Media and entertainment workload comparison: HP Z8 vs. Apple Mac Pro

Creators working in the media and entertainment space benefit from choosing customizable workstations that suit their needs to speed their specific workflows. At Principled Technologies, we compared the performance of two workstations on representative media and entertainment tasks:

- HP Z8 G4 tower workstation
  with two Intel® Xeon® Gold 6226R processors (16 cores each; 32 cores total)
- Apple® Mac Pro® (2019)
  with one Intel Xeon W-3275M processor (28 cores)

We configured the systems as similarly as possible: both had 96GB RAM and comparable GPUs and NVMe SSDs. The systems support different processors, so we chose configurations that had as similar core counts as possible to make a fair comparison.

In our tests, the HP Z8 with Intel Xeon Gold 6226R processors completed a rendering sequence in Avid® Media Composer in 9 percent less time than did the Apple Mac Pro. The HP Z8 also exported a rendered sequence to a .MOV file in 44 percent less time, and exported an unrendered sequence in 43 percent less time than the Apple Mac Pro. Plus, the HP Z8 achieved that improved performance for just 11 percent additional cost.

These results show that creators running media and entertainment workloads could save time to project completion with the cost-effective HP Z8 compared to the Apple Mac Pro.

Up to 44% less time to export a sequence to .MOV file in Avid Media Composer

Performance increase for only 11% additional cost

Our results

To compare the HP Z8 workstation to the Apple Mac Pro, we executed three tasks in Avid Media Composer, a popular video editing platform. We ran each set of tests three times and report the median of three runs.

As Figures 1 through 3 show, the HP Z8 finished a rendering sequence in 9 percent less time than did the Apple Mac Pro, and exported rendered and unrendered sequences to .MOV files in 44 and 43 percent less time, respectively.

Render sequence
(lower is better)

HP Z8 — 8 min 43 sec
Apple Mac Pro — 9 min 40 sec
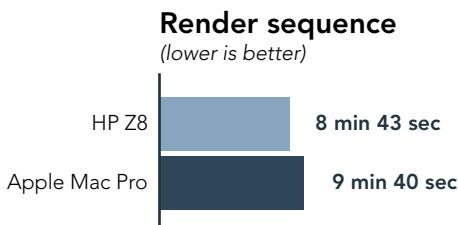
Figure 1: Time to complete a render in Avid Media Composer, in minutes:seconds. Less time is better. Source: Principled Technologies.

Export rendered sequence as H.264 .MOV file
(lower is better)

HP Z8 — 1 min 26 sec
Apple Mac Pro — 2 min 34 sec
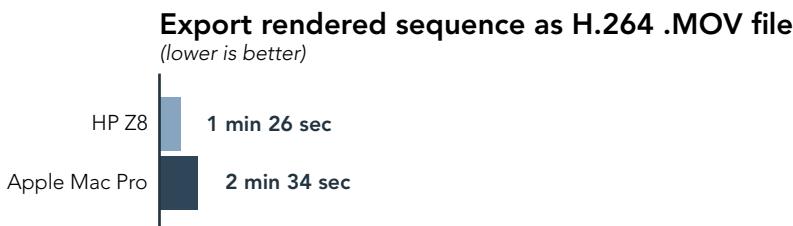
Figure 2: Time to export a rendered sequence to a .MOV file in Avid Media Composer, in minutes:seconds. Less time is better. Source: Principled Technologies.

Export unrendered sequence as H.264 .MOV file
(lower is better)

HP Z8 — 28 min 42 sec
Apple Mac Pro — 51 min 12 sec

Figure 3: Time to export an unrendered sequence to a .MOV file in Avid Media Composer, in minutes:seconds. Less time is better. Source: Principled Technologies.

By rendering and exporting video faster, the HP Z8 workstation with Intel Xeon Gold 6226R processors can help creators working with video finish projects faster.

These performance improvements came at a modest price increase, with the HP Z8 completing workflows in up to 44 percent less time at an increased cost of only 11 percent (see here for details).

