Workstation users can get increased performance and value with the Dell Precision 3640 Tower

vs. Lenovo ThinkStation P340 Tower Workstation and HP Z2 G5 Workstation*

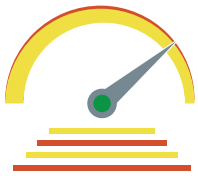
Deciding which entry-level workstation to purchase can be daunting in a landscape where different vendors offer near-identical configurations. What differentiates these systems and how do you choose among them?

At Principled Technologies, we explored the relative performance and value of the Dell™ Precision™ 3640 Tower workstation compared to a Lenovo® ThinkStation® P340 Tower Workstation and an HP Z2 G5 Workstation, testing across two levels of configurations to reflect multiple workstation-grade application use cases. As expected, the identically configured systems performed close to one another on three benchmark workloads, but we found that the Dell Precision 3640 Tower offered up to an average of 9.8 percent performance improvement on SPECworkstation® 3 workloads over the HP Z2 G5 and delivered better performance per dollar compared to all but one of the competitor systems.

These results show that for most of the configurations and use cases we tested, choosing the Dell Precision 3640 Tower could offer an edge in performance for workstation-class workloads like video rendering, content creation, and engineering design (CAD), while providing an overall better value for your investment.

Up to

17% better performance per dollar*



Up to

9.8% average performance improvement

across SPECworkstation 3 workloads

*Improved performance per dollar on select configurations and comparisons only. Read the report for details.

Our comparison

We compared configurations of the following systems:

- Dell Precision 3640 Tower workstation
- Lenovo ThinkStation P340 Tower Workstation
- HP Z2 G5 Workstation

each with the same memory and storage, and the following processors and graphics cards:

- Intel® Core™ i7-10700 with NVIDIA® Quadro® P620
- Intel Core i9-10900 with NVIDIA Quadro P2200

We compared the six systems in the following areas to measure system performance in workstation-grade use cases and value to the user:

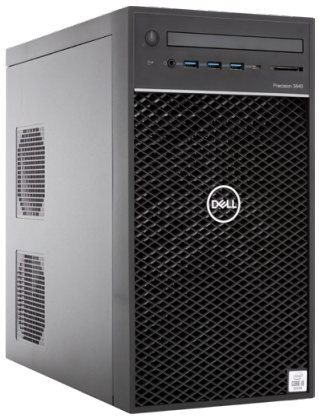
- Performance benchmarks
  - SPECworkstation 3
  - BapCo® SYSmark® 2018
  - Cinebench® R20
- Performance per dollar

We chose performance benchmarks stressing CPU and GPU with various types of workloads to replicate several performance-intensive workstation-class application scenarios. Learn more about our testing, including specific system configurations, in the science behind the report.

About the Dell Precision 3640 Tower workstation

For organizations with users who could benefit from workstation-level performance, the Dell Precision 3640 Tower offers multiple 10th Generation Intel Core and Intel Xeon® processor options with advanced features such as RMT Pro, professional graphics, AI-powered Dell Optimizer, and large PSUs and additional cooling. Users can choose up to NVIDIA® Quadro® RTX 5000 graphics and up to 128 GB of RAM. The Precision 3640 Tower features up to 6TB total PCIe SSD capacity and the choice between Windows 10 Pro for Workstations and Ubuntu 18.04 to deliver the experience that users desire.

To learn more about the Dell Precision 3640 Tower workstation, visit https://www.dell.com/en-us/work/shop/workstations-isv-certified/new-precision-3640-tower-workstation/spd/precision-3640-workstation.



The Dell Precision 3640 Tower workstation

Strong performance across configurations of the Dell Precision 3640 Tower

Organizations often choose workstations to deliver the highest possible performance to their employees. Better performing workstations can lead to greater employee productivity, because users don't have to spend as much time waiting on their systems to complete tasks. Faster computations and renderings can also lead to better quality of work, as well as increased throughput. We assessed the performance of the Dell Precision 3640 Tower with two different processors compared to a Lenovo ThinkStation P340 Tower and an HP Z2 G5 with the same processors, using three productivity benchmarks. We ran each benchmark three times and report the median of each run.

