Running the test

1. Open the web browser under test, and go to https://www.principledtechnologies.com/benchmarkxprt/webxprt/.
2. Click Run WebXPRT 4.
3. At the Ready to test your browser screen, click Continue.
4. Click Start.
5. When the test completes, record the results.
6. Click Run Again, and click Start to rerun WebXPRT. Record the results.
7. Repeat step 6 two more times.

Read the report at https://facts.pt/4nJKCdR ▶

This project was commissioned by Intel.

Principled Technologies®

Facts matter.®