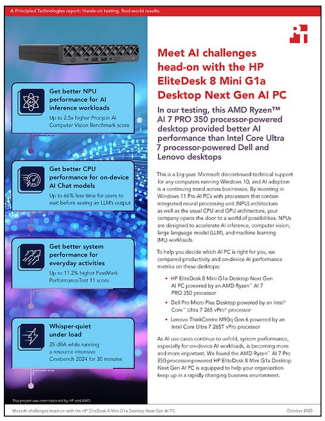

The science behind the report:

Meet AI challenges head-on with the HP EliteDesk 8 Mini G1a Desktop Next Gen AI PC

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 Meet AI challenges head-on with the HP EliteDesk 8 Mini G1a Desktop Next Gen AI PC.

We concluded our hands-on testing on September 25, 2025. 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 6, 2025 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.

	HP EliteDesk 8 Mini G1a Desktop Next Gen AI PC	Dell Pro Micro Plus Desktop	Lenovo ThinkCentre M90q Gen 6
Geekbench AI GPU scores			
Full Precision scores			
Full Precision scores (Higher is better)	6,279	4,609	4,483
Half Precision scores (Higher is better)	9,768	6,290	6,039
Quantized scores (Higher is better)	4,572	3,123	3,012
LM Studio			
Time in seconds (Lower is better)	0.46	2.33	2.50
Tokens per second (Higher is better)	13.27	7.09	7.09

	HP EliteDesk 8 Mini G1a Desktop Next Gen AI PC	Dell Pro Micro Plus Desktop	Lenovo ThinkCentre M90q Gen 6
Procyon AI Computer Vision Benchmark overall scores			
Overall score (Higher is better)	1,820	725	713
MLPerf Client Benchmark – Llama 2 7B Chat			
Time to first token in seconds (Lower is better)	1.17	3.44	3.45
Tokens per second (Higher is better)	14.78	11.59	11.78
MLPerf Client Benchmark – Llama 3.1 8B Instruct			
Time to first token in seconds (Lower is better)	1.19	3.51	3.52
Tokens per second (Higher is better)	14.19	11.86	12.04
MLPerf Client Benchmark – Phi 3.5 Mini Instruct			
Time to first token in seconds (Lower is better)	0.75	2.11	2.12
Tokens per second (Higher is better)	25.53	15.43	16.39
PassMark scores			
Scores (Higher is better)	6,849	6,470	6,155
Acoustics – Cinebench 2024 sustained performance (30 minutes)			
Average dBA under load (Lower is better)	30.5	28.0	26.4

System configuration information

Table 2: Detailed information on the systems we tested.

System	HP EliteDesk 8 Mini G1a Desktop Next Gen AI PC	Dell Pro Micro Plus Desktop	Lenovo ThinkCentre M90q Gen 6
Processor			
Vendor	AMD	Intel	Intel
Model number	Ryzen™ AI 7 PRO 350	Core Ultra 7 265 with vPro®	Core Ultra 7 265T with vPro
Core frequency (GHz)	2.0 – 5.0	2.4 – 5.3	1.5 – 5.3
Number of cores	8	20	20
Number of threads	16	20	20
Memory			
Amount (GB)	64	64	64
Type	DDR5	DDR5	DDR5
Speed	5600 MT/s	5600 MT/s	5600 MT/s
Graphics			
Vendor	AMD	Intel	Intel
Model number	Radeon 860M	Intel Graphics	Intel Graphics
Driver	AMD v32.0.21025.10016	Intel v32.0.101.7029	Intel v32.0.101.7029
Storage			
Amount	512GB	512GB	1TB
Type	M.2 2280 NVMe PCIe Gen 4 x4	M.2 2280 NVMe PCIe Gen 4 x4	M.2 2280 NVMe PCIe Gen 4 x4
Connectivity/expansion			
Communications	LAN: Realtek PCIe GbE Family Controller WLAN: MediaTek Wi-Fi 7 MT7925	LAN: Intel Ethernet Connection (19) I219-LM WLAN: Intel Wi-Fi 7 BE200	LAN: Intel Ethernet Connection (19) I219-LM WLAN: Intel Wi-Fi 6E AX211
Bluetooth	5.4	5.4	5.3
USB	1 x USB Type-C 10Gbps 4 x USB Type-A 10Gbps 2 x Thunderbolt 4 with USB Type-C® 40Gbps	1 x USB Type-C 20Gbps 1 x USB Type-C 10Gbps 4 x USB Type-A 10Gbps 2 x USB Type-A 5Gbps	1 x USB Type-C 20Gbps 5 x USB Type-A 10Gbps 1 x USB Type-A 5Gbps
Video	2 x DisplayPort 2.1 2 x Mini DisplayPort 2.1 1 x HDMI 2.1	3 x DisplayPort 1.4	1 x DisplayPort 1.4 2 x HDMI 2.1
Display			
Size (in.)	24"	24"	24"
	Dell U2417H	Dell U2417H	Dell U2417H
Resolution	1,920 x 1,080	1,920 x 1,080	1,920 x 1,080

