



HYPERION RESEARCH

May 2021 HPC User FORUM: HPC Market Update

May 2021

www.HyperionResearch.com
www.hpcuserforum.com

The Hyperion Research Team

Analysts

Earl Joseph, CEO

Steve Conway, Senior Advisor

Bob Sorensen, SVP Research

Mark Nossokoff, Senior Analyst

Alex Norton, Principal Analyst & Data Manager

Melissa Riddle, Associate Analyst

Thomas Sorensen, Research Associate

Operations

Jean Sorensen, COO

Global Accounts

Rene Copeland, Strategic Mktg & Sales Advisor

Mike Thorp, Sr. Global Sales Executive

Kurt Gantrish, Sr. Account Executive

International Consultants

Katsuya Nishi, Japan and Asia

Jie Wu, China & Technology Trends

Michael Feldman, Europe & Strategic Trends

Data Collection

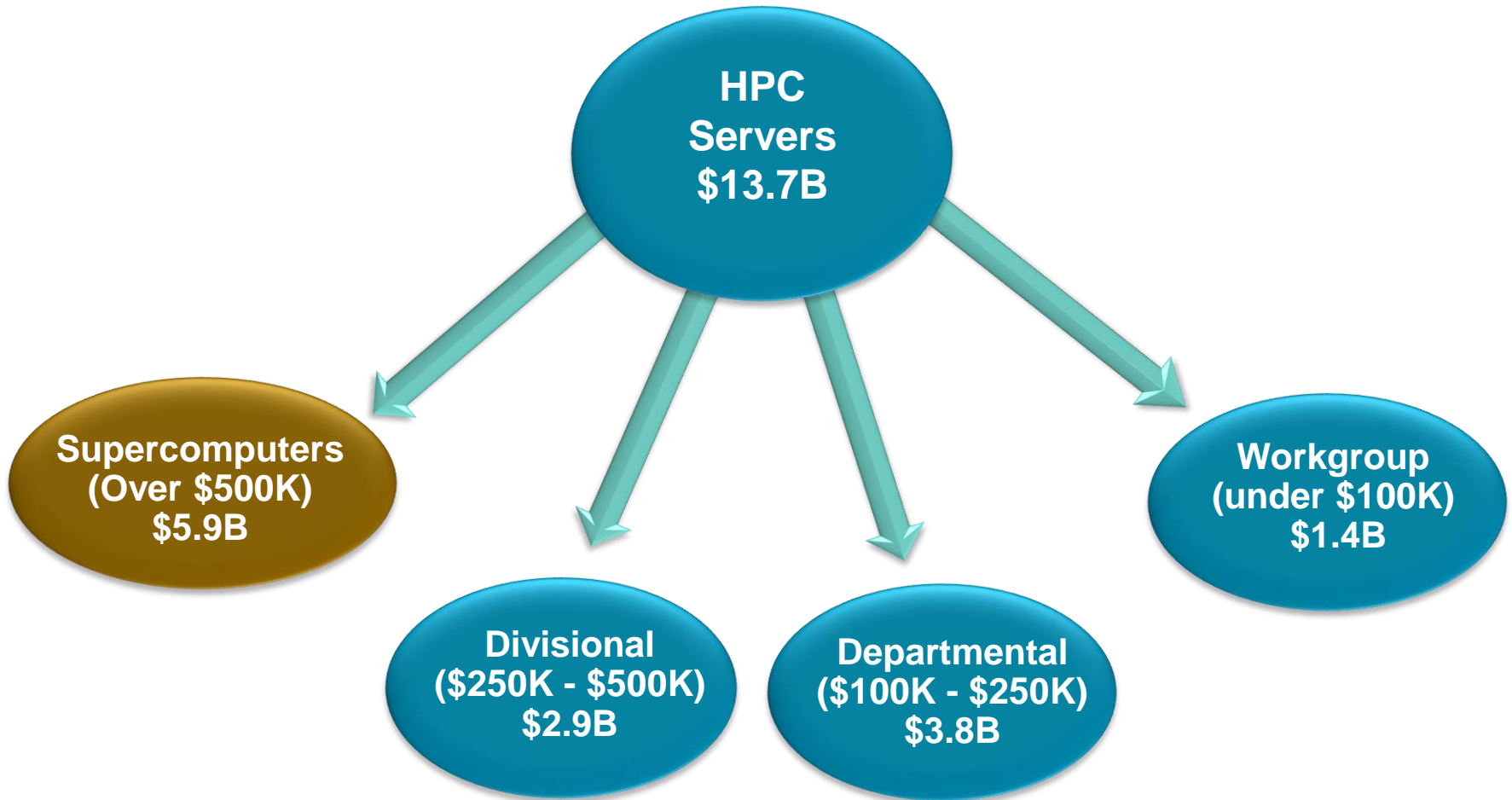
Cary Sudan, Market Data Group

Sue Sudan, Market Data Group

Kirsten Chapman, KC Associates

2020 Market Results

The 2020 Worldwide On-Prem HPC Server Market: \$13.7 Billion (up 1.1%)



WW HPC Market By Segments (\$ Millions)

Fugaku made the supercomputer segment strong in 2020, while the workgroup declined

	2019	2020
Supercomputer	\$5,224	\$5,939
Divisional	\$3,207	\$2,856
Departmental	\$3,240	\$3,570
Workgroup	\$1,924	\$1,380
Total	\$13,595	\$13,744

Source: Hyperion Research, March 2021

WW HPC Market By Verticals (\$ Millions)

Five segments are over a \$ billion a year

	2020
Bio-Sciences	\$1,323
CAE	\$1,560
Chemical Engineering	\$156
DCC & Distribution	\$754
Economics/Financial	\$639
EDA / IT / ISV	\$747
Geosciences	\$865
Mechanical Design	\$049
Defense	\$1,361
Government Lab	\$3,364
