Market Forecast

Worldwide HPC Server Market Forecast by Competitive Segment, 2022-2027

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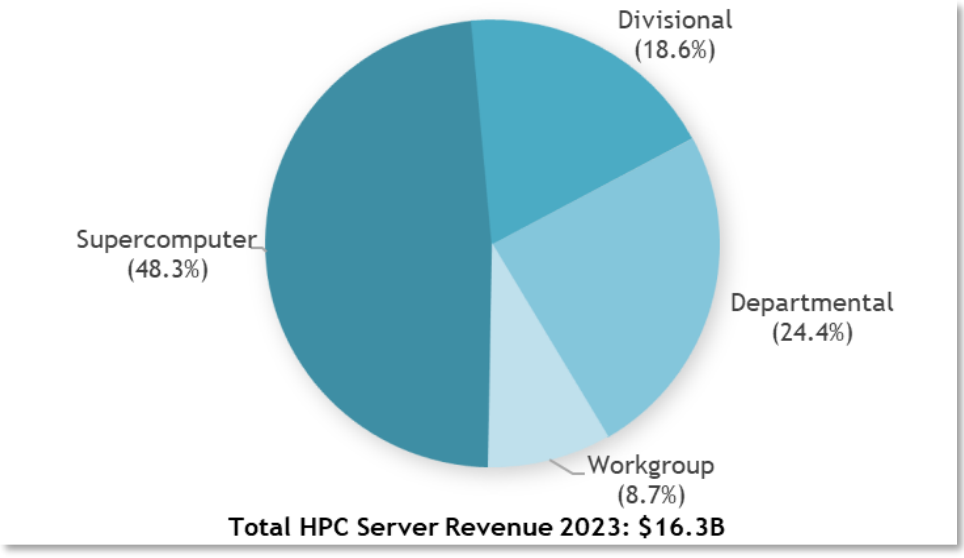
HYPERION RESEARCH OPINION

This Hyperion Research study presents the latest five-year forecast (2022-2027) for HPC on-premises technical servers by competitive segment. Overall, the HPC server market is expected to grow at a 6.9% CAGR to reach $22.3 billion in 2027 as the market recovery continues and exascale systems continue to ramp up.

- The Supercomputer market segment for HPC systems priced at $500K or more is projected to be both the largest and fastest growing segment, reaching $11.2 billion in 2027 with 9.2% CAGR. This is heavily driven by the large exascale system roll-out.
- The Divisional segment for HPC systems priced between $250K and $500K is anticipated to have the second largest growth rate (8.0% CAGR), reaching $4.1 billion in 2027.
- The Workgroup market segment for HPC systems priced under $100,000 is projected to remain relatively flat over the forecast period (2.1% CAGR), representing about $1.7 billion in revenues in 2027.

FIGURE 1

HPC Server Market by Competitive Segment, 2023



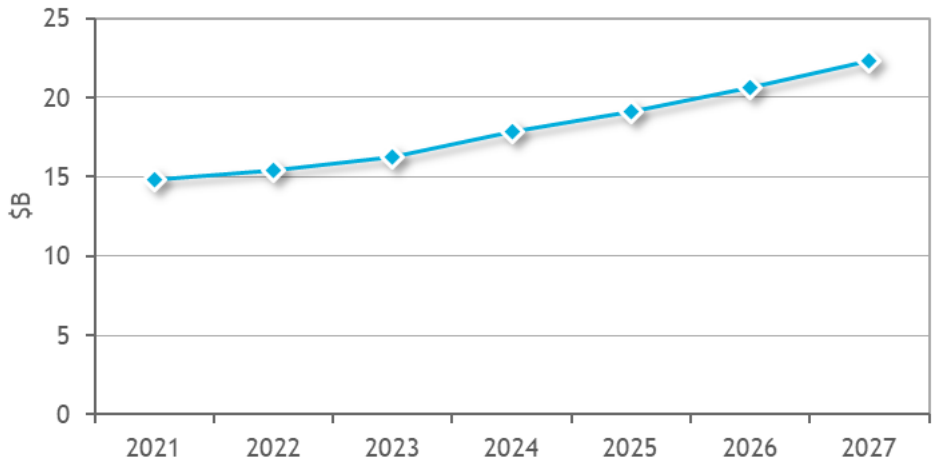
Source: Hyperion Research, September 2023