SPECworkstation 3 evaluates system performance using a variety of workstation-grade workloads in seven key areas (Media and Entertainment, Product Development, Life Sciences, Financial Services, Energy, General Operations, and GPU Compute). In SPECworkstation 3 Product Development and Media and Entertainment tests, the benchmark measures various 3D modeling and simulation workloads creating single-threaded workloads that stress single-core CPU and discrete GPU performance. In these tests, the Dell Precision 3640 Tower provided consistently better performance than both systems across processor configurations, including a 16.8 percent higher Product Development score than the HP Z2 G5 at both processor tiers (see Figures 1 and 2).

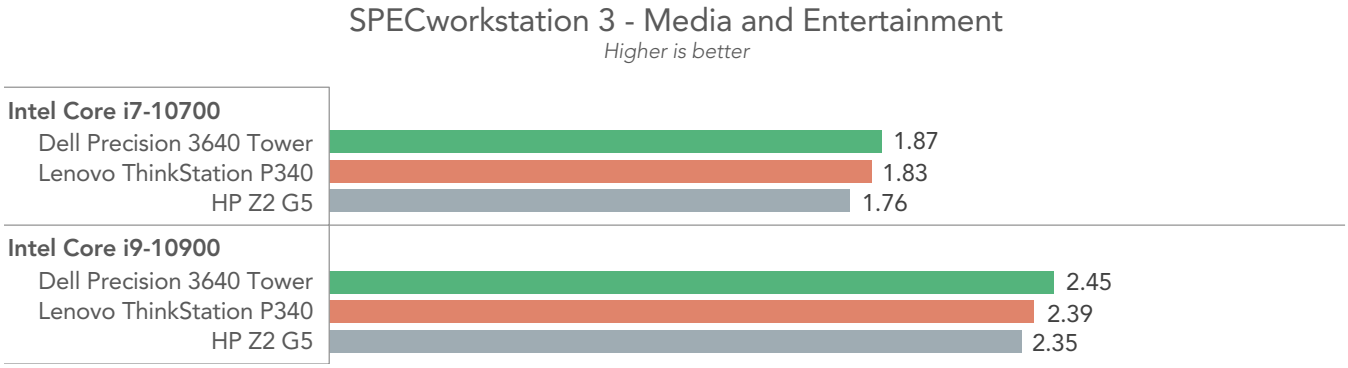


Figure 1: SPECworkstation 3 Media and Entertainment workload scores for the test systems. Higher is better.
Source: Principled Technologies

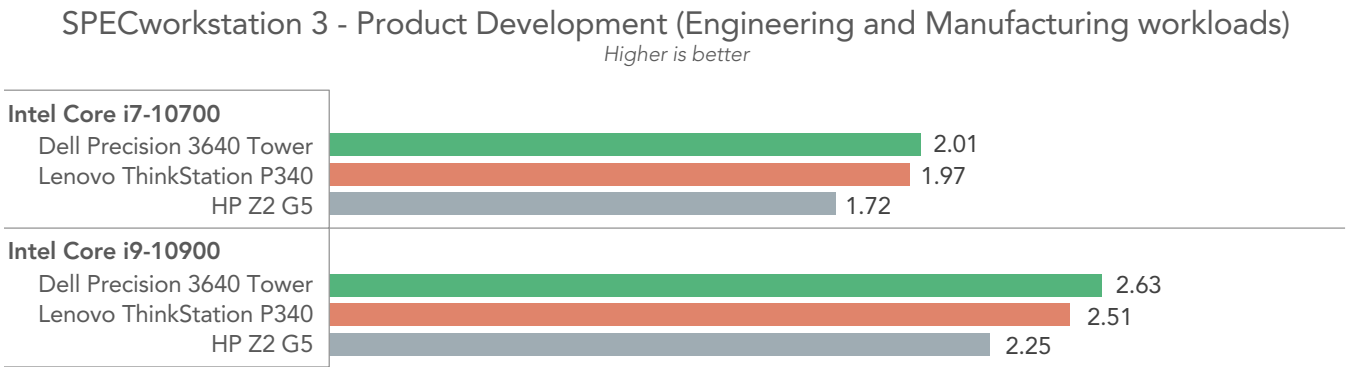


Figure 2: SPECworkstation 3 Product Development workload scores for the test systems. Higher is better.
Source: Principled Technologies.

