

Global Graphics Processing Unit (GPU) Market Research Report 2021-2030

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Report description:

The global graphics processing unit (GPU) market is expected to grow at a CAGR of 22.58% from 2024 to 2030.

IMPACT OF U.S. & CHINA TRADE WAR

- The ongoing geopolitical tensions between the U.S. and China are a trade war that is likely to disrupt the global graphics processing unit (GPU) market.

- On February 2025, the US president imposed a 10% tariff on all Chinese imports. Later, on 2 April 2025, the US again added a 34% reciprocal tariff on top of existing tariffs, which resulted in around 54% on all Chinese imports.

- China has retaliated and announced a 34% tariff on all U.S. goods, which was effective from April 10, 2025. In response to this, on 7 April 2025 US threatened an additional 50%, which is a 104% tariff on Chinese goods, if it does not withdraw its retaliatory tariffs.

-[Furthermore, on 9 April 2025, China imposed an additional 50% tariff, which caused a total tariff of 84%. In reaction, the US increases tariffs to 125%.

-[On 10 April 2025, China announced to increase in tariffs on all American imports to 125%, which is effective from April 12. Further, on 11 April 2025, the U.S. stated that the tariff rate had risen to 145%.

-[Tariffs, export controls, and restricted access to raw materials are likely to raise the GPU production costs and cause delays, which lead to higher prices and limited availability in global markets.

-[Furthermore, key companies like NVIDIA and AMD are expected to face significant challenges because of the rising tariff rates. As per the latest data by NPR, the White House has paused plans to reduce sales of Nvidia H20 chips to Chinese firms. These market conditions reflect growing concerns about competitive pressures in the chip industry, specifically from Chinese companies developing more cost-effective solutions.

GPU MARKET TRENDS

-[]GPU aligns effortlessly with the operations needed by the generative AI systems. Several GPU providers or enterprises are

designing and developing GPUs that can provide efficient performance for AI workloads. For instance, in 2023, AWS and NVIDIA announced a collaboration that focuses on building on-demand AI infrastructure that is used to enhance the training of complex large language models (LLMs) and developing generative AI applications.

-[]In 2022, Meta announced that more than 7% of GPU computing power is to be used to operate on Meta Quest 2 devices for enhanced application performance on the VR headsets. The augmented GPU power expands the developer's capability to use higher pixel density without substantially minimizing the resolution needed at the target frame rate. Thus, such advancements in GPUs across AR and VR are driving the graphics processing unit (GPU) market growth.

-[In 2023, LG Electronics also improved the cloud gaming experience on its TVs + added 4K support for NVIDIA GeForce NOW, and launched the Boosteroid services. Further, in 2022, the integration of Blacknut and Utomik expanded cloud gaming options for LG TV users. Hence, such factors are increasing the demand for high-performance GPUs.

- [] High Performance Computing (HPC) refers to sets of computers in cloud systems that are used for high-speed data analytics and processing. These cloud groups usually work together and coordinate with mechanisms such as cloud file systems, containerized applications, or other software. GPUs facilitate demanding computing work operations, including HPC, AI, and ML, which are more powerful than their earlier counterparts like CPU.

GPU MARKET DRIVERS

-[]In 2024, Volvo also launched its EX90, which is a software-driven vehicle in collaboration with NVIDIA. The EX90 features an advanced computing system that uses NVIDIA DRIVE OS, which is capable of processing over 250 trillion operations per second. Hence, such innovations in autonomous vehicles are significantly raising the demand for GPUs and supporting the global graphics processing unit (GPU) market growth.

-[In 2024, NVIDIA joined the government of the U.S. to launch the Partnership for Global Inclusivity on AI (PGIAI), which provides Deep Learning Institute training, GPU credits, and hardware and software grants in developing countries, thereby supporting the graphics processing unit (GPU) market growth.

- The rapid growth of cryptocurrency mining is stimulating the expansion of the GPU industry as these specialized algorithms are used for mining cryptocurrencies, such as Bitcoin and Ethereum, which require substantial computational power.

-[Internet penetration is increasing across the globe because of the rising data consumption, production of smartphones, affordable data plans, and improved connectivity. In developed countries like India, the internet penetration rate has reached 50%, with over 700 million internet users in 2024. This surge in internet usage and data consumption is surging the demand for smart devices, which is indirectly supporting the GPU market across the consumer electronics application segment.

INDUSTRY RESTRAINTS

The growing complexity of GPUs, which are integrated with larger memory bandwidth, advanced cooling systems, and components such as Tensor cores, AI accelerators, and ray-tracing units, significantly raises production costs, which makes the GPUs expensive, particularly for high-end gaming, AI, and data center usages. Also, GPUs lack the established isolation mechanisms such as CPUs have, which increases the risk of side-channel attacks and data leakage between users, which slows down the demand for GPUs.