WORLDWIDE HPC SERVER MARKET FORECAST

This Hyperion Research study presents the latest five-year forecast (2022-2027) for HPC on-premises technical servers by competitive segment. Overall, the HPC server market is expected to grow at a 6.9% CAGR to reach $22.3 billion in 2027 as the market recovery continues and exascale systems continue to ramp up in the Supercomputers segment (see Figure 2, below). Although the timing of some of these exceptionally large systems remains uncertain, especially at the farthest end of the forecast period, the total dollar amount over the period is more predictable.

FIGURE 2

Worldwide HPC Server Forecast



Source: Hyperion Research, September 2023

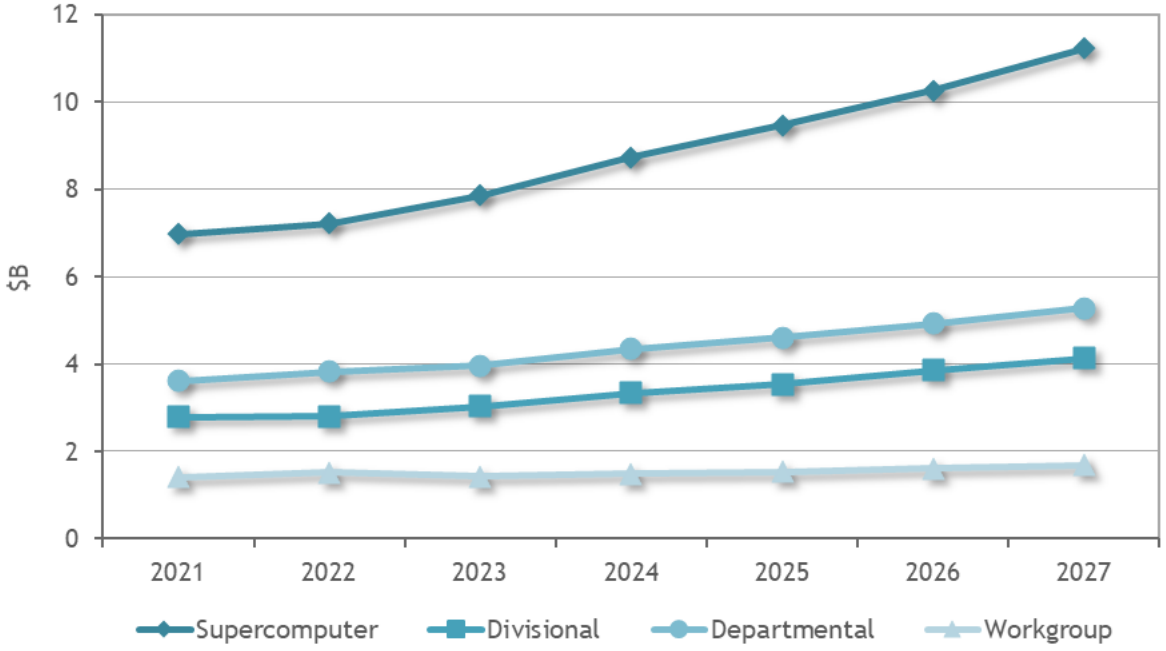
THE ON-PREMISES HPC SERVER MARKET FORECAST BY COMPETITIVE SEGMENT

Figure 3 and Table 1, below, show HPC server revenues by competitive segment.