The Life Sciences workload runs a variety of benchmarks that tests the workstation's ability to simulate molecular dynamics and process medical images. The Dell Precision 3640 Tower performed up to 24.4 percent better than the HP Z2 G5 with Intel Core i7-10700 processor (Figure 3).

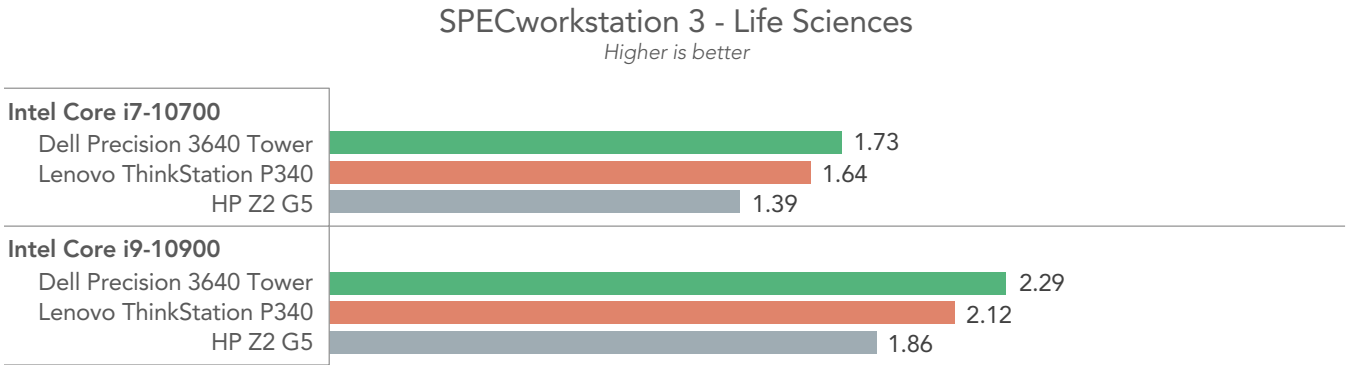


Figure 3: SPECworkstation 3 Life Sciences workload scores for the test systems. Higher is better.
Source: Principled Technologies.

The Financial Services workload uses popular algorithms in the financial industry, such as the Monte Carlo simulation and the binomial options pricing model to measure a device's ability to crunch big data quickly. The Dell Precision 3640 Tower workstation performed up to 5.8 percent better than the HP Z2 G5 with Intel Core i9-10900 processor (Figure 4).