University/Academic	\$2,189
Weather	\$585
Other	\$151
Total Revenue	\$13,744
<i>Source: Hyperion Research, March 2021</i>	

Worldwide HPC Vendor Market Shares

(\$ Millions)

Vendor	2020 HPC Server Sales	Market Share
HPE	4,587	33.4%
Dell Technologies	2,855	20.8%
Lenovo	933	6.8%
IBM	445	3.2%
Fujitsu	1,319	9.6%
NEC	192	1.4%
Inspur	996	7.2%
Atos	250	1.8%
Sugon	451	3.3%
Other	1,504	10.9%
Total	13,745	100.0%
<i>Source: Hyperion Research 2021</i>		

The Broader On-premise Market Areas

(\$ Millions)

The 2020 total spending exceeded \$27 billion (excluding cloud spending)

	2020
Server	\$13,744
Storage	\$5,520
Middleware	\$1,618
Applications	\$4,682
Service	\$2,186
Total Revenue	\$27,750

Source: Hyperion Research, March 2021

High Growth Areas And Forecasts

High Growth Areas

- AI, ML and DL
- HPDA (big data)
- **The use of clouds for running HPC workloads**
- **Storage: both on-premise and in the cloud**
- **And traditional modeling and simulation are expected to grow at ~7% a year**
 - Including new enterprise users adding HPC to their operations
 - Exascale systems are driving growth at the upper end of the market

High Growth AI & HPDA Areas

These are the largest segments today



Precision Medicine



Automated Driving Systems



Fraud and Anomaly Detection



Affinity Marketing



Business Intelligence



Cyber Security



IoT/Edge/Smart Cities

High Growth Areas: HPDA-AI

HPDA is growing faster than overall HPC market; AI subset growing faster than all HPDA

Table 1
Forecast: Worldwide HPC-Based AI Revenues vs Total HPDA Revenues (\$ Millions)

