



The science behind the report:

# Increase output and productivity with the Dell Precision 3551 Mobile Workstation

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 [Increase output and productivity with the Dell Precision 3551 mobile workstation](#).

We concluded our hands-on testing on November 25, 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 October 22, 2020 or earlier. Unavoidably, these configurations may not represent the latest versions available when this report appears.

## Our results

### Benchmarking and hand timed test results

**Note:** The SPECworkstation 3 benchmark requires 1 TB of storage space to run, and the Latitude laptop we tested shipped with a Class 40 256 GB SSD. Because we wanted to run this benchmark on both systems, we replaced the 256GB storage in the Latitude laptop with the Class 50 1TB storage drive from the Precision, and tested the systems sequentially. We chose this path to make the test as fair as reasonably possible given the requirements of the SPECworkstation 3 benchmark.

Table 1: Results of our benchmark and hand-timed testing. These scores and times are the median of three runs.

	Dell Precision 3551 with an Intel® Core™ i9-10885H processor	Dell Latitude 5511 with an Intel Core i7-10850H processor	Percentage difference
<b>Benchmark testing results</b>			
SYSmark® 2018 (Higher is better)			
Overall rating	1,834	1,659	10.5%
SPECworkstation® 3 (Higher is better)			
Media and entertainment	1.72	1.52	13.1%
Product development	1.88	1.28	46.8%
Life sciences	1.63	1.24	31.4%
Financial services	1.38	1.54	-10.3%
Energy	1.13	0.62	82.2%
General operations	1.78	1.77	0.5%
GPU compute	0.98	0.74	32.4%

	Dell Precision 3551 with an Intel® Core™ i9-10885H processor	Dell Latitude 5511 with an Intel Core i7- 10850H processor	Percentage difference
SPECviewperf® 13 (Higher is better)			
3dsmax-06	53.7	33.7	59.3%
catia-05	76.28	25.16	203.1%
creo-02	65.51	26.57	146.5%
energy-02	7.98	0.48	1,562.5%
maya-05	67.73	51.01	32.7%
medical-02	25.11	11.02	127.8%
showcase-02	26.67	15.83	68.4%
snx-03	91.49	6.27	1,359.1%
sw-04	86.64	44.07	96.5%
HDXPRT 4 (Higher is better)			
Overall score	111	99	12.1%
Cinebench R20 (Higher is better)			
CPU score - median	3,128	2,757	13.4%
<b>Hand-timed testing results</b>			
Adobe® Photoshop® workflow (Seconds, lower is better)			
Import and save 50 images (1.1GB) to JPEG	88.7	110.6	19.8%
Merge to HDR Pro Preview appears	22.1	25.3	12.6%
Create Merge to HDR Pro image	9.3	9.4	1.0%
Export to JPEG	2.5	2.5	0.0%
<b>Total</b>	<b>122.6</b>	<b>147.8</b>	<b>17.0%</b>
Adobe Lightroom® workflow (Seconds, lower is better)			
Create a 45MP photo merge Panorama	26.8	32.5	17.5%
Export image	12.8	16.4	21.9%
<b>Total</b>	<b>39.6</b>	<b>48.9</b>	<b>19.0%</b>
<b>PugetBench Adobe Creative Cloud® benchmark testing results</b>			
Adobe Photoshop			
Overall score (higher is better)	822.0	639.0	28.6%
Adobe Lightroom Classic			
Overall score (higher is better)	842.0	719.5	17.0%
Adobe AERender®			
Overall score (higher is better)	743.0	445.0	66.9%

## Return on investment (ROI) calculations

Table 2: Prices for the systems we tested

Prices for the systems	
<b>Dell Precision 3551 mobile workstation</b> with an Intel Core i9 processor and Class 50 1TB SSD	\$3,244.37*
<b>Dell Latitude 5511 laptop</b> with an Intel Core i7 processor and Class 40 1TB SSD	\$2,544.64*
Added cost of Precision model	\$699.73

