

## Special Analysis

# 2022 HPC End Users Perspectives on Processors, Coprocessors/Accelerators, and HPC Budgets

Bob Sorensen, Melissa Riddle, and Earl Joseph  
February 2023

## HYPERION RESEARCH OPINION

---

Key findings from a recent Hyperion Research study revealed that HPC users see continued dominance of the x86 processor in HPC, led by Intel but with a growing interest in AMD, the nearly universal adoption of coprocessor or accelerators in HPC servers, albeit at low overall systems counts, and modest expectations for HPC budgets growth for the bulk of the sector.

Insights into the critical factors driving these and other trends are detailed in the 2022 iteration of Hyperion Research's annual MCS end users' study, *2022 HPC Multi-Client Study: Processors, Coprocessors/Accelerators, and HPC Budgets*. Key findings from the report are summarized in this document.

Hyperion Research conducts an annual end-user Multi-Client Study (MCS) to measure and track key trends across the spectrum of the HPC market. The latest iteration of the MCS encompassed 181 HPC end-user sites with 3,830 HPC systems. Reports produced as a result of the study span:

- AI and HPDA Usage and Future Technology Trends
- Vertical/Application Workload Areas and Technical Computing System Software and Middleware
- Use of Public/External Clouds for HPC Workloads, Trends, and Drivers
- Processors, Coprocessors/Accelerators, and HPC Budgets
- Trends and Forecasts in HPC Storage and Interconnects AI and HPDA Usage and Future Technology Trends

Overall, the HPC market is expected to grow by about 6% to 7% over the next five years and reach \$40 billion by 2026. HPC storage will be the highest growth areas of the HPC market, driven by the capacity demands of AI, machine learning, deep learning, and other analytics methods as well as increasing use of iterative modeling and simulation (M&S) methods. Within that environment, the key trends identified from this HPC end-user base survey include:

- The primary processor type used in a site's largest HPC today was x86 (85%), led by Intel (68%) and AMD (14%).
- Almost all respondents (94%) use compute-oriented coprocessors/accelerators in their largest on-premises HPC system, but many have low counts. Infrastructure-oriented accelerators are also growing in popularity, with half of sites employing at least one kind.
- The overall average expected budget change for next year was an increase of 7.3% for HPC overall.

## SELECT KEY FINDINGS

---

Select key findings in this report include the changing dynamics of next processor purchases, GPU/accelerator usage, HPC and cloud HPC budgets, and the size of the overall HPC professional services sector.

### Processor Preference: x86 Continues to Dominate

For the largest HPC system at any surveyed site, the primary processor type was the x86, with 85% of all processors, led by Intel (68%), AMD (14%), and others (3%). The next largest identified primary processor was the Power or OpenPower chips at 4%, followed by SPARC at 3%. Despite its growing visibility in the overall HPC sector, Arm-based components were only a small percentage of the overall processor space at 4%.

- However, a significant percentage of survey respondents indicated a preference for alternate processor options for their next server procurement. AMD x86 (23%) was cited as the most preferred alternative to the Intel counterpart, signaling the continued pre-eminence of the x86 architecture going forward, albeit with growing interest in chips from AMD.
- Processors also under consideration included Arm (9%) and European designed processors (2%). Additional preferences included RISC-V and SPARC chips, both at 2%.

### Wide Use of GPUs or Coprocessors, But Low Overall System Count

More than 94% of respondents reported having coprocessors or accelerators in their largest on-premises HPC system, a number that has been steadily rising the past few years, approaching the near-universal adoption of these components within the surveyed HPC sites. However, the most chosen response (24%) was for less than 32 coprocessors or accelerators in their largest system, indicating that most large HPC systems do not have coprocessors or accelerators evenly distributed across their entire system architecture but instead deploy them within one or more limited system partitions.

### Next Coprocessors/Accelerators for Largest Systems: Nvidia Maintains Lead

Nvidia GPUs were the preferred coprocessors/accelerators, selected by 59% of respondents who preferred such parts in their next primary HPC technical server. The Intel Xe was the second most popular (11%), followed by the AMD Radeon option (6%). GPUs (6%), FPGAs (5%), and AI-specific ASICs (5%) were also cited as viable options, albeit by a smaller group of respondents.

