



HYPERION RESEARCH

Hyperion Research Market Update

September 2024

Earl Joseph, Bob Sorensen,
Mark Nossokoff,
Tom Sorensen, and Jaclyn Ludema

www.HyperionResearch.com
www.hpcuserforum.com

About Hyperion Research



(www.HyperionResearch.com & www.HPCUserForum.com)

Hyperion Research Mission:

- Hyperion Research helps organizations make effective decisions and seize growth opportunities
 - *By providing research and recommendations in high performance computing and emerging technology areas*

HPC User Forum Mission:

- To improve the health of the HPC/AI/QC industry
 - *Through open discussions, information sharing and initiatives involving HPC users in industry, government and academia along with HPC vendors and other interested parties*

The Hyperion Research Team

Analysts

Earl Joseph, CEO

Bob Sorensen, SVP Research

Mark Nossokoff, Research Director

Jaclyn Ludema, Analyst

Melissa Riddle, Data Analyst

Thomas Sorensen, Analyst

Executive

Jean Sorensen, COO

Global Accounts

Mike Thorp, Sr. Global Sales Executive

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Survey Specialist

Cary Sudan, Principal Survey Specialist

Consultants

Katsuya Nishi, Japan and Asia

Kirsten Chapman, KC Associates

Andrew Rugg, Certus Insights

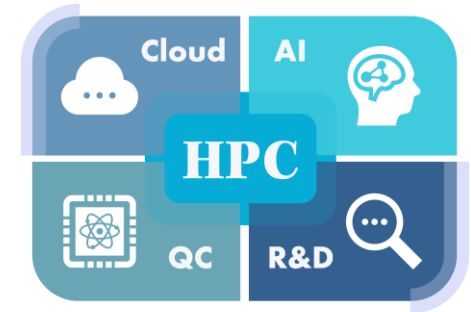
Jie Wu, China and Technology Trends

Mara Jacob, HPC User Forum Support

Example Research Areas

(www.HyperionResearch.com & www.HPCUserForum.com)

- **Traditional HPC**
- **AI, ML, DL, LLMs, Graph**
- **Cloud Computing**
- **Storage & Data**
- **Interconnects**
- **Software & Applications**
- **ROI and Scientific Returns from HPC**
- **Power & Cooling**
- **Tracking all Processor Types & Growth rates**
- **Quantum Computing**
- **R&D and Engineering -- all types**
- **Edge Computing**
- **Supply Chain Issues**
- **Sustainability**



HPC/AI Market Update

2024 Looks Like a Strong Growth Year

Hopefully, supply chain issues won't impact installations too much

- **Across the HPC/AI on-premises market, buyers are expecting to increase their purchases by over 21% in 2024**
 - AI on-premises servers are growing at high rate of close to 40% in 2024
- **The HPC cloud market will see strong growth in 2024 -- End user spending on public cloud resources to run HPC/AI workloads is projected to grow at close to 25% in 2024**
 - Cloud computing is becoming more useful to a larger set of HPC workloads
 - Access to the latest hardware and the ability to quickly setup AI workloads are key drivers
 - This strong growth reflects the heavy work that the cloud service providers (CSPs) have done to make clouds more HPC friendly
 - Users have also gone through extensive work to profile and evaluate where clouds make the most sense