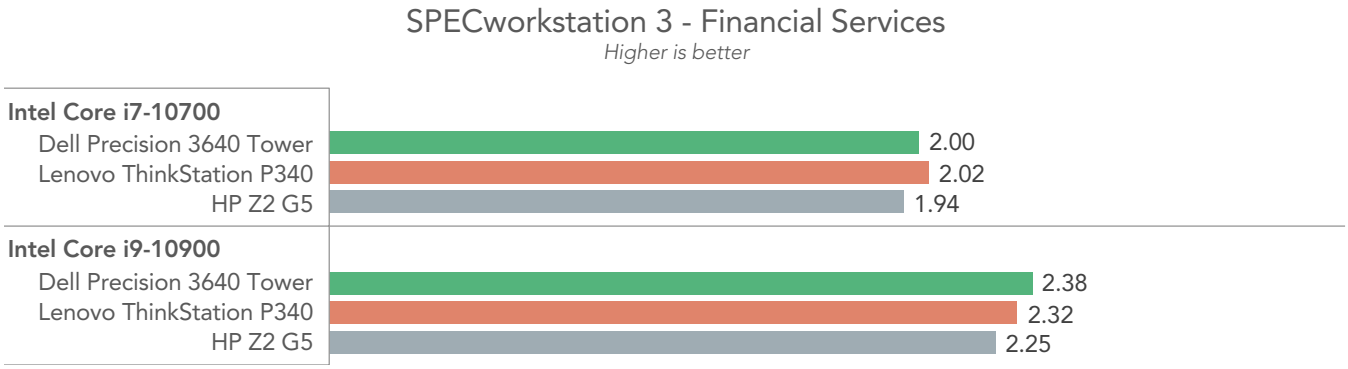
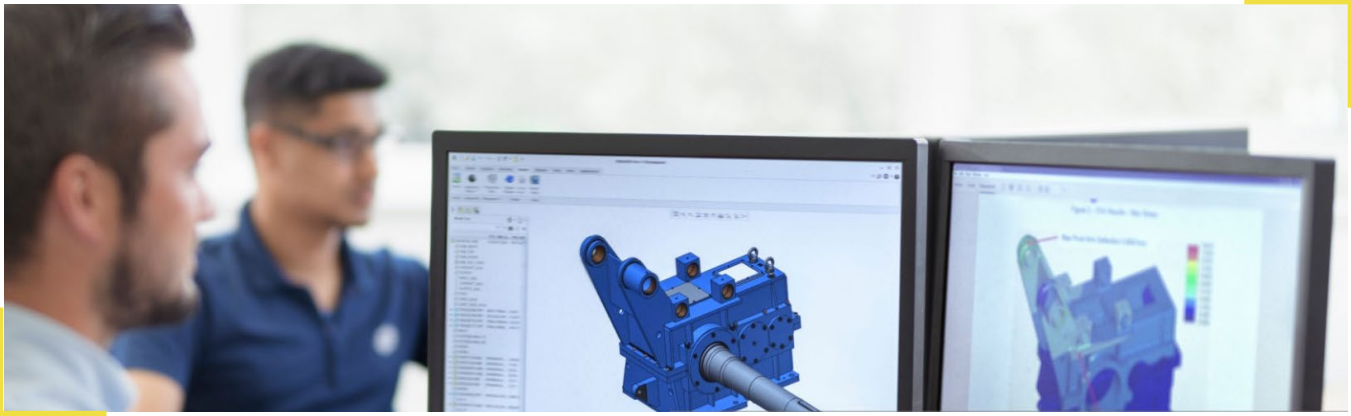


Figure 4: SPECworkstation 3 Financial Services workload scores for the test systems. Higher is better.
Source: Principled Technologies.



The SPECworkstation 3 benchmarks's Energy workload tests seismic processing, as well as other complex equations that the oil and gas industry uses, such as the Fourier transform and the Kirchhoff equation. In these tests, the Dell Precision 3640 Tower achieved up to a 6.9 percent better score than the HP Z2 G5 with Intel Core i9-10900 processor (see Figure 5).