Up to 44% less time to export a sequence

Performance increase for only 11% additional cost

Conclusion

In our tests, we found that the HP Z8 tower with Intel Xeon Gold 6226R processors completed three sample media and entertainment tasks in up to 44 percent less time than the Apple Mac Pro with Intel Xeon W-3275M processor, while adding only 11 percent to the purchase price.

We concluded our hands-on testing on November 19, 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 November 19, 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.

Avid Media Composer testing	HP Z8 Tower G4 Workstation	Apple Mac Pro (2019)	Percent less time	Time faster
Render sequence (min:sec)	08:43	09:40	9.83%	00:57
Export rendered sequence as H.264 .MOV file (min:sec)	01:26	02:34	44.16%	01:08
Export unrendered sequence as H.264 .MOV file (min:sec)	28:42	51:12	43.94%	22:30

Table 2: Cost of the systems we tested.

Cost information	HP Z8 Tower G4 Workstation	Apple Mac Pro (2019)	Percent difference
Cost (list pricing as of 11/24/2020)	$18,772.00	$16,799.00	-10.51%

System configuration information

Table 3: Detailed information on the systems we tested.

System	HP Z8 Tower G4 Workstation	Apple Mac Pro (2019)
Processor		
Number of processors	2	1
Vendor	Intel	Intel
Name	Xeon Gold	Xeon W
Model number	6226R	3275M
Core frequency (GHz)	2.90	2.50
Number of cores	16	28
Cache	22MB	38.5MB
Memory		
Amount (GB)	96	96
Type	PC4-23400	PC4-23400
Speed (MHz)	2933	2933
Graphics		
Vendor	NVIDIA	AMD
Model number	Quadro RTX 6000	Radeon Pro Vega II 32GB
Storage		
Vendor	Samsung	Apple
Model number	MZVLB1T0HALR-000H2	AP1024N
Amount	1TB	1TB
Type	M.2 PCIe NVMe SSD	SSD
Connectivity/expansion		
Wired internet	Intel Ethernet Connection I219-LM	Apple AQC107-AFW
Operating system		
Vendor	Microsoft	Apple
Name	Windows 10 Pro for Workstations	macOS Catalina
Build number or version	2004	10.15.7
BIOS		
BIOS name and version	HP P60 Ver. 02.60	1037.147.4.0.0

How we tested

Avid Media Composer

Avid Media Composer is a major component of modern professional video production workflows. To fully stress the processor, memory, disk, and discrete graphics processor subsystems, we created a collection of high quality video in a variety of formats, including 4K and 8K RED raw video, and assembled them into a single resource-intensive sequence. This sequence used a mix of picture-in-picture, keyframed transforms, SpectraMatte keying, and blends to push up to 18 simultaneous video streams with effects.