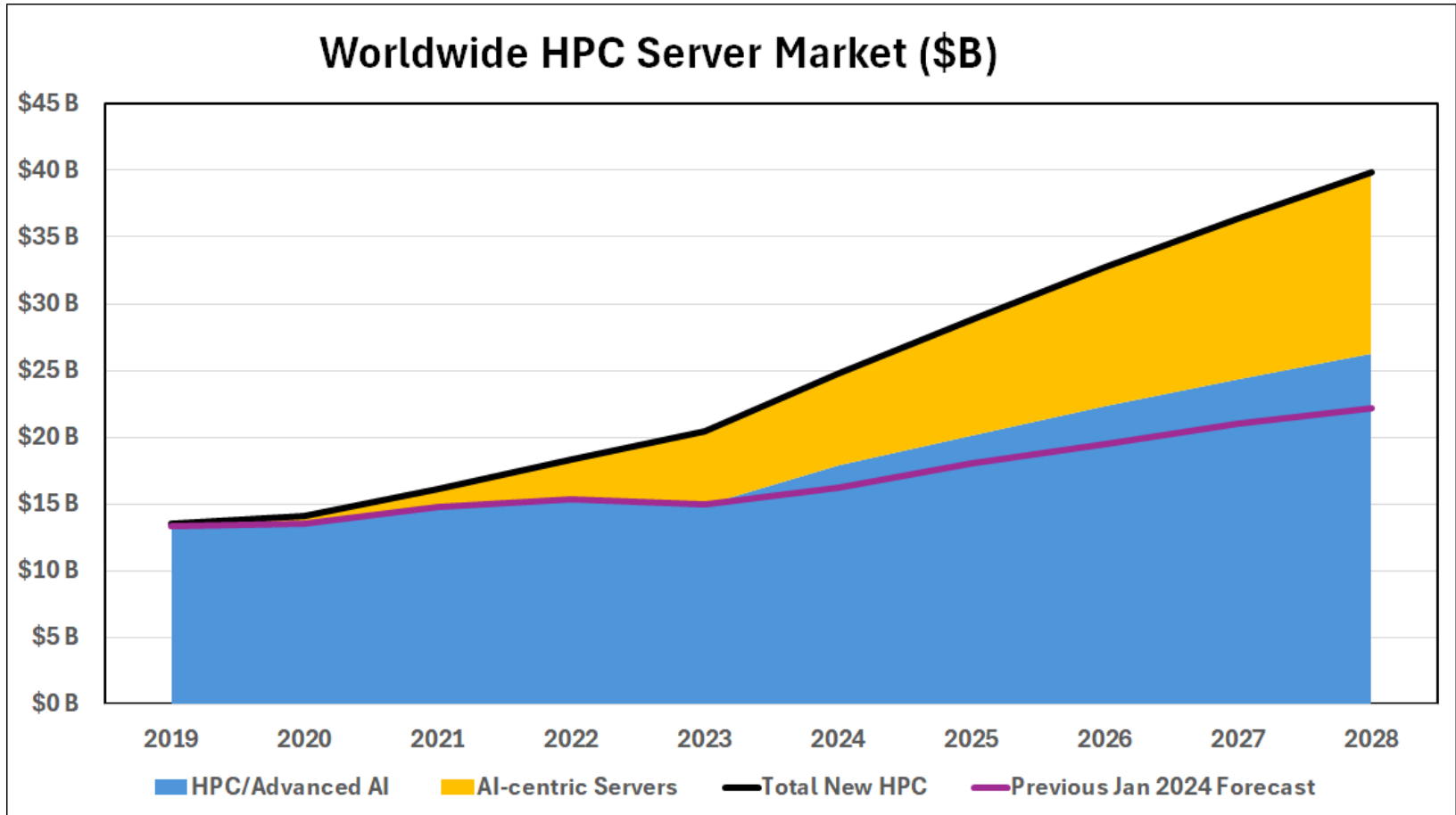
The On-premises HPC Market Should See Strong Growth in 2024

On-premises servers are expected to grow by over 21% in 2024

- **2024 is forecasted to reach an all-time high of around \$25 billion in on-prem HPC servers with close to \$50 billion in total on-premises HPC spending**
- **But there are a number of issues:**
 - The supply chain issues are getting more difficult (e.g., GPUs)
 - Exascale system acceptances are seeing delays
 - The lower end of the on-premises market continues to struggle
- **Growth drivers include:**
 - New use cases especially in AI/LLMs/Generative AI are providing many new areas for users to advance their research
 - Countries and companies around the world continue to recognize the value of being innovative and investing in R&D to advance society, grow revenues, reduce costs, and become more competitive