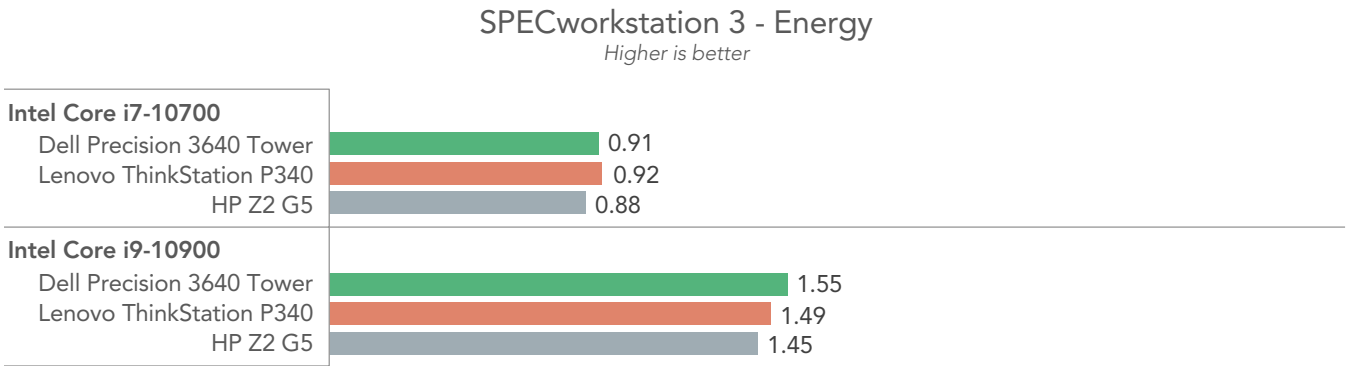


Figure 5: SPECworkstation 3 Energy workload scores for the test systems. Higher is better.
Source: Principled Technologies.

For the General Operations workload, the systems ran a variety of applications used throughout the workstation industry, including 7zip, Python, and Octave. Figure 6 shows that the Dell Precision 3640 Tower outperformed the other systems for each configuration, with up to 13.9 percent better performance than the HP system we tested.

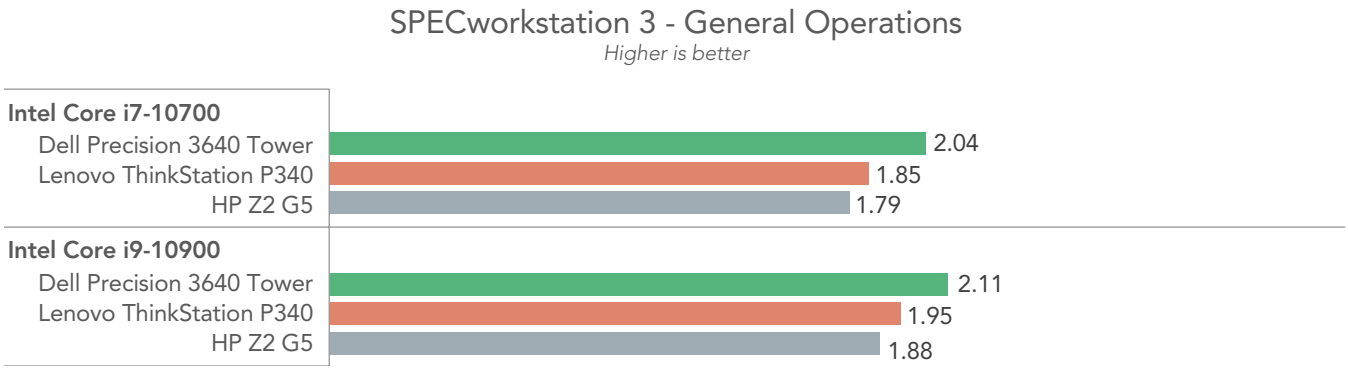


Figure 6: SPECworkstation 3 General Operations workload scores for the test systems. Higher is better.
Source: Principled Technologies.

For complete SPECworkstation 3 results, in which the Dell Precision 3640 Tower averaged up to 9.8 percent better workstation performance across SPECworkstation 3 tests, see the science behind the report.

SYSmark 2018 is a popular benchmark that uses business applications to deliver an Overall Rating based on scores in three categories: Productivity, Creativity, and Responsiveness. In SYSmark 2018 tests, the Dell Precision 3640 Tower provided up to 10.0 percent better performance ratings vs. the HP Z2 G5 workstation across processor configurations and comparable ratings on bothconfigurations of the Lenovo ThinkStation P340 workstation (see Figure 7).