**Explanation of calculations:** Working from the percentage wins for the Dell Precision 3551 mobile workstation vs. the Dell Latitude 5511 laptop, we made the assumptions that a worker could finish tasks that much faster and save that much time working with the Dell Precision 3551 mobile workstation. We calculated the value of worker time saved at \$57.18\*\* per hour (salary + benefits) based on U.S. Bureau of Labor Statistics data from 2nd quarter, 2020, on total compensation per hour worked for the Professional, Scientific, and Technical Services sector. Payback for the \$699.93 higher price of the Dell Precision 3551 mobile workstation would require 12 1/4 hours saved at that compensation. The table below shows the number hours worked on tested tasks that would yield payback for the higher price of the Dell Precision 3551 mobile workstation. Our set of tests include workloads where the worker might not be active doing the task but which tie up the workstation for extended periods of time. We make the assumption that the worker productivity depends on the workstation availability during that time.

\*Dell price for systems accessed on Dell online store on 11/16/2020.

\*\*Average total compensation professional, scientific, and technical services workers receive per hour worked, June 2020.

Source: <https://www.bls.gov/news.release/ecec.t04.htm> and <https://www.bls.gov/news.release/pdf/ecec.pdf> Accessed 12/15/2020.

Table 3: ROI savings across our test scenarios

ROI scenarios	Percentage win with Precision	Minutes saved per hour worked	Value of increased productivity per hour worked on tested tasks	Payback in hours worked on tested tasks
<b>Everyday performance</b> Best of SYSmark 2018 and HDXPRT 4 wins	12.00%	7.20	\$6.86	103.00
<b>More demanding workloads</b> Based on average win on SPECworkstation 3 tests	28.00%	16.80	\$16.01	44.00
<b>More demanding workloads</b> Based on best win on SPECworkstation 3 tests	82.00%	49.20	\$46.88	15.00
<b>Content Creation</b> Adobe Photoshop Our custom workload	17.00%	10.20	\$9.72	72.00
<b>Content Creation</b> Adobe Lightroom Our custom workload	19.00%	11.40	\$10.86	65.00
<b>Content Creation</b> Pugetbench Adobe AERender	66.00%	39.60	\$37.73	19.00
<b>Content Creation</b> Pugetbench Average of AERender, Photoshop and Lightroom results	37.00%	22.20	\$21.15	34.00
<b>Content Creation:</b> SPECPerfView 13 Average win percentage for all tests	406.00%	243.60	\$232.15	4.00
<b>Content Creation:</b> SPECPerfView 13 Best result	1,500.00%	900.00	\$857.70	1.00
<b>Content Creation:</b> SPECPerfView 13 Best result rounded to nearest whole number	1,562.00%	937.20	\$893.15	1.00
<b>CineBench R20</b>	13.00%	7.80	\$7.43	95.00

## System configuration information

Table 4: Detailed information on the systems we tested.

System configuration information	Dell Latitude 5511 laptop	Dell Precision 3551 mobile workstation
Processor		
Vendor	Intel	Intel
Name	Core i7	Core i9
Model number	10850H	10885H
Core frequency (GHz)	2.7 – 5.1	2.4 – 5.3
Number of cores	6	8
Cache	12MB Intel Smart Cache	16MB Intel Smart Cache
Memory		
Amount (GB)	16	64
Type	DDR4	DDR4
Speed (MHz)	2,933	2,933
Integrated graphics		
Vendor	Intel	Intel
Model number	UHD Graphics	UHD Graphics
Discrete graphics		
Vendor	NVIDIA®	NVIDIA
Model number	GeForce MX250	Quadro P620
Storage		
Vendor/Model	Toshiba® KXG60PNV1T02	Toshiba KXG60PNV1T02
Amount (TB)	1	1
Type	M.2 NVMe	M.2 NVMe
Connectivity/expansion		
Wired internet	Intel I219-LM	Intel I219-LM
Wireless internet	Intel Wi-Fi 6 AX201	Intel Wi-Fi 6 AX201
Bluetooth	5.1	5.1
USB	2 x USB 3.2 Type-A ports 1 x USB 3.2 Type-A port with PowerShare 1 x USB 3.2 Gen 2 Type-C port with DisplayPort/Thunderbolt	2 x USB 3.2 Type-A ports 1 x USB 3.2 Type-A port with PowerShare 1 x USB 3.2 Gen 2 Type-C port with DisplayPort/Thunderbolt
Video	1 x HDMI 2.0 port	1 x HDMI 2.0 port
Battery		
Type	Lithium-Ion	Lithium-Ion
Rated capacity (Whr)	68	97