- Overall, all three of the available Nvidia components were the most selected options, with the Nvidia A series components the most selected (27%), followed by the V Series (19%) and the H series (13%).

### HPC Budgets: Increases on the Horizon, But Flat Budgets Dominate Many Sites

The overall average expected budget for spending on HPC/AI/High Performance Data Analytics/Quantum Computing resources in the next year among those with known or sharable budget information was an increase of 7.3% for HPC overall. Only 6% of all respondents indicated that they were expecting a decline in HPC budgets for the next year.

- The academia sector had expectations for some of the largest budget increase of all sectors with more than half of the respondents (57%) expecting increases of 5% and more.
- For all sectors, industry showed the greatest percentage of sites (12%), expecting a decline in budget.
- No government site reported any expectations for budget declines next year, but government sites also lead in expectations of flat or nearly the same budgets (53%).

## Professional Services: A Sizable Portion of Overall HPC Budgets

Survey results indicate that a reasonable percentage of respondents' overall annual HPC budget goes toward HPC-related professional services, with a slight overall majority of sites (27%) committing less than 5% of their overall annual HPC budget, followed by 10% to less than 20% (25%) and 5% to less than 10% (23%). About half of all survey respondents spend somewhere between 10% and 50% of their overall HPC budgets on HPC-related professional services.

- Industry was much more committed to professional services than the other major sectors.
- More than one third of government respondents report spending between 10% to less than 20% for HPC professional services.
- The academia sector was the least dependent on professional services, with 40% reporting less than 5% of their annual budgets going to professional services.

## HPC System Attributes Worth Paying a Premium

When respondents were asked to identify specific system attributes for which they would be willing to pay a 10-15% premium on top of the system price, the most desirable attributes were significantly more powerful processors (48%) and large or fastest memory (39%). More than one third of respondents were willing to pay a premium for higher performance external I/O and storage interconnects between nodes (35%) and better density, power, or cooling attributes (32%).

## FUTURE OUTLOOK

---

The short-term expectation is that 2022 was the beginning of a multi-year recovery as the pandemic's impact subsides in the face of increasingly effective countermeasures that improve health, economies, and vendor productivity. Based on representations Hyperion Research obtained from HPC buyers and vendors, the pandemic's primary impacts to date on the HPC server market have been reducing the production and global distribution of parts, along with eliminating most conferences and other in-person sales opportunities needed to fill pipelines.

The overall broader HPC on-premises market is expected to grow to reach \$40 billion by 2026, with HPC servers representing \$20 billion, add-on storage \$9 billion, middleware \$2 billion, applications software \$6 billion and repair services \$2 billion. The five-year CAGR for the overall market is 6.4%.

## About Hyperion Research, LLC

Hyperion Research provides data-driven research, analysis and recommendations for technologies, applications, and markets in high performance computing and emerging technology areas to help organizations worldwide make effective decisions and seize growth opportunities. Research includes market sizing and forecasting, share tracking, segmentation, technology, and related trend analysis, and both user & vendor analysis for multi-user technical server technology used for HPC and HPDA (high performance data analysis). Hyperion Research provides thought leadership and practical guidance for users, vendors and other members of the HPC community by focusing on key market and technology trends across government, industry, commerce, and academia.

## Headquarters

365 Summit Avenue  
St. Paul, MN 55102  
USA

612.812.5798

[www.HyperionResearch.com](http://www.HyperionResearch.com) and [www.hpcuserforum.com](http://www.hpcuserforum.com)

---

## Copyright Notice

Copyright 2023 Hyperion Research LLC. Reproduction is forbidden unless authorized. All rights reserved. Visit [www.HyperionResearch.com](http://www.HyperionResearch.com) to learn more. Please contact 612.812.5798 and/or email [info@hyperionres.com](mailto:info@hyperionres.com) for information on reprints, additional copies, web rights, or quoting permission.