	2018	2019	2020	2021	2022	2023	2024	CAGR '19-'24
COVID-Impacted HPC Server Revenues	\$13,679	\$13,710	\$13,744	\$14,097	\$16,684	\$18,814	\$19,758	7.6%
HPDA Server Revenues	\$3,153	\$3,598	\$3,499	\$4,500	\$5,467	\$6,650	\$7,800	16.7%
HPC-Based AI (ML, DL & Other)	\$747	\$918	\$1,039	\$1,500	\$2,010	\$2,745	\$3,800	32.9%

Source: Hyperion Research, 2021

Table 2
Forecast: Worldwide ML, DL & Other AI HPC-Based Revenues (\$ Millions)

	2018	2019	2020	2021	2022	2023	2024	CAGR '19-'24
ML in HPC	\$532	\$667	\$719	\$1,039	\$1,366	\$1,816	\$2,445	29.7%
DL in HPC	\$177	\$209	\$263	\$390	\$560	\$804	\$1,200	41.8%
Other AI in HPC	\$38	\$42	\$57	\$71	\$84	\$125	\$155	29.8%
Total	\$747	\$918	\$1,039	\$1,500	\$2,010	\$2,745	\$3,800	32.9%

Source: Hyperion Research, 2021

HPC Cloud Forecast

HPC cloud spending is projected to reach ~\$9B by 2024

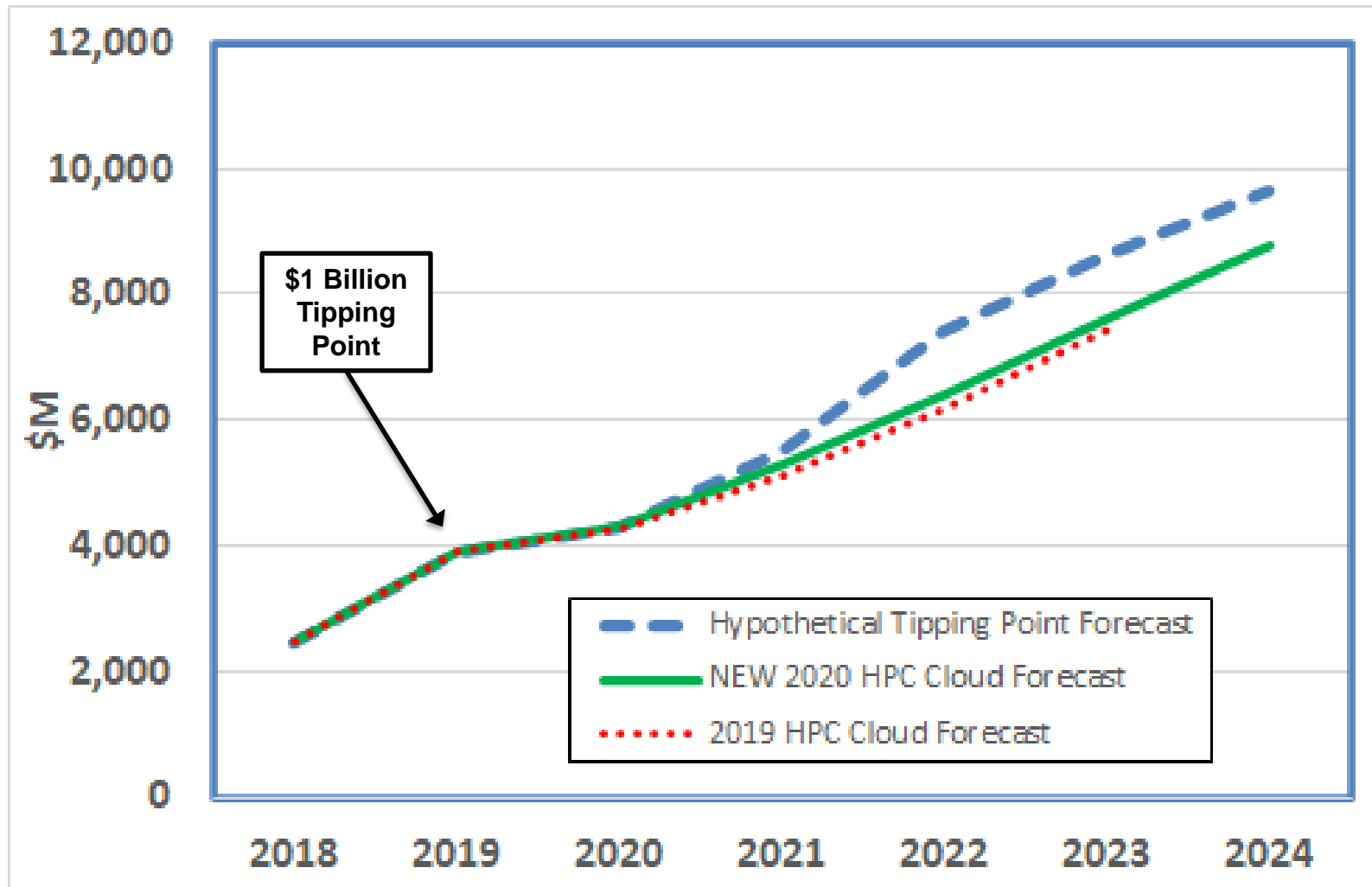
(\$M)	2018	2019	2020	2021	2022	2023	2024	CAGR '19-'24
HPC Cloud Forecast	2,466	3,910	4,300	5,300	6,400	7,600	8,800	17.6%