Updated View of the HPC/AI Market

Hyperion Research just announced a 36.7% increase in the HPC/AI market size



Updated View of the HPC/AI Market

The HPC/AI is projected to reach \$22 billion by 2028

Updated Worldwide Overall Technical Computer Server Market Revenue											
	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	CAGR 23-28
HPC/Advanced AI	\$ 13.5	\$ 13.5	\$ 14.8	\$ 15.4	\$ 15.0	\$ 17.9	\$ 20.1	\$ 22.3	\$ 24.3	\$ 26.2	11.9%
AI-centric Servers	\$ -	\$ 0.6	\$ 1.3	\$ 3.0	\$ 5.5	\$ 6.9	\$ 8.7	\$ 10.5	\$ 12.0	\$ 13.6	19.9%
Total New HPC	\$ 13.5	\$ 14.1	\$ 16.1	\$ 18.4	\$ 20.4	\$ 24.8	\$ 28.8	\$ 32.8	\$ 36.3	\$ 39.8	14.3%
Previous Jan 2024 Forecast	\$ 13.4	\$ 13.5	\$ 14.8	\$ 15.4	\$ 15.0	\$ 16.3	\$ 18.1	\$ 19.5	\$ 21.0	\$ 22.2	8.2%

Source: Hyperion Research, August 2024

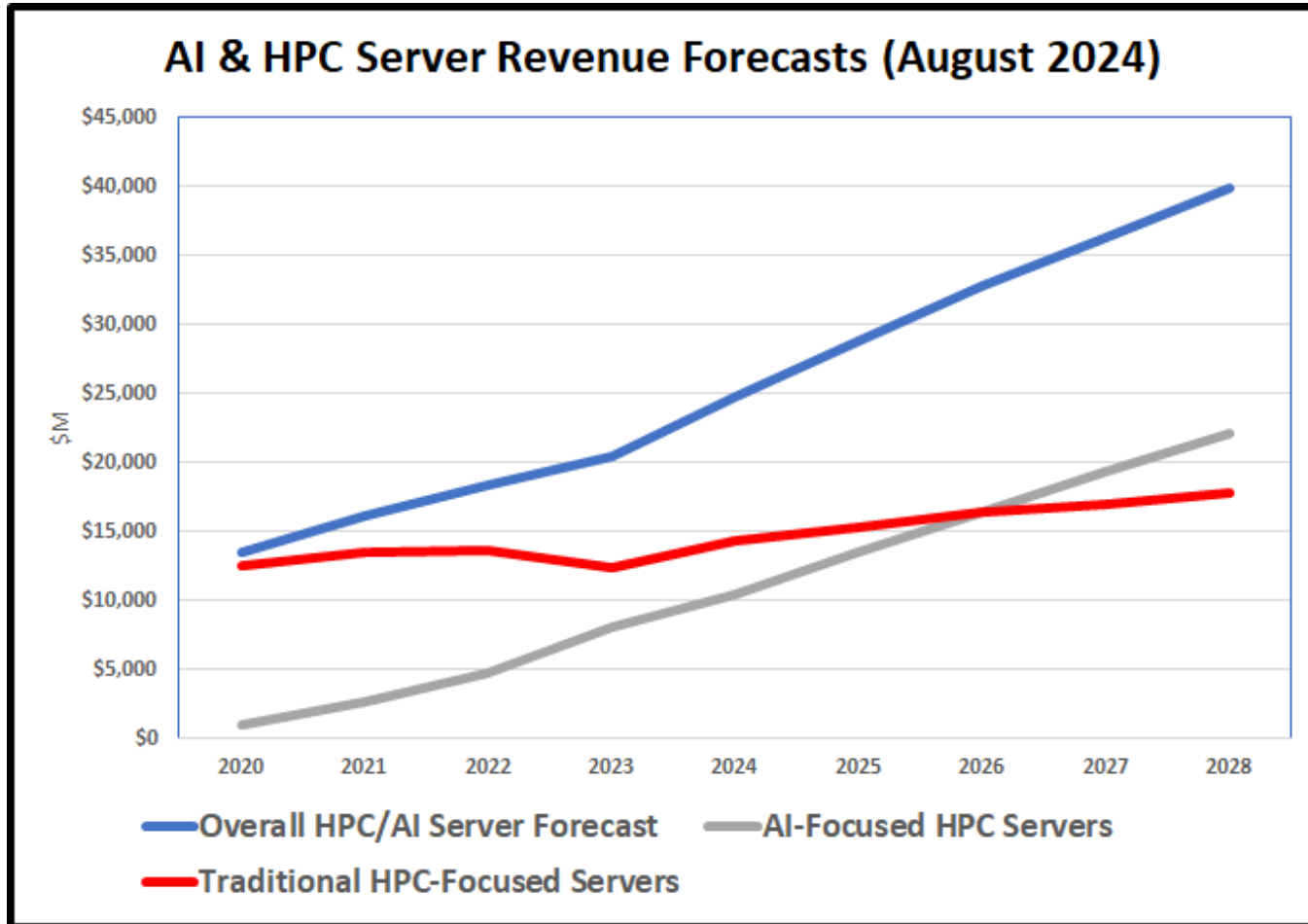
Market Segment Definition: AI-centric Servers (new revenues added to the previous HPC market sizing)