- The Supercomputer market segment is projected to be both the largest and fastest growing segment, reaching $11.2 billion in 2027 with 9.2% CAGR. This is heavily driven by the worldwide roll-out of large, exascale systems. Throughout the forecast, Supercomputers make up about half of all HPC server revenues.
- The Divisional segment is anticipated to have the second largest growth rate (8.0% CAGR), reaching $4.1 billion in 2027.
- The Departmental segment is expected to have five-year growth slightly lower than the HPC server market writ large (6.6% CAGR vs. 7.7% CAGR, respectively), reaching nearly $5.3 billion in 2027. After Supercomputers, Departmental systems are the next largest segment.
- The Workgroup market segment is projected to remain relatively flat over the forecast period (2.1% CAGR), representing about $1.7 billion in revenues in 2027. The Workgroup segment continues to experience erosion from HPC cloud usage and has been the slowest to recover from the economic slowdown.

FIGURE 3

Updated Worldwide HPC Server Revenue Forecast by Segment



Source: Hyperion Research, September 2023

Table 1

Worldwide Technical Server Market Forecast by Price Band ($M)

	2021	2022	2023	2024	2025	2026	2027	CAGR '22-'27
Supercomputer	$6,971	$7,219	$7,859	$8,729	$9,458	$10,261	$11,219	9.2%
Divisional	$2,783	$2,805	$3,029	$3,329	$3,536	$3,848	$4,131	8.0%
Departmental	$3,614	$3,826	$3,970	$4,342	$4,602	$4,919	$5,270	6.6%
Workgroup	$1,412	$1,519	$1,423	$1,488	$1,533	$1,606	$1,686	2.1%
Total HPC Server Revenues	$14,781	$15,369	$16,281	$17,889	$19,129	$20,634	$22,306	7.7%

Source: Hyperion Research, July 2023

Exascale and Pre-Exascale Systems

Exascale and pre-exascale systems make up a large portion of the Supercomputer and overall HPC Server forecasts. Although the number of systems installed per year is expected to rise each year in the forecast, the total revenue from these systems is expected to be somewhat lower in 2025 and beyond as system prices are expected to decrease from over $500 million each, to around $250 million each. The countries/regions that anticipate installing the most exascale and pre-exascale systems are Europe, China, and the United States.

MARKET CONTEXT: MARKET GROWTH DRIVERS

There are several factors driving strong long-term revenue growth rate projections across most segments of the HPC sector. The forecast represents a balance between many ongoing trends:

- Global economic conditions point to a slow and perhaps fragile overall global economic environment for the next few years.
- Enthusiasm for the potential of large language models (LLMs) across a wide range of commercial sectors will drive many HPC end users to consider integrating LLMs into their overall computing environment.
- The roll out of previously announced exascale systems targeted for installations at large, typically government funded HPC centers, will continue as planned (with a few delays), but subsequent systems will likely become more modular and designed to serve a variety of diverse workloads.
- The HPC sector writ large is moving back to 'old school' aspirations for vertical integration, but with a modern twist, as varying parts of the HPC ecosystem seek to expand their technical capabilities beyond their traditional product mix.
- With the profusion of HPC uses cases comes a profusion of HPC metrics. HPC vendors must navigate a more complex set of benchmarks from which to target their designs, especially when trying to anticipate which metrics will carry the most weight in any given procurement.
- Open-standard or open-source assets like the RISC-V ISA will enable flexible technological advancements as well as allow for developments in indigenous semiconductor and technology production. This trend also has the potential to reduce supply-chain concerns or production bottlenecks but will require a full ecosystem in order to become mainstream.
- The explosion of generative AI interest, especially in the public eye, will fuel efforts to acquire, regulate, police, and govern the development and use of AI models.
- A widening rift between China and Western nations in scientific and economic cooperation will magnify calls for indigenous technology, slow economic growth between traditionally aligned trading partners, and limit the accessibility of reliable information from China.
- The conversation about employing cloud-based resources has turned from an adversarial "cloud vs. on-premises" to a conversation about how to leverage both to provide a user with an optimal balance of performance, cost, features, and skillsets.
- Attention is being shifted from storage management to data management. Providing the data when it's needed, where it's needed, goes beyond just capacity and performance.
- Many HPC sites are identifying the first steps towards improving sustainability, driving the widespread implementation of telemetry solutions to track energy use of hardware components and assess software cost efficiency.