- **This forecast includes covid-19 impacts, which have accelerated cloud adoption even more**
- **HPC in the cloud is expected to grow more than 2.5 times faster than the on-prem HPC server market**

Note: This forecast is for public cloud computing, and is from the perspective of end-user spending in the cloud

Cloud Usage May Grow Even Faster

An example of a potential new tipping point



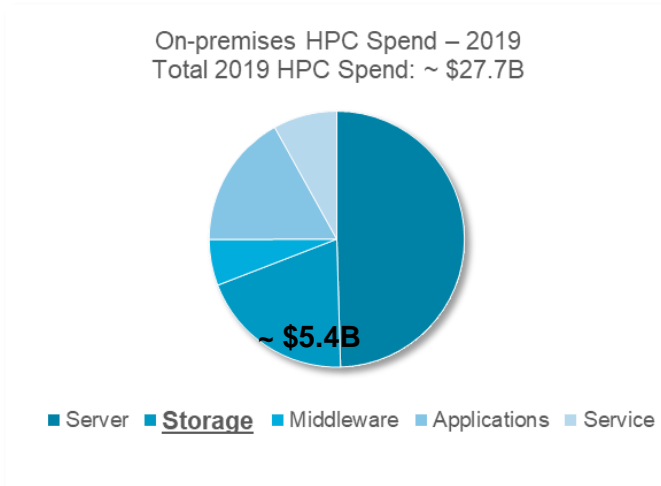
Major Drivers For A Tipping Point

If only 2 or 3 happen, we could see another \$1 billion tipping point in using clouds for running HPC jobs

- **Dramatic additional improvements in running hard HPC jobs in the cloud**
- **Sizable improvement in ease of use and ease of deployment (without changes to code)**
- **More cost effectiveness and transparency for running large HPC jobs**
- **Major increase of running AI workloads in the cloud**
- **A new type of workload that clouds provide an advantage**

HPC Storage is an Attractive Market

(\$ Millions)



- **Storage historically has been the highest growth HPC element**
- **Storage represents ~ 20% of HPC spending**
- **For every \$1 spent on compute, ~ \$0.40 is spent on storage**

Source: Hyperion Research, 2020

Revenues by the Broader HPC Market Areas

	2019	2020	2021	2022	2023	2024	CAGR 19-24
Server	\$13,595	\$13,744	\$13,712	\$16,162	\$17,670	\$18,846	6.8%
Storage	\$5,379	\$5,520	\$5,586	\$6,661	\$7,465	\$8,021	8.3%
Middleware	\$1,599	\$1,618	\$1,636	\$1,943	\$2,138	\$2,294	7.5%
Applications	\$4,647	\$4,682	\$4,629	\$5,371	\$5,774	\$6,049	5.4%
Service	\$2,218	\$2,186	\$2,123	\$2,416	\$2,548	\$2,617	3.4%
Total Revenue	\$27,438	\$27,750	\$27,686	\$32,553	\$35,595	\$37,827	6.6%