These are on-premises AI-centric HPC servers that are provided by non-traditional HPC suppliers like NVIDIA, Cerebras, SambaNova, SuperMicro, etc., frequently at non-traditional HPC user sites like large enterprise sites adding AI capabilities.

- These servers are designed primarily to run AI and AI-related workloads
- These servers are a subsegment of the overall HPC market but haven't historically been accounted for within prior HPC market numbers

HPC Compared to AI-centric Servers

Many servers are running both traditional HPC and AI Workloads



Note: AI systems may still run some traditional HPC jobs (<50% of workload).
Likewise, traditional HPC systems often run some AI jobs (<50% of workload).

The Exascale Market (System Acceptances)

Over 45 systems and over \$13 billion in value

Exascale and Near-Exascale Leadership Systems (2020 to 2028)								
Year Accepted	China	Europe	Japan	US	Other Countries*	Total Systems	Total Value	
2020			1 near-exascale system ~\$1.1B			1	\$1.1B	
2021	2 exascale ~\$350M each	1 pre-exascale system ~\$180M	--	1 pre-exascale system ~\$200M	--	4	\$1.1B	
2022	1 exascale ~\$350M	2 pre-exascale systems ~\$390M total	--	1 exascale system ~\$600M (2/3 accepted 2022)	--	4	\$1.1B	
2023	1 exascale system ~\$350M	1 or 2 pre-exascale systems ~\$150M each	1 near-exascale system ~\$150M	Remaining 1/3 of Frontier system	--	4-5	~\$1.0B	
2024	1 exascale system ~\$350M	1 exascale ~\$350M, plus 1 exascale (or pre) system ~\$200M	?	2 exascale system ~\$600M	1 pre-exascale system ~\$125M	5-6	~\$1.6B	
2025	1 or 2 exascale systems ~\$300M each	2 or 3 exascale systems ~\$350M each	1 exascale system ~\$200M	1 or 2 exascale systems ~\$350M each	1 near-exascale system ~\$125M	6-9	\$1.7B - \$2.7B	
2026	2 exascale systems ~\$300M each	2 or 3 exascale systems ~\$325M each	?	1 or 2 exascale systems ~\$325M each	1 or 2 exascale systems ~\$150M each	6-9	\$1.7B - \$2.5B	
2027	2 exascale systems ~\$275M each	2 or 3 exascale systems ~\$300M	1 exascale system ~\$150M	1 or 2 exascale systems ~\$275M each	2 or 3 exascale systems ~\$130M each	8-11	\$1.8B - \$2.5B	
2028	2 exascale systems ~\$250M each	2 or 3 exascale systems ~\$275M	1 or 2 exascale systems ~\$150M each	1 or 2 exascale systems ~\$275M each	2 or 3 exascale systems ~\$125M each	8-12	\$1.7B - \$2.6B	
Total	12-13	14-19	5-6	8-12	7-10	47-61	\$13.4B - \$16.8B	

* Includes S. Korea, Singapore, Australia, Russia, Canada, India, Israel, Saudi Arabia, etc.

