

Market Forecast

Worldwide HPC External Storage Market Forecast Update, 2017-2022, by Region and by Verticals

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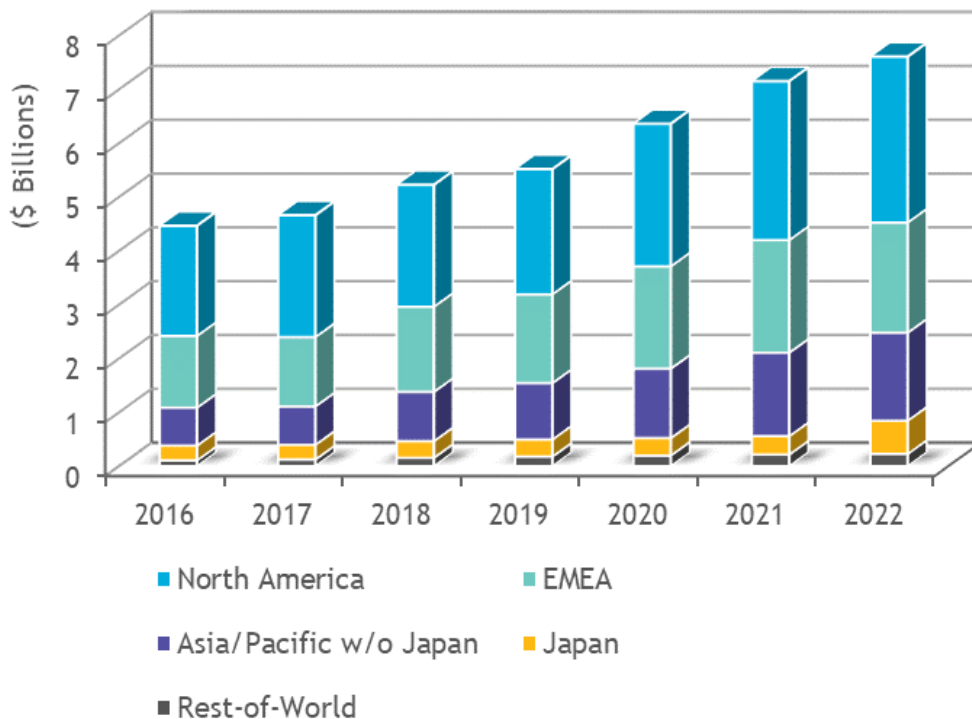
HYPERION RESEARCH OPINION

Worldwide HPC External Storage Market Revenue Snapshot

Hyperion Research forecasts that the worldwide HPC external storage market will grow at a 9.2% CAGR to more than \$7.6 billion in 2022, up from \$4.6 billion in 2017. See Figure 1. This shows a continued trend of high growth, as users expand their data sets.

FIGURE 1

HPC External Storage Revenue Trends by Region



Source: Hyperion Research 2018

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IN THIS REPORT

This Hyperion Research study presents our latest five-year forecast for the HPC external storage market covering the 2017-2022 period.

The HPC Server System Market

Worldwide revenue for the HPC technical server market grew 5.7% from 2016 to 2017 to a record \$12.2 billion. For the HPC technical server sector, Hyperion Research predicts CAGR growth of 9.7% to \$19.5 billion between 2017 and 2022.

- The Supercomputer market segment for HPC systems priced at \$500,000 and up will show the highest growth rate (14.4% CAGR), driven substantially by the global exascale race.
- The Divisional and Departmental segments will continue to exhibit healthy growth, and the Workgroup segment is rebounding to robust growth following several years of decline.

TABLE 1

2016-2022 Worldwide Total Technical Computer Market Revenue Forecast by Competitive Segment (\$ Billions)

	2016	2017	2018	2019	2020	2021	2022	CAGR 17-22
Supercomputer	4.4	4.8	4.9	5.1	6.3	7.5	9.2	14.4%
Divisional	2.2	2.3	2.4	2.5	2.6	2.8	3.0	5.9%
Departmental	3.1	3.3	3.5	3.8	4.0	4.2	4.5	6.1%
Workgroup	1.6	1.7	1.9	2.0	2.1	2.2	2.4	6.7%
Total	11.5	12.2	12.9	13.5	15.2	16.9	19.5	9.7%

Source: Hyperion Research, 2018

The HPC External Storage Market by Region

Hyperion Research defines HPC external storage as storage acquired to support HPC server systems but located outside of the server systems themselves. We count storage located inside of the server system chassis, such as internal scratch disk storage, as part of the server system revenue.

Hyperion Research forecasts that the worldwide HPC external storage market will expand at a 9.2% CAGR to more than \$7.6 billion in 2022, up from \$4.6 billion in 2017.

Projections call for Asia/Pacific, not including Japan, to have the largest CAGR (18.0%) between 2017-2022. The North American market, which made up almost half (48%) of the total worldwide external storage market, is projected to have the lowest CAGR of any region covered (6.4%) between 2017-2022.

