AMD RADEON PRO Software FOR ENTERPRISE

Performance in Computer Aided Design:
Stop Spinning. Start Working. Save Time.

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STOP SPINNING

What are the most common design steps you use in your CAD application?

If you are like most people, much of your time is spent solid modeling. This means you sketch something, and then extrude it, apply fillets, and chamfers. You will cut away material, mirror, add holes, and more. While you are doing this, you will rotate, pan, or zoom your model when required to get the perspective that you need.

If this is the typical usage of a CAD application, why don't we have benchmarks that capture the most common use cases?

Today, most benchmarks take a model and spin it around. After spinning, you get a score.

Who sits at their desk spinning models?

No one I know. Maybe there is some panning and zooming included, and some settings changes, but the most common benchmarks are not measuring the most common operations of the application. If we are what we measure, trying to choose the right graphics solution may result in dizziness.

When it comes to choosing the right graphics card for your needs, you would expect it to excel in the design steps that you spend most of your time using. How can you make sure this is the case?

At AMD we have always been focused on what the end users are doing in real world situations. Users are solid modeling, and that is where we focus our performance tuning. The challenge is that users have difficulty seeing these benefits with today's benchmarks.

START WORKING

Let's take an inside look at how we measure our performance. Using SOLIDWORKS® as an example, most users will be familiar with Model Mania. It is a friendly competition at SOLIDWORKS® World where users see how fast and accurately they can model information from a 2D drawing. The models are not overly complicated but do take advantage of the most commonly used SOLIDWORKS® design steps. We use these same models in our internal benchmarking, only we take things a step further: we automate the design, taking out the time a user spends thinking. In the end, we are only measuring how long it takes to complete each step. Being that the models are not stressful on their own, we do 16 models, and then multiply by four, creating an array with 64 models. If you have spent any time looking at a typical spinning benchmark, we think you will agree that our internal benchmark is more representative of what end users are doing day-to-day.

As you can see in the video, we do quite well vs. the competition. Let's have a closer look.

In the video, you see that the Radeon™ Pro WX 7100 completes the Model Mania test faster than the NVIDIA Quadro® RTX 4000. It is 28% faster overall12 (BTW, the WX 7100 sells for around $500 USD vs. the RTX 4000 selling for over $800 USD16).

SAVE TIME

Looking at design steps that the graphics card needs to draw, there are some impressive leads where our product is faster by up to 68%. The table below shows our normalized performance advantage (where higher is better). This equates to the amount of time you can save performing these design steps.

Inside AMD, we use this data to focus on areas where we can do further performance optimizations. Mirroring is an example here where we have a slight lead. Our Enterprise driver is one way we work to deliver improvements to this product.

As an end user, or IT manager, this is valuable data for your decision-making process. Depending on which design steps you use most, you can make a more educated decision and get the best solution for your workload. And, instead of spinning, you can get working, and save design time too.

Design Steps	Radeon Pro WX 7100	NVIDIA Quadro RTX 4000	AMD ADVANTAGE
Circular Pattern [1]	3.9009357	4.599875	~ 18%
Combine [2]	0.7065854	1.1103836	~ 57%
Draft [3]	1.6274154	2.0226481	~ 24%
Extrude Boss/Base [4]	56.9718648	88.7146738	~ 56%
Extrude Cut [5]	33.3068857	47.4488842	~ 42%
Revolve Boss/Base [6]	6.4252097	10.8076575	~ 68%
Fillet [7]	33.9718716	42.4093635	~ 25%
Hole Wizard [8]	11.5870975	17.5478061	~ 51%
Rib [9]	1.8165574	2.6881045	~ 48%
Lofted Boss/Base [10]	1.4618292	2.0081137	~ 37%
Mirror [11]	26.8616776	29.8534675	~ 11%
Reordering Features [12]	1.5294676	1.9559509	~ 28%
Revolved Surface [13]	5.0028996	5.7113264	~ 14%
Shell [14]	5.928968	8.862579	~ 49%
Sketch [15]	224.4158776	272.6369113	~ 21%
Swept Cut [17]	1.6600935	2.4896466	~ 50%