Note: After 2023, many exascale systems will be 2-10 exascale.

Source: Hyperion Research, March 2024

A New Tool For Data Analysis

The New Hyperion Research Data Tool

To help find important findings more quickly



Welcome

Tables

Charts

Questionnaire

This annual study is part of the eighth edition of Hyperion Research's high-performance computing (HPC) end-user-based tracking of the HPC marketplace. It included 107 HPC end-user sites with 2,243 HPC systems.

This dashboard is provided as a resource to quickly glean insights on the study data and is read-only. To receive an Excel copy of any specific table(s) or chart(s), please contact the email below.

“Tables” tab includes the responses for all multiple-choice questions, overall and split by sector. You can search the question list for any desired key words (e.g., “cloud”) and also filter by countries with sufficient data size.

“Charts” tab includes column charts for all multiple-choice questions, overall and by each sector.

“Questionnaire” tab includes the full questionnaire text, including possible responses. Hover over any question to see a preview of the associated data table.

For questions or data requests, please contact Jaclyn Ludema at jludema@hyperionres.com

The New Hyperion Research Data Tool

HPC End User Profile Summary Results 2024

Clear all slicers

Questions

1.b) Which industry or sector best fits your organization?

Country

All

Multiple Answer

Single Answer

All Sectors

Questions	Number of Responses	%
1.b) Which industry or sector best fits your organization?	107	100.0%
Economics/Financial	17	15.9%
EDA/IT/ISV	21	19.6%
Geosciences	4	3.7%
Government Lab	11	10.3%
University/Academia	13	12.1%
Weather	5	4.7%
Other	10	9.3%
CAE	11	10.3%
Bio-Sciences	12	11.2%
DCC & Distribution	3	2.8%
Total		

Source: Hyperion Research, 2024

Industry

Questions	Number of Responses	%
1.b) Which industry or sector best fits your organization?	77	100.0%
Economics/Financial	17	22.1%
EDA/IT/ISV	21	27.3%
Geosciences	4	5.2%
Other	10	13.0%
CAE	11	14.3%
Bio-Sciences	11	14.3%
DCC & Distribution	3	3.9%
Total		

Source: Hyperion Research, 2024

Government

Questions	Number of Responses	%
1.b) Which industry or sector best fits your organization?	16	100.0%
Government Lab	11	68.8%
Weather	5	31.3%
Total		

Academia

Questions	Number of Responses	%
1.b) Which industry or sector best fits your organization?	14	100.0%
University/Academia	13	92.9%
Bio-Sciences	1	7.1%
Total		



Welcome

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Questionnaire

HPC End User Profile Summary Results 2024

Clear all slicers

Questions

10) How many GPUs/accelerators/co-processors (i.e., GPU, vector accelerators) are in your largest on-premises HPC/AI technical server?

Country

All

Multiple Answer

Single Answer

All Sectors

Questions	Number of Responses	%
<input checked="" type="checkbox"/> 10) How many GPUs/accelerators/co-processors (i.e., GPU, vector accelerators) are in your largest on-premises HPC/AI technical server?	103	100.0%
None	2	1.9%
Less than 16 co-processors or accelerators	17	16.5%
16 to less than 32	6	5.8%
32 to less than 64	16	15.5%
64 to less than 100	13	12.6%
100 to less than 500	15	14.6%
500 to less than 1,000	8	7.8%
1,000 to less than 5,000	7	6.8%
5,000 to less than 10,000	5	4.9%
10,000 to less than 50,000	9	8.7%
50,000 to less than 100,000	1	1.0%
500,000 or more co-processors or accelerators	2	1.9%
Total		

