

A person wearing glasses and a light blue shirt is standing in a server room, looking at a laptop. The room is filled with server racks and has a blue, grid-like light pattern overlaid on the background.

The Most Intensive of Workloads Call for Workstations



Linn Huang
Research Vice President,
Devices and Displays, IDC

White Paper

The Most Intensive of Workloads Call for Workstations

Sponsored by: AMD

Linn Huang
September 2024

SITUATION OVERVIEW

Organizations that depend on technical users completing resource-intensive workloads typically rely on workstations. Workstations differentiate themselves from their PC counterparts by being more performant as well as more reliable. From a performance perspective, workstations typically utilize premium CPUs and professional graphics. From a reliability perspective, leading ISVs have certified workstations to run their top applications optimally. These include leading software suites covering media and entertainment, design, engineering, and manufacturing.

In recent years, AMD has grown its workstation portfolio and market position alike. In terms of the latter, AMD processors have the largest shipment volume in the premium 12 core and higher workstation segment in the combined years 2022 and 2023, according to IDC's Quarterly Worldwide Workstation Tracker. Table 1 provides shipment data for this segment of the workstation market.

TABLE 1

Worldwide 12+ Core Premium Desktop Workstation Shipment Share, 1Q22-4Q23

	1Q22	2Q22	3Q22	4Q22	2022	1Q23	2Q23	3Q23	4Q23	2023
AMD share	5,162	18,495	12,629	9,409	45,695	6,775	7,401	9,407	7,391	30,974
Total	15,974	27,153	21,497	18,511	83,135	13,408	15,291	19,399	17,330	65,428

Source: IDC's Quarterly Worldwide Workstation Tracker, August 2024

Indeed, the AMD Threadripper PRO processor has been instrumental in driving project success across a wide range of compute-heavy industries. Powerful systems featuring

Threadripper PRO processors gave Pixomondo powerful platforms from which to launch a virtual production stage, helped Respawn Entertainment keep development on track during office closures that characterized the early pandemic, and aided Dr. Adi Pandzic in inspiring tomorrow's engineers at the University of Sarajevo's IPM lab.

As an Oscar- and Emmy-winning VFX company, Pixomondo has been at the forefront of the visual effects industry for more than two decades. Yet, as times have changed, Pixomondo has had to change, too. With the launch of *Star Trek: Discovery* in 2017, Pixomondo pivoted from traditional VFX to virtual production. In virtual production, designers can leverage giant video walls to conjure up any setting they can dream of. For the crew of *Star Trek: Discovery*, these dream settings included underground space caverns, the insides of starships, and the iconic Holodeck.

Powering that many dynamic visuals requires significant computing power. Pixomondo chose the AMD Threadripper PRO-powered Lenovo P620 workstation. Threadripper PRO's high core count provided the performance necessary to drive all those video walls and the reliability necessary to ensure that no panel went dark during shooting. The company's VAD supervisor, Zachary Dembinski, states, "I think the hardware that we selected — the AMD Threadrippers and the Lenovo P620s — have never failed on us on that stage. They're going two years strong now, and they are under heavy workloads."

AMD Threadripper PRO also made a huge impact in the gaming industry. During the height of the COVID-19 pandemic, when workers quarantined at home, Respawn Entertainment faced a conundrum. The game developer, responsible for some of today's most popular AAA titles, such as *Apex Legends* and *Titanfall*, was at the time working on its second Star Wars game, *Jedi Survivor*, when its offices locked down.

With employees trading in corporate LAN for residential networks, development time greatly suffered. *Jedi Survivor* featured a massive cast of characters, each of which required animators to create unique facial expressions, gestures, and movements. Respawn Entertainment could not afford to fall behind.

In response, the company deployed P620s running on AMD Threadripper PRO processors to the homes of their developers. With all those cores in tow, developers were able to cut down on build times for cooked and packaged builds by roughly 75% (from 15 hours to four hours), getting the development cycle back on track. Respawn's technical director, Jon Carr, states, "The boon to development that AMD Threadripper PRO had for us honestly can't be overstated. It's very empowering to our team and the whole entire project. And that uplift can be felt across the entire development cycle."