System configuration information	Dell Latitude 5511 laptop	Dell Precision 3551 mobile workstation
Display		
Size (in.)	15.6	15.6
Type	FHD WVA Anti-Glare	FHD WVA Anti-Glare
Resolution	1,920 x 1,080	1,920 x 1,080
Touchscreen	No	Yes
Operating system		
Vendor	Microsoft	Microsoft
Name	Windows 10 Pro	Windows 10 Pro
Build number or version	10.0.19042	10.0.19042
BIOS		
BIOS name and version	Dell 1.3.0	Dell 1.3.0
Dimensions		
Height (in)	0.88 – 0.98	0.88 – 0.98
Width (in)	14.13	14.13
Depth (in)	9.30	9.30
Weight (lbs.)	4.16	4.16

# How we tested

## Setting up the systems

### Creating and updating the OEM Windows 10 Pro Image

1. Boot the system.
2. Follow the on-screen instructions to complete installation, using the default selections when appropriate.
3. Set DPI scaling to 100%, and set Screen and Sleep options to Never:
  - Right-click desktop, and select Display settings.
  - Under the Scale and layout section, select 100% for the Change the size of text, apps, and other items option.
  - Select Power & Sleep.
  - For all power options listed under Screen and Sleep, select Never.
4. Disable User Account Control notifications:
  - Select Windows Start, type UAC, and press Enter.
  - Move the slider control to Never notify, and click OK.
5. Disable Windows Firewall:
  - Select Windows Start, type Windows Firewall, and press the Enter key.
  - From the left column, select Turn Windows Defender Firewall on or off.
  - Under Private and Public network settings, select Turn off Windows Defender Firewall.
6. Run Windows Update, and install all updates available.
7. Launch the Windows Store app, and install all Store app updates.
8. Launch the Dell Command Update utility and update any drivers or BIOS files.
9. Go to <https://www.intel.com/content/www/us/en/support.html> and <https://www.nvidia.com/en-us/geforce/drivers/> to install the latest chipset and graphics drivers available.
10. Verify the date and time are correct, and synchronize the system clock with the time server.
11. Disable Automatic Windows Update:
  - Right-click Windows Start.
  - 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. Right-click desktop, and select Personalize→Home→Update & security→Backup→More options→See advanced settings→System Image Backup→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. 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. Press and hold the Shift key while restarting the system.
3. Select Troubleshoot.
4. Select Advanced options.
5. Select System image recovery.
6. Select the User account.
7. Enter the system password, and click Continue.
8. Verify that the external HDD is selected, and click Next.
9. Once the recovery has completed, click Finish.

## Measuring performance with benchmarks

### SYSmark 2018

#### Avoiding antivirus software conflicts

SYSmark 2018 is not compatible with any virus-scanning software, so we uninstalled any such software present on the systems before we installed the benchmark.

#### Avoiding pre-installed software conflicts

SYSmark 2018 installs the following applications, which its test scripts employ:

##### Productivity

- Adobe Acrobat Pro DC
- AutoIT 3.3.14.2
- BowPad64-2.3.3 installer
- Google® Chrome®
- Microsoft Excel 2016
- Microsoft OneNote 2016
- Microsoft Outlook 2016
- Microsoft PowerPoint 2016
- Microsoft Word 2016
- Windows Zip

##### Creativity

- Adobe Photoshop CC 2017
- Adobe Lightroom Classic CC
- CyberLink PowerDirector® 2015

##### Responsiveness

- Adobe Acrobat Pro DC
- Adobe Lightroom Classic CC
- Adobe Photoshop CC 2017
- CyberLink PowerDirector 2015
- Google Chrome
- Microsoft Excel 2016
- Microsoft OneNote 2016
- Microsoft Outlook 2016
- Microsoft PowerPoint 2016
- Microsoft Word 2016

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 2018 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

##### Level 2 - Recommended

- 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
- 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

We chose the official BAPCo 'Run Benchmark' default as outlined in the BAPCo SYSmark2018 User Guide [http://bapco.com/wp-content/uploads/2018/10/BAPCo\\_SYSmark2018\\_user\\_guide.pdf](http://bapco.com/wp-content/uploads/2018/10/BAPCo_SYSmark2018_user_guide.pdf), which runs the benchmark using the Required and Recommended options.