System	HP EliteDesk 8 Mini G1a Desktop Next Gen AI PC	Dell Pro Micro Plus Desktop	Lenovo ThinkCentre M90q Gen 6
Operating system			
Vendor	Microsoft	Microsoft	Microsoft
Name	Windows 11 Pro	Windows 11 Pro	Windows 11 Pro
Version	24H2 Build 26100.4652	24H2 Build 26100.4652	24H2 Build 26100.4652
BIOS			
BIOS name and version	HP X26 Ver. 02.02.02, 7/17/2025	Dell Inc. 1.6.2, 7/4/2025	LENOVO M5PKT28A, 7/3/2025
Dimensions			
Height (in.)	1.55	1.42	1.44
Width (in.)	6.97	7.17	7.05
Depth (in.)	7.13	7.01	7.20
Weight (lb.)	2.48	2.68	2.66

How we tested

Setting up the systems

When running the tests, we used a factory-provided image. We reset the system image between tests to prevent software from corrupting the test image.

Setting up and updating the OEM image

1. Boot the system.
2. To complete installation, follow the on-screen instructions, using the default selections when appropriate.
3. Set the Windows Power Plan to Best Performance.
4. Set Screen and Sleep options to Never:
    a. Right-click the desktop, and select Display settings.
    b. From the left-hand column, select System.
    c. Click Power.
    d. For all power options listed under Screen and Sleep, select Never.
5. Disable User Account Control notifications:
    a. Select Windows Start, type `UAC` and press the Enter key.
    b. Move the slider control to Never notify, and click OK.
6. Run Windows Update, and install all updates available.
7. Launch each vendor's proprietary utility app installed on each system, and update any drivers or BIOS files:
    - For Dell, run the Dell Command | Update utility.
    - For Lenovo, run the Lenovo Commercial Vantage application. Run all Critical and Recommended Updates.
    - For HP, check for updates using HP PC Hardware Diagnostics Windows. Run the HP Support Assistant Application using a guest login, and run updates.
8. After running updates, in Application settings, disable automatic software updates.
9. Verify the date and time are correct, and synchronize the system clock with the time server.
10. Pause Automatic Windows Updates:
    a. Click Windows Start.
    b. Type `Windows Update settings` and press Enter.
    c. From the Pause updates drop-down menu, select Pause for 5 weeks.

Capturing an image

1. Connect an external HDD to the system.
2. Click the Windows Menu button, and in the search bar, type `Control Panel`. Click Control Panel→System and Security→Backup and Restore (Windows 7)→Create a system image.
3. Verify that the external HDD is selected as the save drive, and click Next.
4. Verify that all drives are selected to back up, and click Next.
5. Click Start backup.
6. When the system asks if 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. Press and hold the Shift key while restarting the system.
3. Select Troubleshoot.
4. Select Advanced options.
5. Select See more recovery options.
6. Select System image recovery.
7. Select the User account.
8. Enter the system password, and click Continue.
9. At the Restore system files and settings screen, select Next.
10. Verify that the external HDD is selected, and click Next.
11. Once the recovery has completed, click Finish.

Running ProcessIdleTasks

Once every 24-hour period, before testing, we rebooted the system and ran the ProcessIdleTasks command, which forces idle processes to complete and minimizes the chance of background tasks affecting test runs.

1. Boot the system.
2. Select Windows Start.
3. Type `cmd` and press Ctrl+Shift+Enter.
4. Type `Rundll32.exe advapi32.dll,ProcessIdleTasks` Do not interact with the system until the command completes.
5. After the command completes, wait 5 minutes before running the test.

Running system performance and productivity tests

Measuring performance with PassMark PerformanceTest 11

Setting up the test

1. Download PassMark PerformanceTest from https://www.passmark.com/products/performancetest/download.php.
2. To begin the installation, click Install.
3. Select Accept to accept the license agreement, and click Next.
4. After the installation is complete, deselect Launch Performance Test, and click Finish.