Source: Hyperion Research, March 2021

The Exascale Market (System Acceptances)

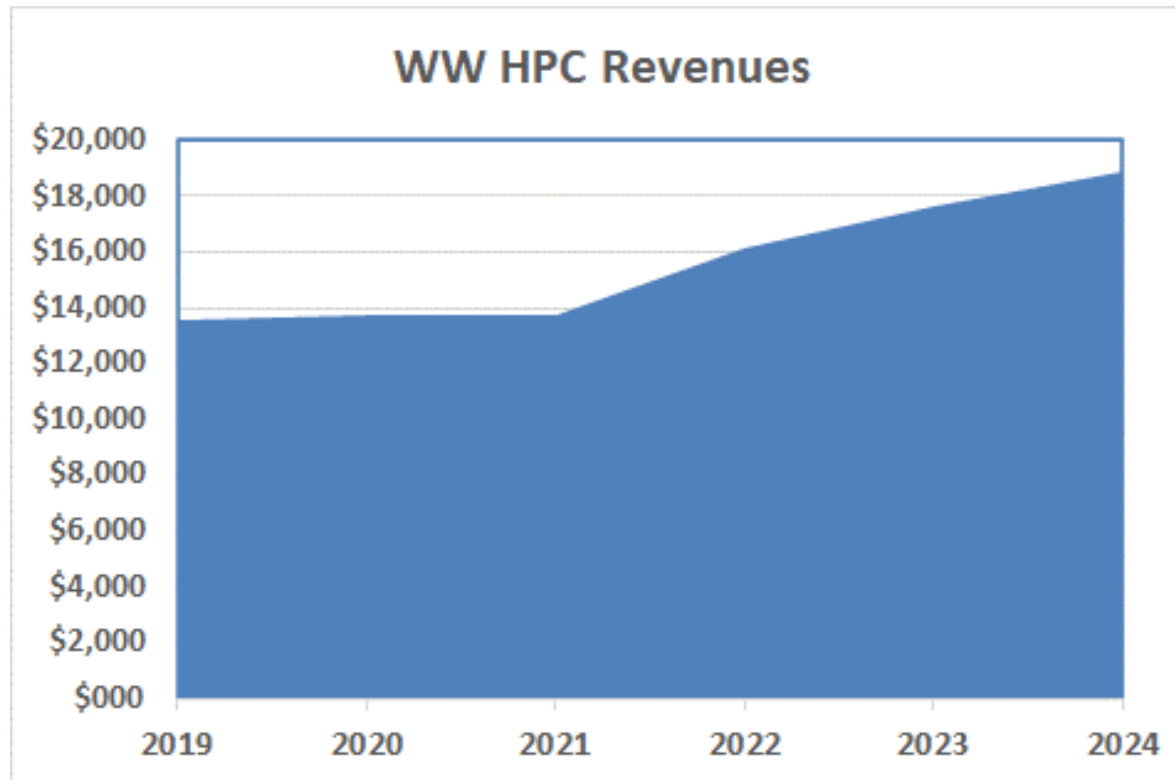
~30 systems and over \$10 billion in value