- Introducing AI, ML, DL, and HPDA to new industries and various new application types is in part enabled by the increased popularity and widespread use of frameworks, which allow a speedier path to adoption for entry-level users.
- Global supply chain delays and chip shortages are continuing to improve but will persist for several more years.
- The historically cyclical nature of the HPC market has also been considered. The HPC market typically alternates between patterns of wide-scale procurements followed by periods of relative calm, or in some cases, limited contractions.

GLOBAL SIGNIFICANCE

HPC systems, especially large exascale and pre-exascale Supercomputer systems, have high national and international importance. In the Government sector, the use of HPC systems has consistently been tied to economic competitiveness and national security. Absolute computing power is not necessarily as important as relative computing power when compared to neighboring countries or strategic regions. The global race to have the largest and most powerful Supercomputers continues to be reflected in this most recent forecast. Going forward, the use of HPC is expected to continue to influence the international stage.

METHODOLOGY

The forecasts in this study are based on a number of Hyperion Research information sources, including conducting many surveys of buyers and vendors, an in-house technical computing systems quarterly census database, vendor results for the historical years, discussions with vendors and users on future business directions and expectations, and in-depth interviews with users.

The forecasts were developed using Hyperion Research's technical computing systems forecast model, which targets compute servers by 13 verticals and by 26 countries/regions. This model considers competitive 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 to the HPC server market.

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

Note: Numbers in this document may not be exact due to rounding. Monetary values given in USD.

DEFINITIONS

Technical Computing (HPC)

Hyperion Research uses the terms *technical computing* and *high-performance computing (HPC)* to encompass the entire market for computer servers used by scientists, engineers, analysts, and other groups using computationally and/or data-intensive modeling and simulation applications. An on-premises system primarily used for HPC workloads (at least 50%) can be referred to as an HPC system, or simply an HPC. Systems acquired by cloud service providers for the purpose of hosting

cloud workloads are excluded, as Hyperion Research separately tracks spending for HPC usage in cloud environments.

Technical servers range from small servers costing less than $10,000 to the large-capability machines valued in hundreds of millions of dollars. In addition to scientific and engineering applications, technical computing includes related markets/applications areas such as economic analysis, financial analysis, animation, server-based gaming, digital content creation and management, business intelligence modeling, and homeland security database applications. These areas are included in the technical computing market based on a combination of historical development, applications type, computational intensity, and associations with traditional technical markets.

Accounting for Exascale and Pre-Exascale Systems

Exascale and pre-exascale systems typically have high costs and often involve a large portion of non-recurring engineering (NRE) in the server contract. As with other HPC servers, Hyperion Research recognizes the entire cost of the server contract as server revenue.

Hyperion Research's accounting rules record these server revenues as a lump sum at the time of system acceptance (as indicated by the purchaser), regardless of when actual payments may have been made. This large dollar amount accepted all at once may give the appearance of extraordinary growth or decline in a single quarter or year. Whenever an exceptionally costly system is accepted in a particular period, this will be clearly noted.

When necessary (such as when multiple exascale systems are accepted in the same period), these exceptionally large systems may be pulled out as a separate line item within the supercomputer segment to preserve forecasting of the general HPC market.

Competitive Segments

Based on input from HPC vendors and end users, Hyperion Research created four competitive segments to reflect the trends in the HPC technical server market. These competitive segments are based on average selling prices and defined as follows:

- **Supercomputers:** Technical servers that sell for $500,000 or more.
- **Divisional servers:** Technical servers that sell for $250,000–$499,999.
- **Departmental servers:** Technical servers that sell for $100,000–$249,999.
- **Workgroup servers:** Technical servers that sell for less than $100,000.

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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