Source: Hyperion Research, 2024

Industry

Questions	Number of Responses	%
<input checked="" type="checkbox"/> 10) How many GPUs/accelerators/co-processors (i.e., GPU, vector accelerators) are in your largest on-premises HPC/AI technical server?	73	100.0%
None	1	1.4%
Less than 16 co-processors or accelerators	14	19.2%
16 to less than 32	5	6.8%
32 to less than 64	12	16.4%
64 to less than 100	9	12.3%
100 to less than 500	5	6.8%
500 to less than 1,000	7	9.6%
1,000 to less than 5,000	5	6.8%
5,000 to less than 10,000	5	6.8%
10,000 to less than 50,000	7	9.6%
50,000 to less than 100,000	1	1.4%
500,000 or more co-processors or accelerators	1	1.4%
Don't know/Not Sure	1	1.4%
Total		

Source: Hyperion Research, 2024

Government

Questions	Number of Responses	%
<input checked="" type="checkbox"/> 10) How many GPUs/accelerators/co-processors (i.e., GPU, vector accelerators) are in your largest on-premises HPC/AI technical server?	16	100.0%
None	1	6.3%
Less than 16 co-processors or accelerators	2	12.5%
16 to less than 32	1	6.3%
32 to less than 64	3	18.8%
64 to less than 100	3	18.8%
100 to less than 500	2	12.5%
500 to less than 1,000	1	6.3%
10,000 to less than 50,000	2	12.5%
500,000 or more co-processors or accelerators	1	6.3%

Academia

Questions	Number of Responses	%
<input checked="" type="checkbox"/> 10) How many GPUs/accelerators/co-processors (i.e., GPU, vector accelerators) are in your largest on-premises HPC/AI technical server?	14	100.0%
Less than 16 co-processors or accelerators	1	7.1%
32 to less than 64	1	7.1%
64 to less than 100	1	7.1%
100 to less than 500	8	57.1%
1,000 to less than 5,000	2	14.3%
Don't know/Not Sure	1	7.1%
Total		



Welcome

[Tables](#)

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[Questionnaire](#)

HPC End User Profile Summary Results 2024

Clear all slicers

Questions

10) How many GPUs/accelerators/co-processors (i.e., GPUs, vector accelerators) are in your largest on-premises HPC/AI technical server?