Exascale and Near-Exascale Systems (2021 to 2026)							
28 - 38 Systems, ~\$10-\$15B in Value							
Year Accepted	China	EU & UK	Japan	US	Other Countries*	Total Systems	Total Value
2021	1 or 2 near-exascale systems ~\$400M each	1 pre-exascale system ~\$150M	1 exascale system Fugaku ~\$1B	--	--	3-4	\$1.6B-\$2.0B
2022	1 or 2 exascale systems ~\$350M - \$400M each	2 pre-exascale systems ~\$150M each	1 near-exascale system ~\$200M	2 exascale systems ~\$550M each	--	6-7	\$2.0B-\$2.4B
2023	1 or 2 exascale system ~\$350M - \$400M each	1 or 2 exascale systems ~\$375M	1 near-exascale system ~\$150M	1 exascale system ~600M	--	4-6	\$1.5B-\$2.3B
2024	1 exascale system ~\$350M - \$400M each	1 or 2 exascale systems ~\$375M	?	1 or 2 exascale systems ~\$500M each	1 exascale system ~\$250M	4-6	\$1.5B-\$2.4B
2025	2 exascale systems ~\$350M - \$400M each	1 exascale systems ~\$375M	1 exascale system ~\$150M	1 or 2 exascale systems ~\$500M each	1 exascale system ~\$200M	6-7	\$1.9B-\$2.5B
2026	1 or 2 exascale systems ~\$350M - \$400M each	1 or 2 exascale systems ~\$375M each	?	2 exascale systems ~\$500M each	1 or 2 exascale systems ~\$200M each	5-8	\$2.0B-\$3.0B
Total	7-11	7-10	4+	7-9	3-4	28-38	\$10B-\$15B

HPC On-Prem Server Forecast

(\$ Millions)

- **The five CAGR 2019 to 2024 is 6.8%**
 - Reaching close to \$19 billion in 2024
 - Exascale is adding major growth
 - Covid is expected to still impact 2021



On-Prem HPC Forecasts (\$ Millions)

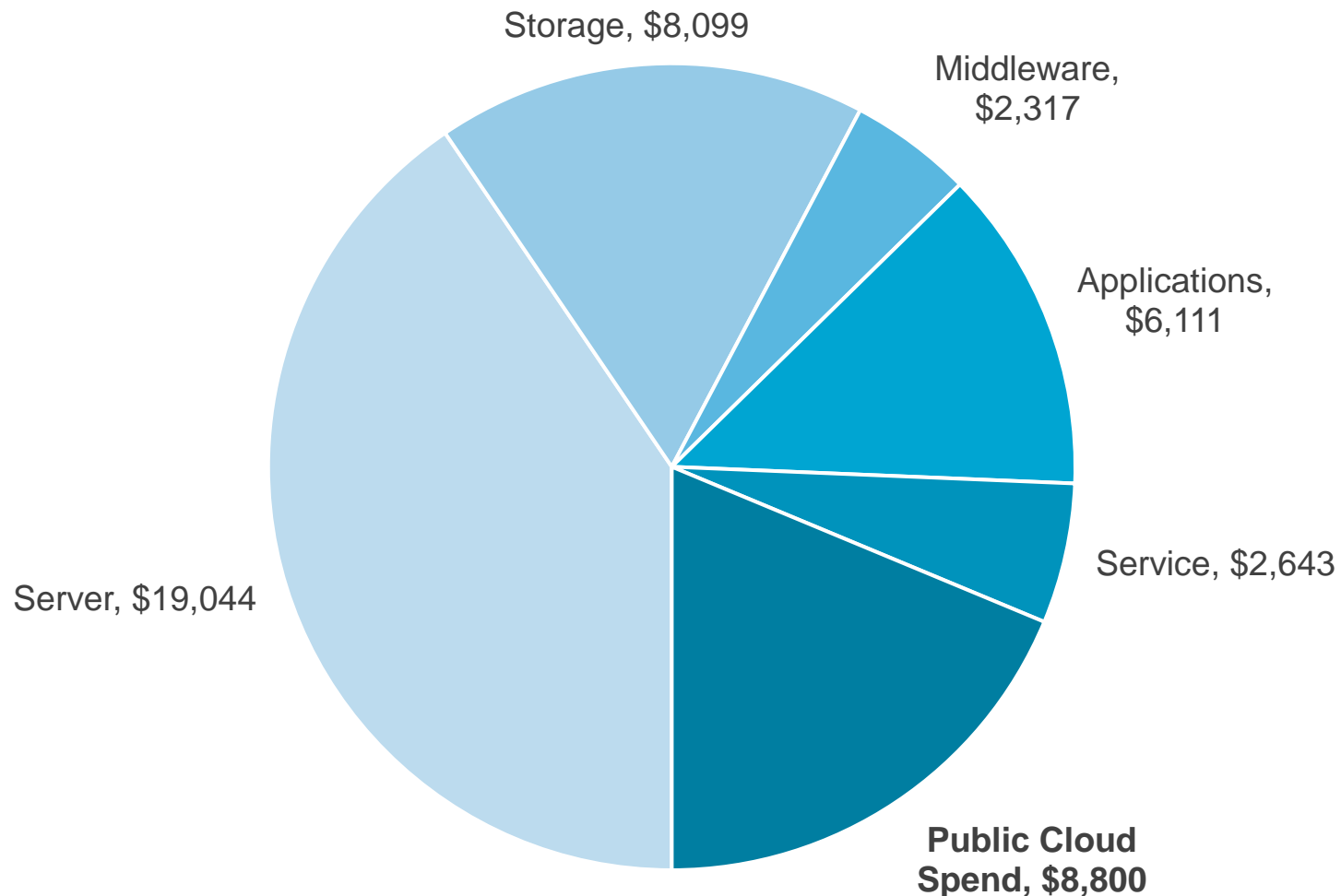
Storage is expected to grow the most at 8.3% CAGR