At the University of Sarajevo, Dr. Adi Pandzic leads the preeminent IPM lab, teaching tomorrow's brightest engineers. Teams representing this lab had won a GrabCAD

Golden Gear Award despite constantly facing software crashes. The IPM lab used SOLIDWORKS, and its hardware at the time did not have the bandwidth to run it properly.

The Dell Precision 7865 workstation, running on the AMD Threadripper PRO processor, transformed the IPM lab. These workstations allowed students to multitask several different manufacturing projects of more than 2,000 parts all at once, design and iterate faster, and avoid the types of software crashes that can sink timelines. As the good doctor put it: "Our complex projects would be almost impossible if we didn't have high-end workstations from AMD and Dell."

Given their performance and reliability, workstations have been stalwarts of design, engineering, and manufacturing houses over the past two decades. Today, a new workload that requires significant amounts of serial computing is drumming up demand in the workstations market. With how much people throw around the letters "A" and "I" jointly nowadays, it's clear we are at the start of an artificial intelligence revolution, kicked off by generative AI (GenAI) apps such as ChatGPT and Stable Diffusion.

GenAI and its offshoot and offspring technologies promise to change the individual user experience, business operations at the organizational level, and even industries at large. Consequently, IDC projects that worldwide spending on generative AI technologies and such will grow 31% a year from 2022 to 2027, surpassing \$0.5 trillion that year.

Today, however, businesses are still ramping up their AI use. Per IDC's March 2024 *Future Enterprise Resiliency and Spending Survey, Wave 5*, 86% of enterprises globally have some significant engagement with generative AI technologies. About 19% have already introduced several GenAI-enhanced applications/services into production, 35% are investing significantly to acquire GenAI-enhanced software, and another 31% are doing initial testing of models.

While speaking about GenAI in the enterprise, another distinction is worth making. GenAI in its current form is both an input into and an output of production. GenAI as an input is a workload or a user experience. We're already seeing software vendors starting to build GenAI-enhanced capabilities into their applications, even at the OS level. For example, new AI-based features in Adobe Photoshop are helping artists iterate faster with simple text prompts.

On the other side of the coin, there is GenAI as an output. Data scientists and programmers work in conjunction to develop software and prototype tomorrow's large language models (LLMs). Using quantized models and tools for local development, developers can start from scratch and build LLMs more rapidly than they could in the datacenter or the cloud due to the substantially reduced latency of working locally.

One project leveraging AMD-powered workstations to develop tomorrow's AI made its way to a TED Talk mainstage, where OpenBCI is using Lenovo P620s to build a more ably equitable future. Christian Bayerlein is a disability rights activist with spinal muscular atrophy. His dream was always to pilot a drone, but he found that his limited motor functions prohibited him from doing so.

OpenBCI worked with Bayerlein to identify the muscle groups he could most reliably fire. They then took these signals and mapped them to digital controls. After months of training, the pilot was ready for takeoff. At TED2023, Bayerlein donned OpenBCI's Galea, a biosensing headset that tracks EEG, EMG, EDA, PPG, and eye movements, and successfully flew a drone over the audience. This level of biosensing generates substantial amounts of data, so OpenBCI turned to Lenovo's P620 running on AMD Threadripper PRO to process that data in real time.

Afterward, Bayerlein described his experience: "Flying a drone has always been a dream of mine. I see it as a way to experience a sense of freedom and independence that is often limited by my disability, and being able to pilot a drone using my brain signals was an incredible experience that I will never forget." OpenBCI made Bayerlein's dream a reality, but AMD and Lenovo made it a possibility.