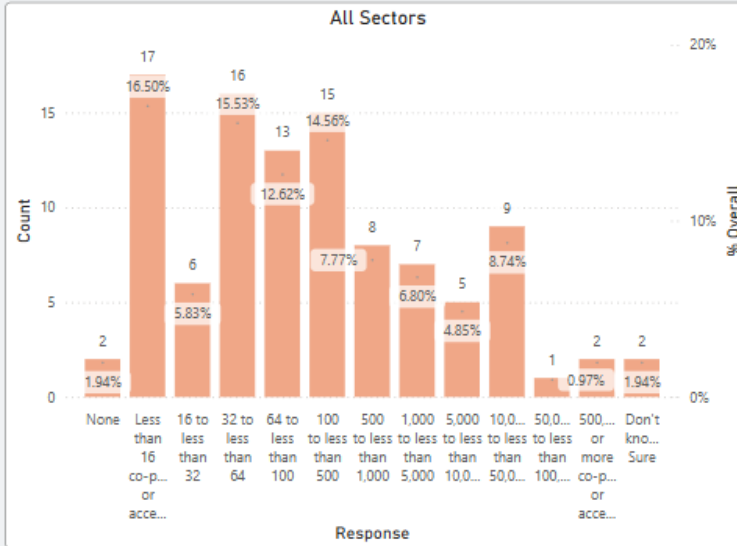
Country

All

Multiple Answer

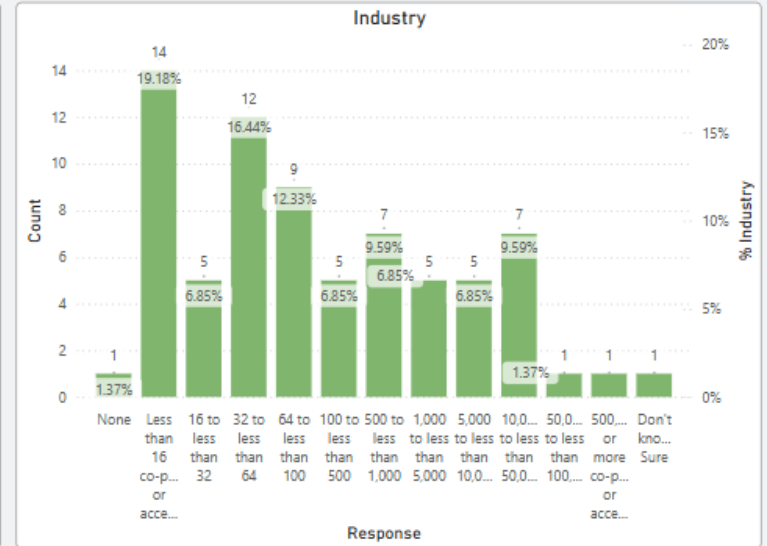
Single Answer

All Sectors



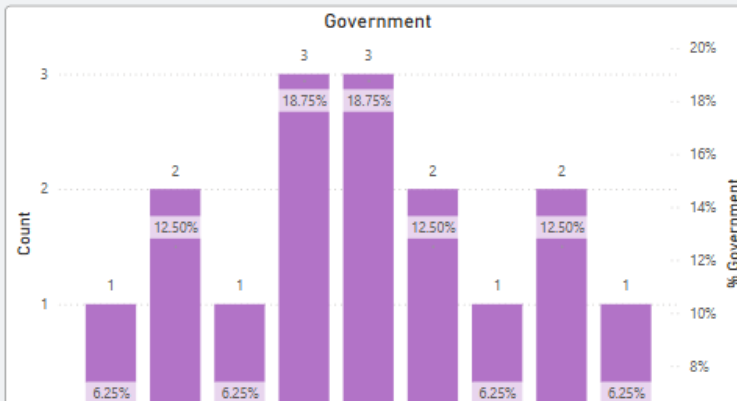
Source: Hyperion Research, 2024

Industry

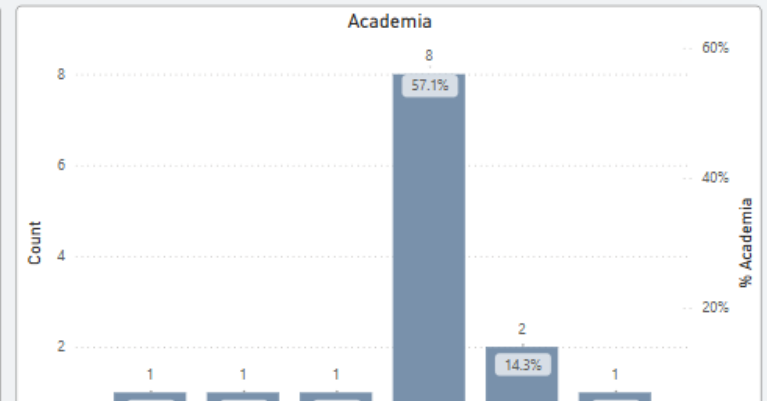


Source: Hyperion Research, 2024

Government



Academia



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HPC End User Profile Summary Results 2024