### Setting up the test

1. Install SYSmark 2018 with the default options.

### Running the test

1. Launch SYSmark 2018.
2. Click Settings.
3. For iterations, enter 3.
4. Verify that Conditioning Run is enabled.
5. Enable Process Idle Tasks.
6. Enter a name for the benchmark run.
7. To return to the main menu, click Back.
8. Click Run Benchmark.
9. When the benchmark finishes, record the SYSmark 2018 benchmark results.

## HDXPRT 4

### Setting up the test

1. Download HDXPRT from <https://www.principledtechnologies.com/benchmarkxpert/hdxprt/>.
2. Extract the HDXPRT4\_1\_2\_Install\_11\_13\_2019.zip file to C:\.
3. To start HDXPRT 4 setup, right-click HDXPRTSetup.exe in the build folder, and select Run as administrator.
  - If a SmartScreen warning appears, select More info to enable the Run anyway option.
4. Install HDXPRT with default options. The installer automatically executes the setup of the required applications.
  - Do not interact with any intermediate dialogs you see during setup, as this can cause setup to fail.
5. When the installer has completed, click Finish to reboot the system.
6. HDXPRT 4 includes tests that use the trial versions of Adobe Photoshop Elements 2020 and CyberLink MediaEspresso 7.5. However, it does not install these applications. Before you run HDXPRT 4, download and install these applications to the test system.
7. To download the Cyberlink\_MediaEspresso\_Downloader.exe, go to <https://www.cyberlink.com/prog/ap/mex/download.jsp>.
8. To automatically start the download, click Cyberlink\_MediaEspresso\_Downloader.exe.
9. When the CyberLink MediaEspresso downloader reports that the installation process will begin after a set amount of time, click Install Now with default options.
10. When the installer reports "Installation Complete," close the installer without launching MediaEspresso.
11. To download Photoshop Elements 2020, go to <https://helpx.adobe.com/download-install/kb/photoshop-elements-downloads.html>.
12. Locate the downloaded PhotoshopElements\_2020\_LS30\_win64\_ESD.zip, and extract it.
13. Disable Wi-Fi:
  - To disconnect from the wireless network, click Wireless in the taskbar.
14. To install with default options, double-click Set-up.exe in the extracted Photoshop Elements 2020 installation folder.
15. When the setup process finishes, close the window.
16. On the desktop, right-click Adobe Photoshop, and select Run as administrator.
17. In the Last Used Version of the PSE splash screen, click Photoshop Elements drop-down menu, and select First Time User.
18. Click Confirm.
19. Click Photo Editor.
20. In the Sign In Required window, click I Agree.
21. In the trial duration notice window, click Start Trial.
22. In the Welcome to Photoshop Elements screen, click OK.
23. Once Photoshop finishes loading, close all open Adobe windows, and exit the program.
24. Change the configuration to use discrete graphics.
  - a. Go to Program Files (x86)\HDXPRT4\HDXPRT4\_Workloads\HDXPRT4\_Tests.
  - b. Open the HDXPRT4\_Setting.ini file.
  - c. Set the following flag to false.

```
[HWAccel]
UseIntegrated=true
```
  - d. Save the changes and close the file.
25. Shut down the system.



### 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 5 minutes before running the test.
6. Right-click HDXPRT desktop icon, and select Run as administrator.
7. Enter a test name, and change to 3 iterations.
8. To begin the benchmark, click Start.
9. When the test completes, record the results.

## SPECworkstation 3

### Setting up the test

1. Go to <https://www.spec.org/gwpg/wpc.static/workstation3-info.html>, and purchase and download the vendor license of the benchmark.
2. Unzip the SPECworkstation\_304.zip file to C:\.
3. To install, navigate to the extracted SPECworkstation\_304 directory, and click SPECworkstation\_304.exe.
4. Shut down the system.