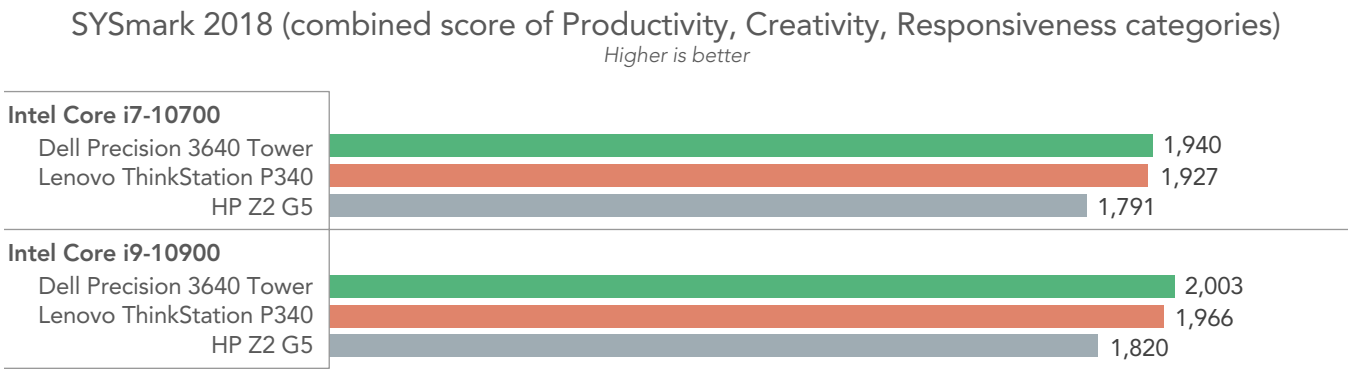


Figure 7: SYSmark 2018 Overall Rating scores for the test systems. Higher is better. Source: Principled Technologies.

Cinebench R20 is another standard benchmark that assesses computer hardware, completing 3D renderings to tax the processor. In Cinebench R20 tests (see Figure 8), the Dell Precision 3640 Tower provided up to a 9.1 percent higher overall rating vs. the HP Z2 G5 with Intel Core i9-10900 processor. The Dell Precision 3640 Tower outperformed the Lenovo ThinkStation P340 by up to 5.2 percent.

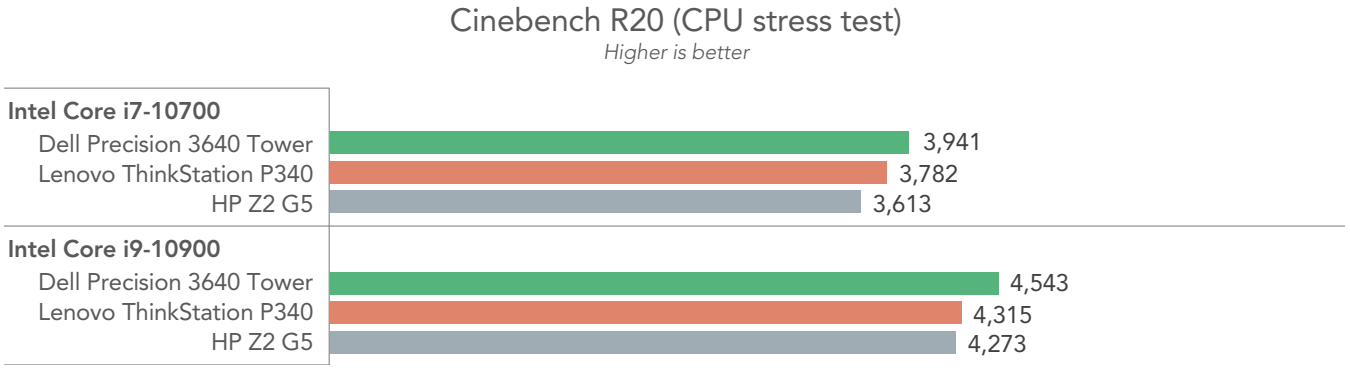


Figure 8: Cinebench R20 Overall Rating scores for the test systems. Higher is better. Source: Principled Technologies.