Running the test

1. To launch PassMark PerformanceTest, click the PassMark PerformanceTest icon.
2. To start the benchmark, click Run Benchmark.
3. When the test completes, record the results.
4. Repeat steps 2 through 3 twice more.

Running the AI tests

Measuring performance with the Procyon AI Computer Vision Benchmark

Setting up the test

1. Purchase and download the Procyon AI Computer Vision Benchmark from https://benchmarks.ul.com/procyon.
2. Install the Procyon benchmark.
3. Launch Procyon.
4. Select Settings, and input the Procyon AI Computer Vision license key.
5. Close Procyon.

Running the test

1. Launch Procyon.
2. Select the Computer Vision test.
3. For the Integer test, make the following selections:
   - For AMD processor-based devices, select the AMD Ryzen AI tab.
   - For Intel processor-based devices, select the Intel OpenVINO tab.
4. Select NPU, and select Integer.
5. Click Run.
6. When the test completes, record the results, and wait 15 minutes before rerunning.
7. Repeat steps 2 through 6 twice more.

Measuring performance with Geekbench AI Pro

Setting up the test

1. Purchase and download a Geekbench AI Pro license from https://www.geekbench.com/ai/download/.
2. Run the installer, and install using all defaults.

Running the test

1. Launch Geekbench AI.
2. Enter the license key.
3. For GPU testing, select:
   - AI Framework: ONXX
   - AI Backend: DirectML
   - AI Device: graphics card
4. Click Run AI Benchmark.
5. Wait 5 minutes, and complete steps 3 through 5 twice more.

Measuring performance with LM Studio

Setting up the test

1. Download LM Studio from https://lmstudio.ai.
2. Run the installer, and install using all defaults.
3. Launch LM Studio.
4. In the Select a model to load field, download the Llama 3.1 8B model.

Running the test

1. Launch LM Studio.
2. Select Load a model, and choose the Meta-Llama-3.1-8B-Instruct-Q4_K_M model.
3. When the model is fully loaded, in the message field, type: `How can AMD Ryzen™ Processors in HP workstations help enterprise customers deliver better user experience, productivity performance and ROI?` and click Send.
4. When the test is complete, record the results.
5. Eject the model.
6. Delete the Chat messages.
7. Open a new chat by clicking the + icon, and reload the same model.
8. Wait 5 minutes, open a new chat window, and repeat steps 2 through 7 twice more.

Measuring performance with MLPerf Client benchmark

Setting up the test

1. Download the latest MLPerf Client GUI from (we used version 1.0.0): https://github.com/mlcommons/mlperf_client/releases
2. Extract the files, and launch MLPerf Client.
3. Accept the license agreement and wait for the benchmark assets to download.
4. Close MLPerf Client.

Running the test

1. Launch MLPerf Client.
2. Depending on the hardware tested, select either the `AMD ORT GenAI Ryzen AI NPU-GPU` or `Intel Native OpenVINO NPU` checkboxes for all the following models:
   - Llama 2 7B Chat
   - Llama 3.1 8B Instruct
   - Phi 3.5 Mini Instruct
3. Click Run Benchmark Tests.
4. When the test completes, record the results, and wait 15 minutes before rerunning.
5. Repeat steps 2-3 twice more.

Measuring system acoustics with Cinebench 2024

These tests require the following items:

- Extech SDL600 Sound Level Meter/Datalogger with SD card
- Cinebench 2024

Setting up the test

1. Place the system under test in a sound-proofed professional sound booth.
2. Set the Extech SDL600 on a tripod so that it is 2 feet in front of, and 1 foot above, the bottom of the system under test.
3. Download and install Cinebench 2024 from https://www.maxon.net/en/downloads/cinebench-2024-downloads.
4. Launch Cinebench 2024.
5. Select File → Advanced benchmark.
6. Select File → Preferences, and change the Custom Minimum Test Duration to 30 minutes, and click OK.
7. Exit Cinebench, and shut down the system.

Running the test

1. Boot the system.
2. Launch Cinebench 2024.
3. In the Minimum Test Duration field, select Custom (30 minutes).
4. Start the Extech SDL600 Sound Level Meter/Datalogger.
5. Click the Cinebench 2024 CPU (Multi Core) Start button.
6. At the end of the 30-minute Cinebench 2024 run, stop the Extech SDL600, and record the average sound level (dB) while running Cinebench 2024.
7. Shut down the system for 60 minutes, and let it return to room temperature.
8. Repeat steps 1 through 7 twice more.

Read the report ▶

This project was commissioned by HP and AMD.

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