### 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 5 minutes before running the test.
6. Launch SPECworkstation.
7. Change the iterations to 3, and check the box next to Official Run.
8. Click OpenCL/CUDA Configuration, select the discrete graphics card option, and select CUDA.
9. Click Run Benchmark.
10. When the test is complete, record the results.

## SPECviewperf 13

### Setting up the test

1. Go to <https://www.spec.org/gwpg/gpc.static/vp13info.html>, and purchase and download the vendor license of the benchmark.
2. Unzip the SPECviewperf13.zip file to C:\.
3. To install, navigate to the extracted SPECviewperf13 directory, and click SPECgpcViewperf13.0.exe.
4. Shut down the system.

### 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 5 minutes before running the test.
6. Launch SPECviewperf.
7. Change the iterations to 3.
8. Click Run.
9. When the test is complete, record the results.

## Cinebench

### Setting up the test

1. Download and install Cinebench from <https://www.maxon.net/en-us/products/cinebench-r20-overview/>.
2. Launch Cinebench, and accept the license agreement.
3. Close Cinebench.
4. Shut down the system.

### 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 5e minutes before running the test.
6. Launch Cinebench.
7. Click Run.
8. When the test completes, record the results.
9. Shut down the system.
10. Repeat steps 1 through 9 twice more.

## PugetBench for Photoshop

### Setting up the test

1. Purchase, and download the PugetBench for Photoshop license from <https://www.pugetsystems.com/labs/articles/PugetBench-for-Adobe-Creative-Cloud-1642/>.
2. Extract the PugetBench for Photoshop zip file to the desktop.
3. Download, and install aescrpts ZXP installer from <https://aescrpts.com/learn/zxp-installer/>.
4. To install the Adobe plug-in necessary to run the benchmark, open the extracted PugetBench for Photoshop directory, and click PugetBench\_PS.zxp.
5. Open Adobe Photoshop.
6. Click Window→Extensions→PugetBench for Photoshop.
7. Next to License Key, click Change, enter your license key, and click Save.
8. Close Adobe Photoshop.
9. Shut down the system.

### 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 5 minutes before running the test.
6. Open Adobe Photoshop.
7. Click Window→Extensions→PugetBench for Photoshop.
8. Click Run Benchmark.
9. When the benchmark finishes, record the overall score.
10. Close Adobe Photoshop, and shut down the system.
11. Before performing the next run, wait 15 minutes.
12. Repeat steps 1 through 11 twice more.
13. Record the median time.

## PugetBench for Lightroom Classic

### Setting up the test

1. Purchase, and download the PugetBench for Lightroom license from <https://www.pugetsystems.com/labs/articles/PugetBench-for-Adobe-Creative-Cloud-1642/>.
2. Extract the PugetBench for Lightroom Classic zip file to the desktop.
3. Open Adobe Lightroom Classic.
4. Click File→Plug-in Manager.
5. Click Add.
6. Find the extracted PugetBench Lightroom Classic directory, select the pugetsystems.lrplugin directory, and click Done.
7. Click File→Open Catalog→Benchmark Catalog.lrcat.
8. At the Relaunch Lightroom with this Catalog dialog box, check the box next to Don't show this again, and click Relaunch.
9. At the Lightroom Classic Catalog Upgrade dialog box, click Upgrade.
10. Close Adobe Lightroom Classic.
11. Find the extracted PugetBench Lightroom Classic directory, rename the Benchmark Catalog to Benchmark Catalog Old, and rename the Benchmark Catalog-v10 to Benchmark Catalog.
12. Launch Adobe Lightroom Classic.
13. Click Choose a Different Catalog, and click Ok.
14. Click File→Plug-in Extras→Benchmark Run.
15. Enter the license key, check the boxes next to Do not upload results and Write CSV/JSON log file, and click Save/update settings.
16. Close Adobe Lightroom Classic.
17. Shut down the system.

### 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 5 minutes before running the test.
6. Open Adobe Lightroom Classic.
7. Click File→Plug-in Extras→Benchmark Run to start the benchmark.
8. Enter the Puget Systems license key, check the boxes next to Do Not upload results and Write CSV/JSON log file, and click Save/Update Settings.
9. When the benchmark finishes, record the overall score.
10. Close Adobe Lightroom Classic, and shut down the system.
11. Before performing the next run, wait 15 minutes.
12. Repeat steps 1 through 11 twice more.
13. Record the median time.