Footnotes:
1. Testing conducted by AMD labs as of April 22nd, 2019 on a test system comprising of HP Z8 Workstation platform, Intel® Xeon® Gold 5122 CPU @ 3.60 GHz, 16 GB RAM, Windows® 10 Pro October 2018 Update using Radeon™ Pro Software for Enterprise 19.Q2 running on the Radeon™ Pro WX 7100 and the NVIDIA Quadro® Optimal Driver for Enterprise (ODE) R418 U4 (425.31) driver running on the NVIDIA Quadro® RTX 4000. The test was conducted using the AMD internal real-world benchmark for SOLIDWORKS® 2019 where the total time taken for the "Circular Pattern" design feature was recorded for both AMD and the competition. Using this configuration, the Radeon™ Pro WX 7100 had a total time of 3.9 seconds for all instances of the "Circular Pattern" design feature through the test while the competition took a total time of 4.6 seconds. Making the Radeon™ Pro WX 7100 up to 18% faster than the NVIDIA Quadro® RTX 4000 in this feature. Performance Differential: 4.6–3.9 (seconds) =~18.0%.RPS-61

2. Testing conducted by AMD labs as of April 22nd, 2019 on a test system comprising of HP Z8 Workstation platform, Intel® Xeon® Gold 5122 CPU @ 3.60 GHz, 16 GB RAM, Windows® 10 Pro October 2018 Update using Radeon™ Pro Software for Enterprise 19.Q2 running on the Radeon™ Pro WX 7100 and the NVIDIA Quadro® Optimal Driver for Enterprise (ODE) R418 U4 (425.31) driver running on the NVIDIA Quadro® RTX 4000. The test was conducted using the AMD internal real-world benchmark for SOLIDWORKS® 2019 where the total time taken for the "Combine" design feature was recorded for both AMD and the competition. Using this configuration, the Radeon™ Pro WX 7100 had a total time of 0.7 seconds for all instances of the "Combine" design feature through the test while the competition took a total time of 1.1 seconds. Making the Radeon™ Pro WX 7100 up to 57% faster than the NVIDIA Quadro® RTX 4000 in this feature. Performance Differential: 1.1–0.7 (seconds) =~57.0%.RPS-62

3. Testing conducted by AMD labs as of April 22nd, 2019 on a test system comprising of HP Z8 Workstation platform, Intel® Xeon® Gold 5122 CPU @ 3.60 GHz, 16 GB RAM, Windows® 10 Pro October 2018 Update using Radeon™ Pro Software for Enterprise 19.Q2 running on the Radeon™ Pro WX 7100 and the NVIDIA Quadro® Optimal Driver for Enterprise (ODE) R418 U4 (425.31) driver running on the NVIDIA Quadro® RTX 4000. The test was conducted using the AMD internal real-world benchmark for SOLIDWORKS® 2019 where the total time taken for the "Draft" design feature was recorded for both AMD and the competition. Using this configuration, the Radeon™ Pro WX 7100 had a total time of 1.6 seconds for all instances of the "Draft" design feature through the test while the competition took a total time of 2 seconds. Making the Radeon™ Pro WX 7100 up to 24% faster than the NVIDIA Quadro® RTX 4000 in this feature. Performance Differential: 2–1.6 (seconds) =~24.0%.RPS-63

4. Testing conducted by AMD labs as of April 22nd, 2019 on a test system comprising of HP Z8 Workstation platform, Intel® Xeon® Gold 5122 CPU @ 3.60 GHz, 16 GB RAM, Windows® 10 Pro October 2018 Update using Radeon™ Pro Software for Enterprise 19.Q2 running on the Radeon™ Pro WX 7100 and the NVIDIA Quadro® Optimal Driver for Enterprise (ODE) R418 U4 (425.31) driver running on the NVIDIA Quadro® RTX 4000. The test was conducted using the AMD internal real-world benchmark for SOLIDWORKS® 2019 where the total time taken for the "Extrude Boss/Base" design feature was recorded for both AMD and the competition. Using this configuration, the Radeon™ Pro WX 7100 had a total time of 57 seconds for all instances of the "Extrude Boss/Base" design feature through the test while the competition took a total time of 88.7 seconds. Making Radeon™ Pro WX 7100 up to 56% faster than the NVIDIA Quadro® RTX 4000 in this feature. Performance Differential: 88.7 – 57 (seconds) =~56.0%. RPS-64