The disruption in the global supply chain has led to increased costs for raw materials, logistics, and transportation, which have inflated operational costs and are often passed on to end consumers, leading to higher GPU prices. Also, CPUs are integrating Al acceleration features such as Intel's Deep Learning Boost (DL Boost) or AMD's Al engines, reducing the need for discrete GPUs for certain Al workloads, thereby hampering the graphics processing unit (GPU) market growth.

SEGMENTATION INSIGHTS

INSIGHTS BY TYPE

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The graphics processing unit (GPU) market by type is segmented into integrated, discrete, and hybrid. In 2024, the integrated segment dominated the global GPU market because of its high demand across laptops, tablets, and desktops, owing to cost-effectiveness and efficient performance for everyday computing tasks. Furthermore, the discrete segment is the second largest segment, which also has a significant role contributing to the growth of the GPU market as they are essential for advanced gaming, AI processing, professional visualization, and high-end computing. The segment is expected to add additional revenue of over USD 32.41 million by 2030. Also, cryptocurrency mining has significantly encouraged the demand for discrete graphics card markets as mining operations require high-performance GPUs to handle complex calculations successfully.

INSIGHTS BY MEMORY

In 2024, the more than 32 GB GPU segment dominated the global graphics processing unit (GPU) market and is expected to grow at a high CAGR of over 24% during the forecast period. The growth is ascribed to its high adoption across data centers, research institutions, and professional visualization users owing to its high memory. Furthermore, the 16 GB to 32 GB GPU segment is the second largest market and has a significant impact on the GPU market owing to its major use in upper-mid-range to high-end gaming systems and engineering applications. The segment is expected to add additional revenue of over USD 54.62 million by 2030.

INSIGHTS BY COOLING TYPE

In 2024, air cooling held the largest share of the global graphics processing unit (GPU) market because of its vast availability, cost-effectiveness, and easy integration across consumer-grade and enterprise GPU solutions. Furthermore, liquid cooling is also gaining momentum in the global GPU market and growing at a CAGR of over 26% during the forecast period. These cooling systems are major across data center environments that need superior thermal performance and low noise operation.

INSIGHTS BY SERVER TYPE

The graphics processing unit (GPU) market by server type is segmented into multi-server and single-server. The multi-server segment is expected to grow at a high CAGR during the forecast period because of the increasing need for undistributed computing, model training, and real-time analytics. These setups are designed to work in parallel pooling GPU resources to process large-scale work that cannot be handled by single-server environments alone. Furthermore, the single-server segment holds a smaller share of the market but remains significant where cost efficiency, simplicity, and deployment speed are important.

Segmentation By Type

- Integrated - Discrete - Hybrid

INSIGHTS BY DEPLOYMENT

The global graphics processing unit (GPU) market by deployment is segmented into on-premises and cloud-based. On-premises GPU likely remains strong across large enterprises and research institutions where data sensitivity, compliance, and low-latency processing are the major concerns and are expected to add around USD 73 billion to the revenue by 2030. Also, on-premises systems offer improved data transfer speed and integration flexibility ranging from training foundation models to real-time inferences. Furthermore, cloud-based GPUs are experiencing a high growth rate of approximately 28.00% in the GPU market because of the rise in gaming platforms and data centers in emerging economies.

Segmentation by Deployment On-premises Oloud-based

INSIGHTS BY APPLICATION

The global graphics processing unit (GPU) market by application is segmented into gaming, data center, professional visualization, consumer electronics, automotive, and other applications. The data center application segment is holding the largest market share and is growing at a high CAGR rate of over 29% during the forecast period. Several vendors are also focusing on the development of GPUs that are efficient for data centers. For instance, NVIDIA offers H100 Tensor Core GPU which is built on the Hopper architecture majorly used for AI training in powering models like GPT-4, Claude, and LLaMA 2. The gaming segment is the second largest market in the global GPU market, owing to the rising popularity of esports and immersive gaming experiences which need advanced GPUs to support technologies such as ray tracing and high display rates. Furthermore, the professional visualization segment is also experiencing steady growth because of the increased demand from industries such as architecture, engineering, media & entertainment, and design.

Segmentation by Application
-[Gaming
-[Data Center
-[Professional Visualization
-[Consumer Electronics
-[Automotive
-[Other Applications

INSIGHTS BY END-USERS

The global graphics processing unit (GPU) market by end-users is segmented into consumers, enterprises, cloud service providers, and other users. In 2024, the consumer segment dominated the global GPU market and grew at a CAGR of 21.35% during the forecast period. The increasing demand for high-performance graphics across segments like gaming and consumer electronics is supporting its market growth. Consumers seek GPUs that deliver high frame rates, real-time ray tracing, and enhanced visual fidelity. For instance, NVIDIA's GeForce RTX series is widely adopted by gamers seeking cutting-edge graphics performance. Furthermore, the enterprise end-user segment is expected to grow significantly in the global GPU market. It uses GPUs to support business and industrial applications such as AI development, data analytics, and others. Enterprises are increasingly preferring cloud-based GPU either through their own private clouds or via partnerships with public cloud providers to avoid the capital expense of on-premise hardware. Other users have a smaller share, and it is expected to grow steadily because of the emerging applications of GPU technology in fields such as autonomous vehicles and others. Segmentation by End-Users