## PugetBench for AERender

### Setting up the test

1. Purchase and download the PugetBench for AERender license from <https://www.pugetsystems.com/labs/articles/PugetBench-for-Adobe-Creative-Cloud-1642/>.
2. Extract the PugetBench for AERender zip file to the desktop.
3. Download and install aescripts ZXP installer from <https://aescripts.com/learn/zxp-installer/>.
4. To install the Adobe plug-in necessary to run the benchmark, open the extracted PugetBench for AERender directory, and click PugetBench\_AER.zxp.
5. Open Adobe After Effects.
6. Click Edit→Preferences→Scripts & Expressions.
7. Select Allow Scripts to Write Files and Access Network and click OK.
8. Click Edit→Preferences→Memory.
9. The benchmark requires 12 GB of RAM space. Adjust the RAM reserved for other applications to get to 12 GB and click OK.
10. Click Window→Extensions→PugetBench for AERender.
11. Next to License Key click Change and enter your license key. Click Save.
12. Close Adobe After Effects.
13. Shut down the system.

## 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 5 minutes before running the test.
6. Open Adobe After Effects.
7. Click Window→Extensions→PugetBench for AERender.
8. Click Run Benchmark.
9. Record the overall score when the benchmark finishes.
10. Close Adobe After Effects, and shut down the system under test.
11. Before performing the next run, wait 15 minutes.
12. Repeat steps 1 through 11 twice more.
13. Record the median time.

## Testing hand-timed scenarios

### Adobe Photoshop

#### Setting up the test

1. Copy the test 1.06GB photo directory (50 raw .NEF images) to the Pictures directory.
2. Install Photoshop from <https://www.adobe.com/> with default options.
3. Launch Photoshop, and click Next to advance through all the “What’s new” dialog boxes.
4. Close Photoshop, and shut down the system.

#### 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 5 minutes before running the test.
6. Launch Photoshop.
7. Select File→Scripts→Image Processor.
8. Click Select Folder, and select the test file directory.
9. Select 10 as the JPEG Quality.
10. Simultaneously start the timer and click Run.
11. When the spinning circle disappears, stop the timer, and record the result.
12. Select File→Automate→Merge to HDR Pro.
13. Find the directory where the 5 images are located, select them, and click OK.
14. Simultaneously start the timer and click OK.
15. When the preview merged file appears, stop the timer, and record the result.
16. Simultaneously start the timer and click Ok.
17. When the HDR image has been created, stop the timer, and record the result.
18. Click File→Export→Export As.
19. Verify that the settings are set to JPG 100% Quality.
20. Click Export.
21. Simultaneously start the timer and click Save.
22. When the file has been exported, stop the timer, and record the result.
23. Close Photoshop, and shut down the system.
24. Repeat steps 1 through 23 twice more.

## Adobe Lightroom Classic

### Setting up the test

1. Copy the 550MB test photo directory (six 45MP raw .NEF images) to the Pictures directory.
2. Install Lightroom Classic from <https://www.adobe.com/> with default options.
3. Launch Lightroom.
4. At the Welcome screen, click Ok, got it.
5. To cycle through the tips, when the tips dialog appears, check the box next to Don't show this on startup, and click Next.
6. Close Lightroom, and shut down the system.

### 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 5 minutes before running the test.
6. Launch Lightroom.
7. Click Import.
8. Select the test file directory, and click Import.
9. To select all the imported photos, press Ctrl + A.
10. Click Photo→Photo Merge→Panorama.
11. Simultaneously start the timer and click Merge.
12. When the progress bar in the top left corner disappears, stop the timer, and record the result.
13. Click File→Export.
14. Verify that the settings are set to JPG 100% Quality.
15. Simultaneously start the timer and click Export.
16. Stop the timer when the file has been exported and record the result.
17. Close Lightroom Classic, and shut down the system.
18. Repeat steps 1 through 17 twice more.

Read the report at <http://facts.pt/003KDol> ►

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