Revenues by the Broader HPC Market Areas							
	2019	2020	2021	2022	2023	2024	CAGR 19-24
Server	\$13,595	\$13,744	\$13,712	\$16,162	\$17,670	\$18,846	6.8%
Storage	\$5,379	\$5,520	\$5,586	\$6,661	\$7,465	\$8,021	8.3%
Middleware	\$1,599	\$1,618	\$1,636	\$1,943	\$2,138	\$2,294	7.5%
Applications	\$4,647	\$4,682	\$4,629	\$5,371	\$5,774	\$6,049	5.4%
Service	\$2,218	\$2,186	\$2,123	\$2,416	\$2,548	\$2,617	3.4%
Total Revenue	\$27,438	\$27,750	\$27,686	\$32,553	\$35,595	\$37,827	6.6%

Source: Hyperion Research, March 2021

2024 Total HPC Market with Cloud

Cloud spending brings 2024 HPC forecast to \$47 billion



In Summary

The ROI From HPC Is High

The average ROI is \$507 for revenue, and on average \$47 for profits/cost savings

Updated results continue to indicate substantial returns for investments in HPC:

- The data now covers 763 successful HPC projects
- On average \$507 dollars in revenue per dollar of HPC invested was generated (excluding outliers)
- On average \$47 dollars of profit (or cost savings) per dollar of HPC invested was generated (excluding outliers)
- The average HPC investment per innovation was \$2.6 million

Note that this research is looking at the economic impacts based on the HPC investment compared with the output of revenue/sales and/or profits and cost savings. It excludes the additional costs of production, sales, etc. that are also required for each project.

The full data and results of this research are available at: www.hpcuserforum.com/ROI/

Conclusions

- **The pandemic was expected to impact 2020 by a 8% decline, but Fugaku made 2020 a growth year!**
 - 2022 to 2024 are expected to be strong growth years
 - Exascale systems will drive growth in 2022 to 2024
 - AI, HPDA, big data are hot growth areas
 - HPC in the cloud will lift the sector writ large
- **New technologies are showing up in larger numbers:**
 - Processors, AI hardware & software, memories, 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**

Visit Our Website: www.HyperionResearch.com

Twitter: [@HPC_Hyperion](https://twitter.com/HPC_Hyperion)

HYPERION RESEARCH [Home](#) [Services](#) [Team](#) [Hyperion In the News](#) [Sample Projects](#) [Contact](#) [LOGIN](#)

Hyperion Research helps organizations make effective decisions and seize growth opportunities by providing research and recommendations in both high performance computing and emerging technology areas.

[Cloud Tool](#) [Sample Projects ^](#) [HPC User Forum](#) [Purchase Documents](#)

QUESTIONS?



**Questions or comments
are welcome**

**Please contact us at:
info@hyperionres.com**