AMD's contribution to the workstation category extends beyond the CPU. Radeon PRO graphics have been some of the most trusted discrete graphics cards in use by architecture/engineering/construction firms, design and manufacturing houses, and content creators. HaZimation has used Radeon PRO GPUs to boost speed while developing *Moontopia*, West Surrey Racing has used them to reduce design times, and Stantec has used them to achieve the bandwidth necessary to design in 3ds Max while rendering in Lumion at the same time. AMD has also worked with ISVs to ensure that their software applications run optimally and reliably on AMD platforms. These include 3ds Max, AutoCAD, Inventor, and Maya.

AMD knows workstations and workstation graphics, and it's proving to know AI equally well. For the past year, AMD has been accelerating and optimizing its AI software stack for both APU and GPU products. Mobile workstations with Ryzen AI or desktop workstations with the Threadripper PRO processor with up to 64 cores provide the performance and power users need to both leverage the AI-enhanced applications of today and develop the AI models of tomorrow.

FUTURE OUTLOOK

Given the growth of technical workloads and computing, demand for workstations is likely to steadily grow. IDC expects worldwide shipments of workstations to grow by 3.0% annually, mobile workstation shipments by 3.3%, and desktop workstations by 2.7% from 2023 to 2028.

CHALLENGES/OPPORTUNITIES

Opportunities

- Workstations provide high-performance computing for media and entertainment, design, engineering, and manufacturing.
- Performance levels are highly configurable with regard to professional graphics, server-grade CPUs, and ECC memory, meeting the most demanding technical workloads.
- Some of the industry's most prominent software vendors, including Adobe, Autodesk, Siemens, Dassault, PTC, and Bentley, have certified workstations.
- This reliability may allow users to cut down task completion times, reduce downtime resulting from crashes, and improve the quality of their output.
- It is possible to use workstations for developing and even training large AI models.
- Manufacturers generally back their workstation brands up with additional levels of support and service.
- Companies that have deployed workstations in the past have seen productivity gains from their power users to date.

Challenges

- While workstations can provide better TCO in certain use cases, buyers should expect higher up-front hardware costs, typically owing to better components.
- Workstations could overserve the computing needs of non-power users. Companies should be shrewd in deciding where to deploy.
- In lieu of its specialized nature, the workstation market is less diverse than the broader PC market in terms of vendor offerings and product mix.

CONCLUSION

As the aforementioned case studies show, workstations offer the type of bandwidth and performance necessary to drive highly complex and resource-intensive workloads. We've seen workstations help gaming studios cut down their build times by more than 70% and VFX studios build complete virtual production sets. When businesses rely on peak performance to drive their mission-critical workloads, they have typically relied on workstations.

Today, a new workload is demanding the high-performance throughput of workstations. Data scientists and AI developers are utilizing that bandwidth and performance to develop exciting new AI models and databases. Typical users could make use of that performance to run new features being released on AI-enhanced software. Summarily, if your company is coming to grips with how to use AI, consider deploying workstations to those users of AI.

MESSAGE FROM THE SPONSOR

All performance claims are provided by the organizations mentioned herein and have not been independently verified by AMD. Performance benefits are impacted by a variety of variables. Results herein are specific to the organizations named and may not be typical. GD-181

ABOUT IDC

International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications, and consumer technology markets. With more than 1,300 analysts worldwide, IDC offers global, regional, and local expertise on technology, IT benchmarking and sourcing, and industry opportunities and trends in over 110 countries. IDC's analysis and insight helps IT professionals, business executives, and the investment community to make fact-based technology decisions and to achieve their key business objectives. Founded in 1964, IDC is a wholly owned subsidiary of International Data Group (IDG, Inc.).

Global Headquarters

140 Kendrick Street
Building B
Needham, MA 02494
USA
508.872.8200
Twitter: @IDC
blogs.idc.com
www.idc.com

Copyright Notice

External Publication of IDC Information and Data — Any IDC information that is to be used in advertising, press releases, or promotional materials requires prior written approval from the appropriate IDC Vice President or Country Manager. A draft of the proposed document should accompany any such request. IDC reserves the right to deny approval of external usage for any reason.

Copyright 2024 IDC. Reproduction without written permission is completely forbidden.