5. Testing conducted by AMD labs as of April 22nd, 2019 on a test system comprising of HP Z8 Workstation platform, Intel® Xeon® Gold 5122 CPU @ 3.60 GHz, 16 GB RAM, Windows® 10 Pro October 2018 Update using Radeon™ Pro Software for Enterprise 19.Q2 running on the Radeon™ Pro WX 7100 and the NVIDIA Quadro® Optimal Driver for Enterprise (ODE) R418 U4 (425.31) driver running on the NVIDIA Quadro® RTX 4000. The test was conducted using the AMD internal real-world benchmark for SOLIDWORKS® 2019 where the total time taken for the "Extrude Cut" design feature was recorded for both AMD and the competition. Using this configuration, the Radeon™ Pro WX 7100 had a total time of 33.3 seconds for all instances of the "Extrude Cut" design feature through the test while the competition took a total time of 47.4 seconds. Making Radeon™ Pro WX 7100 up to 42% faster than the NVIDIA Quadro® RTX 4000 in this feature. Performance Differential: 47.4–33.3 (seconds) =~42.0%. RPS-65

6. Testing conducted by AMD labs as of April 22nd, 2019 on a test system comprising of HP Z8 Workstation platform, Intel® Xeon® Gold 5122 CPU @ 3.60 GHz, 16 GB RAM, Windows® 10 Pro October 2018 Update using Radeon™ Pro Software for Enterprise 19.Q2 running on the Radeon™ Pro WX 7100 and the NVIDIA Quadro® Optimal Driver for Enterprise (ODE) R418 U4 (425.31) driver running on the NVIDIA Quadro® RTX 4000. The test was conducted using the AMD internal real-world benchmark for SOLIDWORKS® 2019 where the total time taken for the "Revolve Boss/Base" design feature was recorded for both AMD and the competition. Using this configuration, the Radeon™ Pro WX 7100 had a total time of 6.4 seconds for all instances of the "Revolve Boss/Base" design feature through the test while the competition took a total time of 10.8 seconds. Making the Radeon™ Pro WX 7100 up to 68% faster than the NVIDIA Quadro® RTX 4000 in this feature. Performance Differential: 10.8–6.4 (seconds) =~68.0%. RPS-66

7. Testing conducted by AMD labs as of April 22nd, 2019 on a test system comprising of HP Z8 Workstation platform, Intel® Xeon® Gold 5122 CPU @ 3.60 GHz, 16 GB RAM,Windows® 10 Pro October 2018 Update using Radeon™ Pro Software for Enterprise 19.Q2 running on the Radeon™ Pro WX 7100 and the NVIDIA Quadro® Optimal Driver for Enterprise (ODE) R418 U4 (425.31) driver running on the NVIDIA Quadro® RTX 4000.The test was conducted using the AMD internal real-world benchmark for SOLIDWORKS® 2019 where the total time taken for the "Fillet" design feature was recorded for both AMD and the competition. Using this configuration, the Radeon™ Pro WX 7100 had a total time of 33.97 seconds for all instances of the "Fillet" design feature through the test while the competition took a total time of 42.41 seconds. Making the Radeon™ Pro WX 7100 up to 25% faster than the NVIDIA Quadro® RTX 4000 in this feature. Performance Differential: 42.41–33.97 (seconds) =~25%.RPS-67

8. Testing conducted by AMD labs as of April 22nd, 2019 on a test system comprising of HP Z8 Workstation platform, Intel® Xeon® Gold 5122 CPU @ 3.60 GHz, 16 GB RAM, Windows® 10 Pro October 2018 Update using Radeon™ Pro Software for Enterprise 19.Q2 running on the Radeon™ Pro WX 7100 and the NVIDIA Quadro® Optimal Driver for Enterprise (ODE) R418 U4 (425.31) driver running on the NVIDIA Quadro® RTX 4000. The test was conducted using the AMD internal real-world benchmark for SOLIDWORKS® 2019 where the total time taken for the "Hole Wizard" design feature was recorded for both AMD and the competition. Using this configuration, the Radeon™ Pro WX 7100 had a total time of 11.59 seconds for all instances of the "Hole Wizard" design feature through the test while the competition took a total time of 17.55 seconds. Making the Radeon™ Pro WX 7100 up to 51% faster than the NVIDIA Quadro® RTX 4000 in this feature. Performance Differential: 17.55–11.59 (seconds) =~51%.RPS-68