Get better value with the Dell Precision 3640 Tower

Not only does an organization need to consider performance for their entry-level workstations, but they also need to focus on performance per dollar. Though we configured the systems with the same processors and graphics cards, prices varied across the two levels of processor configurations. Using a performance per dollar comparison with performance data taken from the SPECworkstation 3 General Operations workload, the Dell Precision 3640 Tower offered a better value against three of the four systems we compared it to, including a 14.9 percent increase over the HP Z2 G5 and a 9.8 percent increase over the Lenovo ThinkStation P340 on Intel Core i7-10700 processor configurations (see Figure 9). Table 1 compares the prices for each configuration, in USD, taken from their respective vendor web sites. In the science behind the report, we also show performance per dollar comparisons using the Product Development workload. On the SPECworkstation 3 Product Development workload, which caters to engineering and manufacturing use cases, the Dell Precision 3640 Tower offered up to 17.8 percent better performance per dollar vs. the HP Z2 G5 workstation.

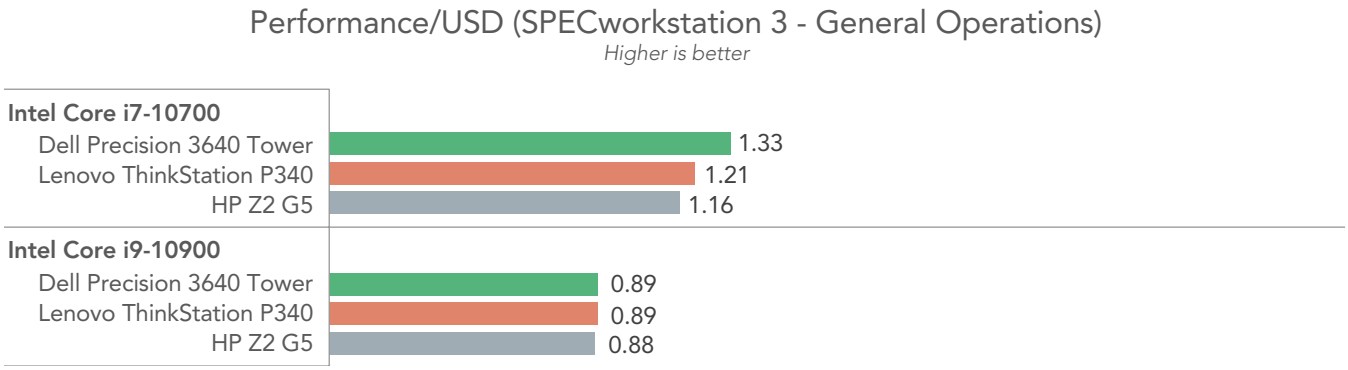
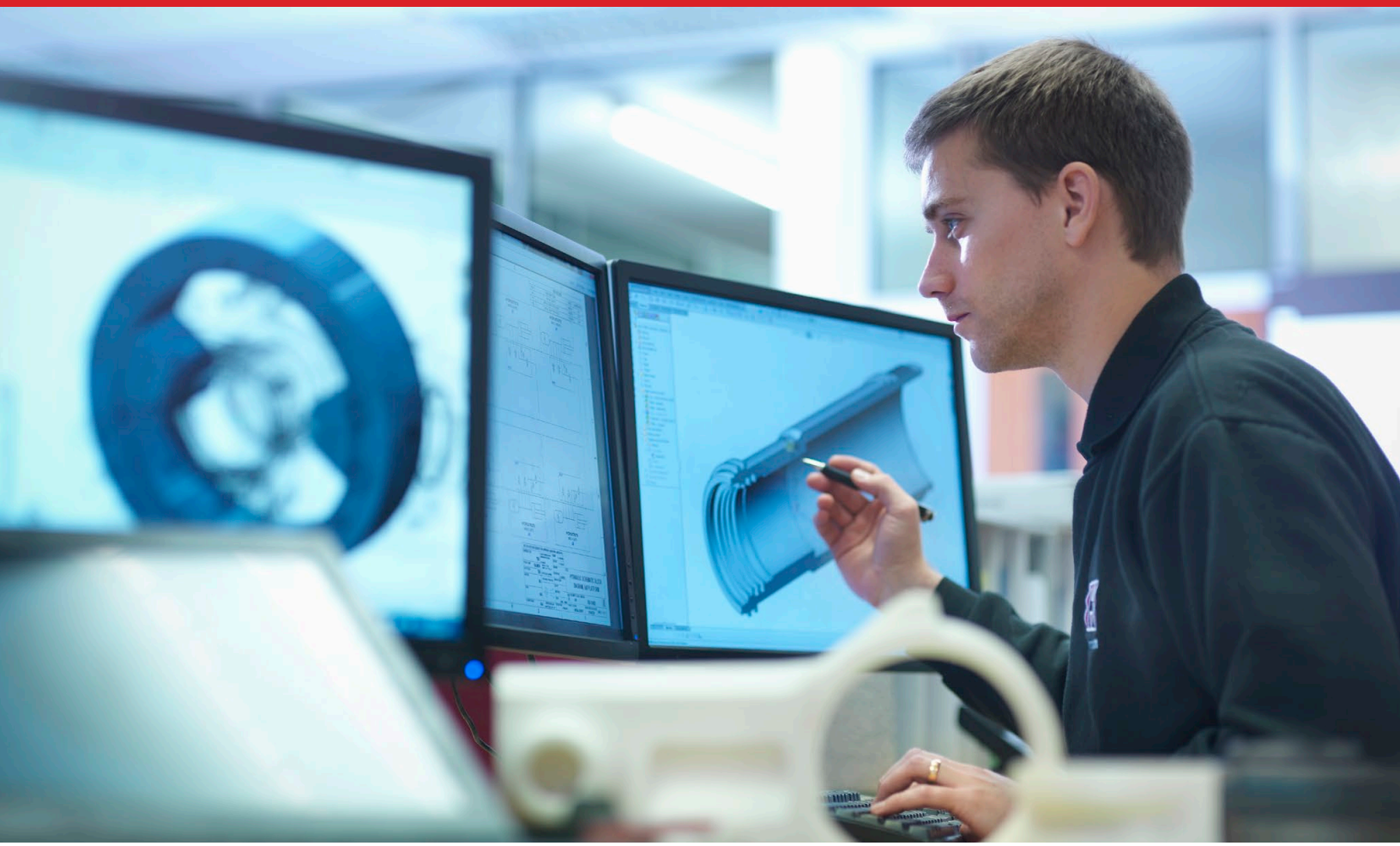


