

Global AI Server Market: Analysis By Type (Training & Inference), By Processing Unit (GPU & Non GPU), By Shipments, By Region (North America, Europe, Asia Pacific & ROW), Size and Trends with Impact of COVID-19 and Forecast up to 2029

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Abstracts

The global AI server market was valued at US\$12.34 billion in 2023, and is expected to be worth US\$50.65 billion in 2029. AI servers are specialized computing systems designed for handling artificial intelligence (AI) tasks, including machine learning model training, large dataset processing, and AI algorithm execution. They feature powerful hardware components like GPUs or TPUs to accelerate AI workloads. Equipped with advanced software frameworks, these servers facilitate the development and deployment of AI applications. With the increasing adoption of digital transformation, businesses require scalable and flexible computing resources, making AI servers crucial for meeting the computational demands of AI applications. AI server shipments are anticipated to increase to 6.25 million by 2029.

The AI server market is propelled by various driving factors and is poised to witness noteworthy trends in the upcoming years. One key driving factor is the escalating demand for advanced AI applications across diverse sectors such as healthcare, finance, manufacturing, and autonomous systems. The increasing complexity of these applications necessitates high-performance computing, fostering a robust demand for AI servers equipped with specialized hardware. Another driving force is the continuous evolution of AI models, necessitating powerful training servers that can handle intricate algorithms and vast datasets. Additionally, the rise of edge computing and the integration of AI into edge devices contribute to the growing demand for efficient inference servers capable of real-time decision-making. Other significant factors include the accelerating investment in machine learning, proliferation of inference applications

and higher rate of adoption of AI cloud service. The AI server market is expected to grow at a CAGR of 26.54% over the years 2024-2029.

Market Segmentation Analysis:

By Type: The report identifies two segments on the basis of type: Training Server and Inference Server. The training segment dominated the market in 2023, due to the increasing demand for sophisticated AI models across various industries, including healthcare, finance, autonomous vehicles, and natural language processing. As organizations strive to deploy more advanced and accurate AI solutions, the need for powerful AI servers equipped with specialized hardware, such as high-performance GPUs and TPUs, has surged. The constant evolution of machine learning models and the exploration of deep learning techniques contribute to the sustained growth of the training segment in the AI server market. However, it is expected that the market size of inference servers would surpass that of training servers for the first time in 2026 and the gap between these two kinds of servers will continue to widen.

By Processing Unit: In terms of shipments, the AI server market can be divided into two segments: GPU and Non-GPU. In 2023, the GPU segment asserts its dominance in the market, propelled by the escalating demand for high-performance computing in AI applications. The robust growth of the GPU segment is primarily attributed to the increasing sophistication of AI models and the expanding size of datasets. GPUs' parallel processing capabilities play a pivotal role in facilitating quicker training and more efficient inference, thereby contributing to the overall progression of AI technologies. Simultaneously, the non-GPU segment is anticipated to exhibit the fastest CAGR during the forecasted period.

By Region: In the report, the global AI server market is divided into four regions: North America, Europe, Asia Pacific, and ROW. North America dominates the global AI server market due to its advanced technology landscape, significant investments, and the presence of leading tech companies. The US, particularly Silicon Valley, plays a crucial role in influencing AI server development and adoption. The competitive industries in North America, such as e-commerce, social media, and autonomous vehicles, drive the demand for cutting-edge AI infrastructure. Companies in the region utilize AI servers for diverse applications, including natural language processing in customer service and training complex machine learning models for recommendation systems. The convergence of 5G, IIoT (Industrial Internet of Things), and advanced technologies within the expansive cloud ecosystem highlights not only technological evolution but also emphasizes the central role of cloud services in shaping the future of the AI server

market in the country.

The Asia Pacific (APAC) region is poised to lead the global AI server market's rapid growth, fueled by a surge in cloud adoption. It is predicted that the demand for cloud services in APAC will surpass the rest of the world, driven by businesses seeking increased agility and resilience amid the ongoing impact of COVID-19. There is a noticeable uptick in the percentage of IT spending dedicated to the cloud. China, Japan, and India play key roles in shaping the AI server landscape in APAC. The region benefits from diverse economies, each contributing to AI server adoption based on specific needs. In India, the growing tech industry is integrating AI servers into projects across e-commerce, healthcare, and finance.