9. Testing conducted by AMD labs as of April 22nd, 2019 on a test system comprising of HP Z8 Workstation platform, Intel® Xeon® Gold 5122 CPU @ 3.60 GHz, 16 GB RAM, Windows® 10 Pro October 2018 Update using Radeon™ Pro Software for Enterprise 19.Q2 running on the Radeon™ Pro WX 7100 and the NVIDIA Quadro® Optimal Driver for Enterprise (ODE) R418 U4 (425.31) driver running on the NVIDIA Quadro® RTX 4000. The test was conducted using the AMD internal real-world benchmark for SOLIDWORKS® 2019 where the total time taken for the "Rib" design feature was recorded for both AMD and the competition. Using this configuration, the Radeon™ Pro WX 7100 had a total time of 1.82 seconds for all instances of the "Rib" design feature through the test while the competition took a total time of 2.69 seconds. Making the Radeon™ Pro WX 7100 up to 48% faster than the NVIDIA Quadro® RTX 4000 in this feature. Performance Differential: 2.69–1.82 (seconds) =~48%.RPS-69

10. Testing conducted by AMD labs as of April 22nd, 2019 on a test system comprising of HP Z8 Workstation platform, Intel® Xeon® Gold 5122 CPU @ 3.60 GHz, 16 GB RAM, Windows® 10 Pro October 2018 Update using Radeon™ Pro Software for Enterprise 19.Q2 running on the Radeon™ Pro WX 7100 and the NVIDIA Quadro® Optimal Driver for Enterprise (ODE) R418 U4 (425.31) driver running on the NVIDIA Quadro® RTX 4000. The test was conducted using the AMD internal real-world benchmark for SOLIDWORKS® 2019 where the total time taken for the "Lofted Boss/Base" design feature was recorded for both AMD and the competition. Using this configuration, the Radeon™ Pro WX 7100 had a total time of 1.46 seconds for all instances of the "Lofted Boss/Base" design feature through the test while the competition took a total time of 2.01 seconds. Making the Radeon™ Pro WX 7100 up to 37% faster than the NVIDIA Quadro® RTX 4000 in this feature. Performance Differential: 2.01– 1.46 (seconds) =~37%. RPS-70

11. Testing conducted by AMD labs as of April 22nd, 2019 on a test system comprising of HP Z8 Workstation platform, Intel® Xeon® Gold 5122 CPU @ 3.60 GHz, 16 GB RAM, Windows® 10 Pro October 2018 Update using Radeon™ Pro Software for Enterprise 19.Q2 running on the Radeon™ Pro WX 7100 and the NVIDIA Quadro® Optimal Driver for Enterprise (ODE) R418 U4 (425.31) driver running on the NVIDIA Quadro® RTX 4000. The test was conducted using the AMD internal real-world benchmark for SOLIDWORKS® 2019 where the total time taken for the "Mirror" design feature was recorded for both AMD and the competition. Using this configuration, the Radeon™ Pro WX 7100 had a total time of 26.86 seconds for all instances of the "Mirror" design feature through the test while the competition took a total time of 29.85 seconds. Making the Radeon™ Pro WX 7100 up to 11% faster than the NVIDIA Quadro® RTX 4000 in this feature. Performance Differential: 29.85–26.86 (seconds) =~11%. RPS-71

12. Testing conducted by AMD labs as of April 22nd, 2019 on a test system comprising of HP Z8 Workstation platform, Intel® Xeon® Gold 5122 CPU @ 3.60 GHz, 16 GB RAM, Windows® 10 Pro October 2018 Update using Radeon™ Pro Software for Enterprise 19.Q2 running on the Radeon™ Pro WX 7100 and the NVIDIA Quadro® Optimal Driver for Enterprise (ODE) R418 U4 (425.31) driver running on the NVIDIA Quadro® RTX 4000. The test was conducted using the AMD internal real-world benchmark for SOLIDWORKS® 2019 where the total time taken for the "Reordering Features" design feature was recorded for both AMD and the competition. Using this configuration, the Radeon™ Pro WX 7100 had a total time of 1.53 seconds for all instances of the "Reordering Features" design feature through the test while the competition took a total time of 1.96 seconds. Making the Radeon™ Pro WX 7100 up to 28% faster than the NVIDIA Quadro® RTX 4000 in this feature. Performance Differential: 1.96–1.53 (seconds) =~28%.RPS-72