Individually, rendering the effects in a sequence is primarily CPU-bound, while relying on the GPU and disk to a lesser degree, while exporting a sequence that has been previously rendered relies more on disk and memory I/O constraints, as well as the GPU when used to accelerate some raw media processing. Combining these two tasks, by exporting a sequence with un-rendered effects, taxes the resources of the entire system in different combinations throughout the timeline, as each frame is processed individually, and the layers of video in the timeline have different processing needs at different times.
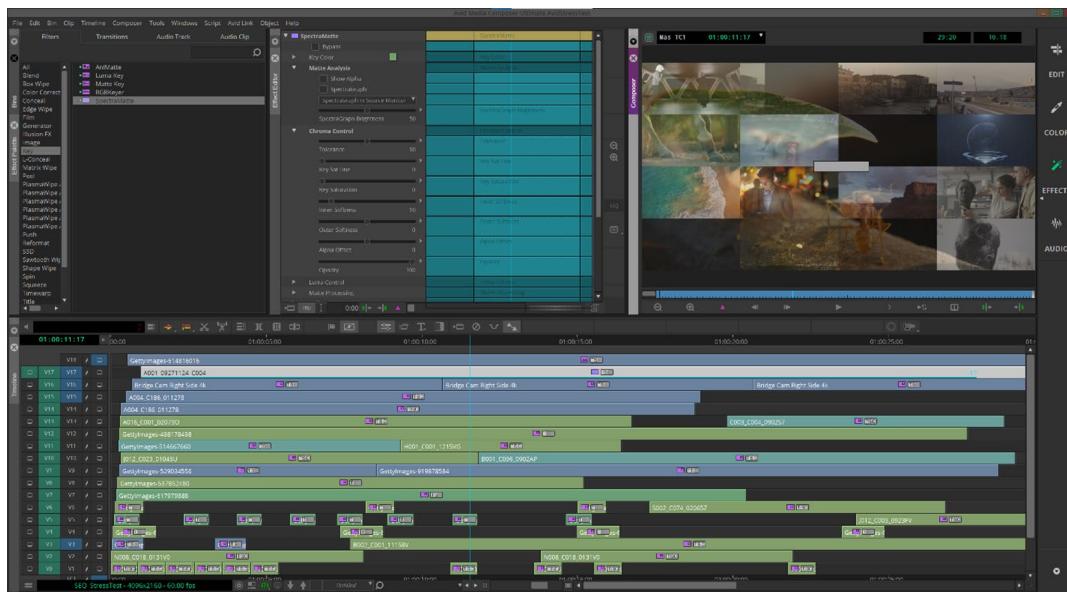
- The render sequence simulates a pro user opening a project from another user (shared project) and rendering the effects for preview playback.
- Export pre-rendered sequence simulates taking a pre-rendered timeline and outputting it to a video file for distribution.
- Export un-rendered sequence simulates taking a shared project and outputting for distribution while simultaneously rendering. (Example might be someone whose job it is to do a final render of a project and give approval, distribute to another department/ social media/etc.)
- Avid Media Composer: Version 2020.6
- RED Avid plugin: AMA-Avid-REDR3D-win-installer-1.26.2.10184

Installing Avid Media Composer

1. Download Avid Media Composer version 2020.6 installer.
2. Install using default settings.
3. Select the AvidStressTest project, click Open.
4. Click File > Settings, and select the Site tab.
5. Double-click Media Cache.
6. Select the Video Memory tab, and set the Desired Video Memory (GB) to 48.
7. Click Flush Frame Cache.
8. Click Apply, then OK.
9. Select the Project tab, and double-click on Media Creation.
10. Select the Capture tab, confirm the Video Drive is set to the SSD, and click Apply to All.
11. Confirm on the Titles, Import, Mixdown & Transcode, Motion Effects, and Render tabs that the setting was applied properly.
12. Click OK.
13. Close the Settings window.
14. Close Avid Media Composer.

Rendering a sequence

1. Launch Avid Media Composer.
2. Select the AvidStressTest project, click Open.
3. Click in the timeline to focus it, ensure that all tracks and layers are active.
4. Click Timeline > Render > Render In/Out.
5. Time the duration of the timeline render process.
6. Click Timeline > Render > Clear Renders In/Out.
7. Close Avid Media Composer.
8. Browse to the Avid MediaFiles/MXF path and delete all files and folders, empty the Recycle Bin/Trash.
9. Repeat steps 1-8 two more times.

Exporting a pre-rendered sequence as an H.264 .MOV file

1. Launch Avid Media Composer
2. Select the AvidStressTest project, click Open.
3. Click in the timeline to focus it, ensure that all tracks and layers are active.
4. Click Timeline > Render > Render In/Out.
5. Click File > Output > Export to File …
6. Ensure the filename is SEQ_StressTest.mov, click Save to save the file to the Desktop.
7. Time the duration of the export process.
8. Delete the SEQ_StressTest.mov file from the Desktop.
9. Repeat steps 5-8 two more times.

Exporting an un-rendered sequence as an H.264 .MOV file

1. Launch Avid Media Composer.
2. Select the AvidStressTest project, click Open.
3. Click in the timeline to focus it, ensure that all tracks and layers are active.
4. Click File > Output > Export to File …
5. Ensure the filename is SEQ_StressTest.mov, click Save to save the file to the Desktop.
6. Time the duration of the export process.
7. Delete the SEQ_StressTest.mov file from the Desktop.
8. Click Timeline > Render > Clear Renders In/Out.
9. Close Avid Media Composer.
10. Browse to the Avid MediaFiles/MXF path and delete all files and folders, empty the Recycle Bin/Trash.
11. Repeat steps 1-10 two more times.

This project was commissioned by HP.