Questions

Questions	Responses
1) In what sector is your organization in?	<ul style="list-style-type: none"> a) Government b) Academia c) Industry
1.b) Please specify which industry:	<ul style="list-style-type: none"> i. Bio & Life sciences, pharmaceutical, biological, life sciences, healthcare, drug discovery, bioinformatics, genomics, etc. ii. CAE, manufacturing, e.g., aerospace, automotive, consumer products, etc. iii. Chemical engineering, chemical design, development, and production iv. Mechanical design e.g., CAD v. DCC, entertainment, digital content creation, 3D animation, advanced graphics, gaming, visualization, etc. vi. Financial or economic modeling, pricing, risk management, modeling, business intelligence, etc. vii. EDA, electronic design and analysis viii. IT, computers, HPC systems, IT services, ISV, software company, cloud provider, etc. ix. Geosciences, energy, petroleum, oil and gas, seismic, reservoir simulation, alternative energy, power distribution, etc. x. Weather/climate xi. Transportation and logistics, traffic management, pattern recognition, linear programming, etc. xii. Retail, marketing, and related BI xiii. Telecommunications xiv. Other (please specify)
2) How many on-premises HPC/AI technical server systems (number of clusters, SMP systems, etc.) does your organization have? Please include all HPC/AI systems/servers. By "server" we mean a full system, not the individual nodes.	<ul style="list-style-type: none"> a) None – we only use external clouds b) 1 c) 2 to 4 d) 5 to 7 e) 8 to 10 f) 11 to 12 g) 13 to 15 h) 16 to 20 i) 21 to 25 j) 26 to 30 k) 31 to 40 l) 41 to 50 m) 51 to 75 n) 76 to 100 o) More than 100 HPC/AI systems
3) What is the approximate Peak Performance (in PF) of your LARGEST SYSTEM:	<ul style="list-style-type: none"> a) Less than 0.5 petaflops b) 0.5 to less than 1 petaflop c) 1 to less than 5 petaflops d) 5 to less than 10 petaflops e) 10 to less than 25 petaflops f) 25 to less than 50 petaflops g) 50 to less than 100 petaflops h) 100 to less than 250 petaflops i) 250 to less than 500 petaflops j) 500 to less than 750 petaflops k) 750 to less than 1,000 petaflops l) 1,000 to less than 2,500 petaflops m) 2,500 petaflops or greater

The Hyperion Research AI Advisory Committee

We Invite You to Join the Hyperion Research AI Advisory Committee

AI Advisory Committee Mission:

- To support the worldwide AI/HPC community by helping to answer key questions about how AI is evolving
 - Guiding Hyperion Research AI-related studies by identifying the most important questions to be explored and topics to be researched
 - A major portion of study findings will be shared with the broader AI/HPC community
- To share ideas, best practices, and areas of concern between Committee members

Overview of the AI Advisory Committee:

- Members are from all areas of the AI ecosystem: users, vendors, CSPs, academic experts, etc.
 - The Committee is worldwide
 - There is no cost for membership
- Members receive the ability to help guide Hyperion Research studies with questions that are important to Committee members
 - Members receive the results before the broader AI/HPC community

Conclusions

- **2024 is expected to be a strong growth year**
 - GPUs, cloud, AI/ML/DL/LLM are high growth areas
- **New technologies are showing up large numbers:**
 - Generative AI and LLMs is fueling a new level of growth
 - Processors, AI hardware & software, memories, new storage approaches, etc.
 - The cloud has become a viable option for many HPC workloads
- **Storage will likely see major growth driven by AI, big data and the need for much larger data sets**
- **There are still concern about the supply chain and growing concerns around power & talent**
- **Diversity in HPC needs to be addressed**

We Welcome Questions, Comments and Suggestions



Please contact us at:
info@hyperionres.com

Next On The Agenda

8:00 – 8:30 am Welcome and Meeting Overview

- Safety Minute, David Martin, ANL
- Welcome & Logistics, Piyush Mehrotra and Earl Joseph
- Changes in HPC and Advanced AI, Earl Joseph, Hyperion Research

(Session Leader: Piyush Mehrotra, Chairman, HPC User Forum Steering Committee)

8:30 – 9:00 am Welcome to ANL and ANL Update, Rick Stevens, ANL

9:00 – 9:30 am The Future of AI, Rick Stevens, ANL

9:30 – 11:45 am Real-world Large Scale AI Use Cases and Examples

- AuroraGPT, Sam Foreman, ANL
- **Brain Reconstruction**, Tom Uram, ANL
- **AI in Medicine**, Arvind Ramanathan, ANL
- *Break: 10:15 – 10:30 am*
- **AI for Controlling Things** (e.g., reactors), Chris Ritter, Idaho National Laboratory
- **AI in Medicine** (Part Two), Heidi Hanson, ORNL
- **NVIDIA Earth-2**, Karthik Kashinath, NVIDIA

11:45 – 12:00 pm Vendor Update: Mike Woodacre, HPE