13. Testing conducted by AMD labs as of April 22nd, 2019 on a test system comprising of HP Z8 Workstation platform, Intel® Xeon® Gold 5122 CPU @ 3.60 GHz, 16 GB RAM, Windows® 10 Pro October 2018 Update using Radeon™ Pro Software for Enterprise 19.Q2 running on the Radeon™ Pro WX 7100 and the NVIDIA Quadro® Optimal Driver for Enterprise (ODE) R418 U4 (425.31) driver running on the NVIDIA Quadro® RTX 4000.The test was conducted using the AMD internal real-world benchmark for SOLIDWORKS® 2019 where the total time taken for the "Revolved Surface" design feature was recorded for both AMD and the competition. Using this configuration, the Radeon™ Pro WX 7100 had a total time of 5 seconds for all instances of the "Revolved Surface" design feature through the test while the competition took a total time of 5.71 seconds. Making the Radeon™ Pro WX 7100 up to 14% faster than the NVIDIA Quadro® RTX 4000 in this feature. Performance Differential: 5.71–5 (seconds) =~14%.RPS-73

14. Testing conducted by AMD labs as of April 22nd, 2019 on a test system comprising of HP Z8 Workstation platform, Intel® Xeon® Gold 5122 CPU @ 3.60 GHz, 16 GB RAM, Windows® 10 Pro October 2018 Update using Radeon™ Pro Software for Enterprise 19.Q2 running on the Radeon™ Pro WX 7100 and the NVIDIA Quadro® Optimal Driver for Enterprise (ODE) R418 U4 (425.31) driver running on the NVIDIA Quadro® RTX 4000. The test was conducted using the AMD internal real-world benchmark for SOLIDWORKS® 2019 where the total time taken for the "Shell" design features was recorded for both AMD and the competition. Using this configuration, the Radeon™ Pro WX 7100 had a total time of 5.93 seconds for all instances of the "Shell" design feature through the test while the competition took a total time of 8.86 seconds. Making the Radeon™ Pro WX 7100 up to 49% faster than the NVIDIA Quadro® RTX 4000 in this feature. Performance Differential: 8.86–5.93 (seconds) =~49%. RPS-74

15. Testing conducted by AMD labs as of April 22nd, 2019 on a test system comprising of HP Z8 Workstation platform, Intel® Xeon® Gold 5122 CPU @ 3.60 GHz, 16 GB RAM, Windows® 10 Pro October 2018 Update using Radeon™ Pro Software for Enterprise 19.Q2 running on the Radeon™ Pro WX 7100 and the NVIDIA Quadro® Optimal Driver for Enterprise (ODE) R418 U4 (425.31) driver running on the NVIDIA Quadro® RTX 4000. The test was conducted using the AMD internal real-world benchmark for SOLIDWORKS® 2019 where the total time taken for the "Sketch" design features was recorded for both AMD and the competition. Using this configuration, the Radeon™ Pro WX 7100 had a total time of 224.4 seconds for all instances of the "Sketch" design features through the test while the competition took a total time of 272.6 seconds. Making the Radeon™ Pro WX 7100 up to 21% faster than the NVIDIA Quadro® RTX 4000 in this feature. Performance Differential: 272.6–224.4 (seconds) =~21%.RPS-75

16. As of May2019., using street etail pricing information based on Amazon.com. the following information from http://newegg.com $477 on newegg.com for WX 7100
https://www.newegg.com/Product/ProductList.aspx?Submit=ENE&DEPA=0&Order=BESTMATCH&Description=WX+7100&ignorear=0&N=-1&isNodeId=1, and $889.99 on newegg.com for RTX 4000
https://www.newegg.com/Product/Product.aspx?Item=2VV-000K-000T1&Description=Quadro%20RTX%204000&cm_re=Quadro_RTX_4000-_-2VV-000K-000T1-_-Product

17. Testing conducted by AMD labs as of April 22nd, 2019 on a test system comprising of HP Z8 Workstation platform, Intel® Xeon® Gold 5122 CPU @ 3.60 GHz, 16 GB RAM, Windows® 10 Pro October 2018 Update using Radeon™ Pro Software for Enterprise 19.Q2 running on the Radeon™ Pro WX 7100 and the NVIDIA Quadro® Optimal Driver for Enterprise (ODE) R418 U4 (425.31) driver running on the NVIDIA Quadro® RTX 4000. The test was conducted using the AMD internal real-world benchmark for SOLIDWORKS® 2019 where the total time taken for the "Swept Cut" design feature was recorded for both AMD and the competition. Using this configuration, the Radeon™ Pro WX 7100 had a total time of 1.66 seconds for all instances of the "Swept Cut" design feature through the test while the competition took a total time of 2.49 seconds. Making the Radeon™ Pro WX 7100 up to 50% faster than the NVIDIA Quadro® RTX 4000 in this feature. Performance Differential: 2.49–1.66 (seconds) =~50%. RPS-76