Figure 9: Performance/USD for the systems using pricing information from the Dell, Lenovo, and HP websites on February 15, 2021 and scores from the SPECworkstation 3 – Product Development workload. Higher numbers are better. Source: Principled Technologies.

Table 1: Price in USD for the systems using pricing information from the Dell, Lenovo, and HP websites on February 15, 2021.Prices will vary. Source: Principled Technologies.

	Dell Precision 3640 Tower	Lenovo ThinkStation P340 Tower	HP Z2 G5 Tower
Intel Core i7-10700	$1,535.88	$1,530.62	$1,549.01
Intel Core i9-10900	$2,366.94	$2,183.12	$2,145.07



Conclusion

When choosing an entry-level workstation, it can be difficult to ascertain which provides the best levels of performance and value. In our tests, we found that at two processor levels, Dell Precision 3640 Tower workstations configured identically to Lenovo ThinkStation P340 and HP Z2 G5 workstations offered generally better performance on industry-standard workstation-grade benchmarks that assess high-intensity single-threaded application and discrete graphics intensive workloads. We also found that the Dell workstation we tested delivered better value in most comparisons. These results show that if you're in the market for an entry-level workstation, the Dell Precision 3640 Tower could offer an attractive balance of performance and value to meet your productivity demands.

Read the science behind this report at http://facts.pt/ZCCvxbY►

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This project was commissioned by Dell Technologies.