In India, a growing tech industry is embracing AI technologies, with AI servers becoming integral to projects in e-commerce, healthcare, and finance. The government's initiatives to promote digital transformation, such as the 'Digital India' campaign, further stimulate the adoption of AI infrastructure. For instance, in January 2023, The central government of India announced the launch of the Production Linked Incentive (PLI) scheme and additional incentives for server and IT hardware manufacturers. The government also plans to offer additional incentives for manufacturers to incorporate Indian-designed IP into their products. Such initiatives in countries such as India, where digitization is happening rapidly, are expected to boost the availability of servers at a cheaper rate, thereby driving the market's growth.

Market Dynamics:

Growth Drivers: The market has been growing over the past few years, due to factors such as increasing adoption of AI and machine learning (ML), favorable government regulations, advancements in GPU technology, increased research and development activities, integration of AI in autonomous systems and rise in big data analytics. Organizations across diverse sectors are recognizing the transformative potential of AI and ML technologies to enhance decision-making, optimize processes, and gain competitive advantages. As businesses generate and analyze massive datasets, the demand for robust computational power has surged. AI servers, equipped with high-performance hardware and accelerators like GPUs and TPUs, play a central role in meeting these computational demands. The complexity of AI and ML algorithms, particularly in training deep neural networks, necessitates dedicated infrastructure capable of handling parallel processing and intricate computations. Consequently, the AI server market experiences growth as enterprises invest in scalable and efficient solutions to deploy, manage, and accelerate AI workloads.

Challenges: However, some challenges are also impeding the growth of the market such as data privacy and security concerns and complexity of AI algorithms and skill shortages. Data privacy and security concerns constitute a formidable challenge for the AI server market, impeding its widespread adoption. As AI systems increasingly leverage vast amounts of sensitive data for training and decision-making, the vulnerability of such data becomes a critical issue. With the implementation of AI server solutions, there is an inherent risk of exposing valuable information to cyber threats, potentially resulting in severe financial and reputational damages for organizations.

Trends: The market is projected to grow at a fast pace during the forecast period, due to various latest trends such as edge AI computing, growing demand for explainable AI (XAI), AI-as-a-Service (AIaaS), diversified applications of generative AI and high rate of adoption of AI cloud service. Edge AI computing is a transformative trend reshaping the landscape of the AI server market. Unlike traditional centralized AI server architectures, Edge AI involves processing data locally on devices rather than relying solely on remote servers. Edge AI is particularly valuable in applications like autonomous vehicles, IoT devices, and smart sensors, where instantaneous processing is critical. This trend has sparked a shift in AI server requirements, with a growing demand for smaller, more efficient, and power-optimized servers to support edge deployments.

Impact Analysis of COVID-19 and Way Forward:

The global AI server market has been significantly impacted by the COVID-19 pandemic, presenting both challenges and opportunities. Disruptions in supply chains and manufacturing processes have caused delays and shortages in hardware production, leading to increased prices and difficulties in meeting the rising demand for AI servers. However, the pandemic has also accelerated digital transformation across industries, fueling a surge in demand for AI solutions. Remote work, healthcare advancements, and the need for efficient data processing have highlighted the crucial role of AI servers. As businesses and governments seek to enhance technological capabilities in response to pandemic uncertainties, the AI server market has experienced sustained growth.

Competitive Landscape:

The AI server market is highly competitive, with companies continually innovating to improve performance, energy efficiency, and scalability for AI workloads. Additionally, new entrants and partnerships can influence the market dynamics. The competitive

landscape is shaped by ongoing technological advancements, strategic partnerships, and market trends influencing the adoption of AI and ML across various industries. Companies across the globe are actively participating in this competitive environment, aiming to provide solutions that meet the evolving needs of AI-driven applications. The key players of the global AI server market are:

IBM Corporation
Huawei
NVIDIA Corporation
ADLINK Technology
Dell Technologies Inc.
Lenovo Group Limited
Hewlett Packard Enterprise Development LP
GIGA-BYTE Technology Co., Ltd.
Fujitsu Limited
Inventec Corporation
PSSC Labs
Phoenixnap
Quanta Computer Inc. (Quanta Cloud Technology (QCT))

NVIDIA is one of the major company in the GPU industry due to its commitment to R&D, which results in the constant introduction of new products. To improve the use of GPUs, NVIDIA has introduced the CUDA platform, In March 2023, NVIDIA unveiled the H100 chip, a highly anticipated GPU designed specifically for LLMs at the GTC conference, generating significant market attention.

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