-[Consumers -[Enterprises -[Cloud Service Provides -[Other Users

GRAPHICS PROCESSING UNIT (GPU) MARKET GEOGRAPHICAL ANALYSIS

In 2024 the APAC region dominated the global graphics processing unit (GPU) market and is experiencing significant growth with the increasing demand for gaming, AI, and data centers across emerging countries like Indonesia, South Korea, and India. China is the largest market in the region and is poised for strong performance during the forecast period because of its robust economy.

Meanwhile, South Korea and India are also increasing their growth with the rising gaming industry. Major global GPU players such as NVIDIA, AMD, and Intel have a strong presence in the region along with emerging local manufacturers, particularly in China and Taiwan. Additionally, the presence of manufacturers like Samsung and Mediateck in countries like China, Taiwan, South Korea, and Japan are further encouraging the market growth.

The North American GPU market is highly competitive as it consists of several major vendors such as NVIDIA, Intel Corporation, and AMD among others which cater to customers worldwide. Moreover, the robust gaming industry across the U.S. further supports the market growth. Furthermore, the Europe region is growing at a significant compound annual growth rate of 19.56% during the forecast period owing to the presence large number of industries including healthcare, gaming, and data centers. Germany, the UK, and France are the major contributors to the Europe graphics processing unit (GPU) market. Latin America accounted for a significant share of the global graphics processing unit (GPU) market and is expected to experience lucrative growth during the forecast period. Brazil and Mexico lead the regional market with substantial investments in data center infrastructure is further accelerating the market growth. Furthermore, the increasing adoption of cloud-based GPUs and rapid digital transformation initiatives like Saudi Arabia's Vision 2030 are expected to boost the GPU market in the MEA.

Segmentation by Geography

- APAC o∏China o∏Japan o
South Korea o[]India o[]Australia o∏Thailand - North America o[]The U.S. o
Canada -[Europe o

Germany o
The U.K. o∏France o∏ltaly o[]Spain o∏Sweden - Latin America o∏Brazil o Mexico o
Argentina o∏Chile - Middle East & Africa o∏UAE o
Saudi Arabia o
South Africa o∏Turkey

GPU MARKET VENDOR LANDSCAPE

The global graphics processing unit (GPU) market is mature and characterized by numerous manufacturers that hold modest

market share. Key players in the global graphics processing unit (GPU) market, including NVIDIA, Intel Corporation, and AMD, have established dominance in the market by continuously innovating and expanding their product offerings. Major vendors have strategically implemented innovative technologies to maintain their market positions. For instance, in 2023, AMD introduced the MI300 series, integrating CPU and GPU capabilities into a single package using advanced 3D chipset technology. The companies in the graphics processing unit (GPU) industry are also focusing on several strategic partnerships with foundries and technology providers to ensure continuous supply chains and manufacturing capabilities. For instance, in 2024, AWS expanded its partnership with NVIDIA to improve its generative AI innovation. Also, market leaders are making significant R&D investments to enhance their products, specifically in areas like ray tracing, ML, and AI, among others. For instance, in 2024, NVIDIA introduced the Blackwell platform to enable a new era of computing. Furthermore, companies in the GPU market have increasingly expanded their product range and strengthened their market positions through acquisitions and partnerships. For instance, in 2024, NVIDIA officially completed its USD700 million acquisition of Run:ai which is an Israeli AI company specializing in AI workload management and optimization. This acquisition aligns with NVIDIA's extensive aim to enable businesses with tools for accelerated AI development.

Global Graphics Processing Unit (GPU) Market Developments

-[In 2024, AMD launched its Ryzen 8000G with integrated graphics and Ryzen AI and added 5000 series processors. -[In 2023, Yotta Data Services formed a partnership with NVIDIA to accelerate AI transformation in India. -[In 2023, LG Electronics improved the cloud gaming experience on its 2023 TVs by adding 4K support for NVIDIA GeForce NOW and launched the Boosteroid service.

Key Company Profiles

-[]Nvidia -[]Intel -[]AMD

Other Prominent Company Profiles

- [Biren Technology - [Moore Threads - [Imagination Technologies - [Qualcomm - [Silicon Motion - [INNOSILICON - [Apple Inc. - [Arm Limited

KEY QUESTIONS ANSWERED:

1. How big is the global graphics processing unit (GPU) market?
2. What is the growth rate of the global graphics processing unit (GPU) market?
3. Who are the key players in the global graphics processing unit (GPU) market?
4. What are the significant trends in the global graphics processing unit (GPU) market?

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