TABLE 2

HPC External Storage Market Revenue by Region (\$B)

	2016	2017	2018	2019	2020	2021	2022	CAGR 2017-22
North America	2.1	2.3	2.3	2.3	2.7	3.0	3.1	6.4%
EMEA	1.3	1.3	1.6	1.7	1.9	2.1	2.1	9.2%
Asia/Pacific w/o Japan	0.7	0.7	0.9	1.1	1.3	1.6	1.6	18.0%
Japan	0.3	0.3	0.3	0.3	0.3	0.3	0.6	17.7%
Rest-of-World	0.1	0.1	0.2	0.2	0.2	0.2	0.2	13.0%
Total	4.5	4.7	5.2	5.5	6.4	7.2	7.6	9.2%

Source: Hyperion Research 2018

The 2017 HPC External Storage Market by Verticals/Application Areas

Table 3 displays 2017 worldwide revenues for HPC external storage by vertical segments/application areas. The three largest markets for HPC external storage in 2017 were defense, government labs, and the university/academic segment. These three were also the largest segments for HPC server revenue in 2017.

TABLE 3

2017 HPC External Storage Market Revenue by Vertical/Application Area (\$M)

Vertical/Application Area	2017 (\$ Millions)	Percentage of External Storage
Bio-Sciences	415	8.9%
CAE	501	10.7%
Chemical Engineering	69	1.5%
DCC & Distribution	300	6.4%
Economics/Financial	236	5.1%

TABLE 3**2017 HPC External Storage Market Revenue by Vertical/Application Area (\$M)**

Vertical/Application Area	2017 (\$ Millions)	Percentage of External Storage
EDA	304	6.5%
Geosciences	192	4.1%
Mechanical Design	18	0.4%
Defense	888	19.1%
Government Lab	816	17.5%
University/Academic	725	15.5%
Weather	177	3.8%
Other	21	0.4%
Total	4,661	100.0%

Source: Hyperion Research 2018

MARKET CONTEXT: MARKET GROWTH DRIVERS

Hyperion Research is expecting a number of factors to drive healthy growth rates across all segments of the HPC market going forward. These drivers include:

- Costly exascale systems being installed in 2022, including in Japan, US, China and Europe, with full-exascale systems costing up to \$600 million or more each.
 - Hyperion Research expects a dramatic increase in revenues at the highest end of the HPC market over the next few years, starting with pre-exascale systems in 2018 to 2021, and then full exascale systems in 2021 to 2022. Hyperion Research estimates that the supercomputer segment of the HPC market will be one of the fastest growing, with a CAGR of 14.4% between 2017 and 2022.
- Important revenue gains in the HPC sector writ large, driven by the rapid rise of high performance data analysis (HPDA). Hyperion Research projects that HPDA-focused server revenues will grow at a CAGR of almost 17.0 % out to 2022, and new commercial analytics emerging within that space will see a CAGR of over 29.5% during the same time frame.
 - Examples here include AI (machine learning and deep learning) use cases, especially fraud and anomaly detection, precision medicine, affinity marketing, automated driving systems and business intelligence.
- The ability of HPC systems to empower big data analysis on a near-real time basis, an increasingly necessary requirement for many application spaces.

- Requirements for new HPC systems with a broad range of architectures to support development and operational capabilities in the artificial intelligence sector, especially in the areas of machine and deep learning.
- The continued expansion of HPCs into the traditional modeling and simulation environment as more commercial and government users turn to advanced computing to meet their toughest computational requirements for larger problem sizes, higher modeling fidelity, and more aggressive iteration methods, all operating under the requirement for faster turnaround time. In addition, we expect more SMEs to turn to HPC for modeling and simulation.

MARKET DEFINITIONS

The data in this study is based on Hyperion Research's segmentation of the technical market, which is as follows:

- **Supercomputers:** Systems purchased to support technical applications and sold for \$500,000+
- **Technical divisional servers:** Systems purchased to support technical applications and sold for \$250,000-\$499,999
- **Technical departmental servers:** Systems purchased to support technical applications and sold for \$100,000-\$249,999
- **Technical workgroup servers:** Systems purchased to support technical applications and sold for under \$100,000

METHODOLOGY

The forecasts in this study are based on a number of information sources, including Hyperion Research's technical computing systems quarterly census database, vendor results for the historical years, discussions with vendors and users on future business directions and expectations, end-user studies, and in-depth interviews with users.

The forecasts were developed based on Hyperion Research's technical computing systems forecast model, which targets compute servers. This model initially considers competitive (price band) segments (supercomputers, technical divisional servers, technical departmental servers, and technical workgroup servers), forecasting system unit shipments, revenue, and average sales price by industry/application segment. The forecasts include estimates for second-tier and new-entrant vendors selling into the HPC server market space.

The forecasts provided in this study include only server systems used in technical computing applications. Systems sold into commercial (nontechnical) applications and desktop technical computers are not included in this study.

Note: All numbers in this document may not be exact due to rounding.

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 and vendor analysis for multi-user technical server technology used for HPC and HPDA (high performance data analysis). We provide 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.

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