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Computer Graphics Market Assessment, By Deployment [Hardware, Software], By Application [Animation, Engineering Design & 3D Modelling, AR & VR, Data Visualization, Others], By End-user [Media and Entertainment, Healthcare, Automotive, BFSI, Others], By Region, Opportunities, and Forecast, 2016-2030F

https://marketpublishers.com/r/CF900EB50605EN.html
Date: March 2025
Pages: 247
Price: US$ 4,500.00 (Single User License)
ID: CF900EB50605EN

Abstracts

Global Computer Graphics Market has experienced significant growth in recent years and is expected to maintain a strong pace of expansion in the coming years. With projected revenue of approximately USD 31.67 billion in 2022, the market is forecasted to reach a value of USD 50.86 billion by 2030, displaying a robust CAGR of 6.1% from 2023 to 2030.

The Computer Graphics Market is a highly dynamic and progressive sector that plays a pivotal role in enhancing high-quality graphics and visual computing across diverse industries. Often referred to as graphics processing units (GPUs), these are specialized electronic circuits designed to display images, videos, and animations. The gaming industry remained a driving force behind the demand for high-performance GPUs, with NVIDIA and AMD leading the way in the consumer market. Moreover, GPUs played a critical role in data centers by accelerating AI and deep learning tasks. Periodically, shortages in GPUs occurred due to cryptocurrency mining, particularly for Bitcoin and Ethereum. These shortages were aggravated by the essential role GPUs played in cryptocurrency mining. In industries such as CAD and content creation, professional graphics solutions from companies like NVIDIA and AMD remained indispensable.

The introduction of ray tracing technology in gaming GPUs marked a significant

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advancement, offering realistic graphics that mirrored real-world lighting effects. The market also witnessed the entry of new players like Intel and Apple, intensifying the competition. However, challenges in the supply chain, notably semiconductor shortages, had a substantial impact on GPU availability and pricing. Despite these challenges, the graphics processor market continued to evolve, with applications extending beyond gaming. Areas such as AI, rendering, and data processing played a central role in driving the market's growth, highlighting its dynamic and multifaceted nature.

Gaming Industry Creating Significant Demand for Computer Graphics Industry

Modern video games require increasingly realistic and immersive graphics to captivate gamers. GPUs are essential for rendering lifelike visuals, from detailed character models to expansive game worlds with intricate textures and lighting effects. Specially, PC gaming continues to thrive, with enthusiasts building custom gaming rigs that feature high-end GPUs. These GPUs are essential for running games at the highest settings and achieving high frame rates, providing superior gaming experience. Moreover, the rise of e-sports and competitive gaming has created a demand for high-refresh-rate monitors and GPUs capable of delivering smooth and responsive gameplay. Professional gamers often invest in top-tier GPUs to gain a competitive edge which further accelerates the market.

For example, in November 2022, AMD introduced fresh graphics cards that leverage the next-generation AMD RDNA3 architecture, renowned for its high performance and energy efficiency. These new offerings from AMD include the Radeon RX 7900 XTX and Radeon RX 7900 XT graphics cards. In a continuation of the success seen with AMD's 'Zen' architecture-based Ryzen chiplet processors, these newly unveiled graphics cards proudly stand as the world's initial gaming graphics cards to incorporate a cutting-edge AMD chiplet design.

Implementation of AR & VR Influencing Computer Graphics Market

Augmented Reality (AR) and Virtual Reality (VR) are significant influencers in the field of computer graphics, driving innovation and shaping the development of advanced visual technologies. AR and VR applications necessitate powerful GPUs and graphics hardware to render high-quality, real-time 3D graphics. The demand for more capable hardware leads to innovations in GPU technology, pushing the boundaries of what's possible in computer graphics. AR relies on spatial computing, where virtual objects interact with the real-world environment. This interaction demands sophisticated

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algorithms and graphics processing to ensure that virtual objects seamlessly integrate with the user's surroundings, requiring complex computer graphics techniques. Moreover, AR and VR require intuitive and immersive interfaces. Designing user interfaces in 3D space challenges traditional concepts, leading to the development of new UI/UX paradigms. This innovation in interface design is closely tied to advancements in computer graphics.

For example, in December 2022, Meta revealed its decision to provide developers with an additional 7% of graphics processing unit (GPU) compute power for Meta Quest 2 devices. The boost aims to enhance application performance on the virtual reality (VR) headsets. The heightened GPU power will enable developers to utilize higher pixel density more effectively, without significantly compromising resolution to maintain the desired frame rate.

North America Region Holding Largest Share in the Computer Graphics Market

In 2022, North America region took the lead in the overall market, securing a substantial market share of more than 28%. The remarkable surge in the gaming industry within North America is a significant catalyst for market expansion. This region is a vibrant hub for game development and consumption, boasting an extensive audience that craves visually stunning and immersive gaming encounters. Graphic processing units (GPUs) are indispensable in empowering developers to craft cutting-edge games that cater to the discerning gaming community's demands. Furthermore, the North America region's emphasis on advanced technologies like artificial intelligence, robotics, and autonomous vehicles further amplifies the demand for GPUs. These transformative fields rely on intricate computations, a domain where GPUs excel, fostering innovation across diverse industries.

The escalating demand for cloud services and data centers within the region is another driving force for GPU demand. These facilities necessitate robust GPUs to manage resource-intensive applications, encompassing AI-driven analytics and high-performance computing tasks. This trend supports the region's technological advancement and contributes significantly to its economic growth.

Government Initiatives

In 2023, the UK government is committing ?100 million in public funds to expedite the manufacturing of computer chips to establish a domestic AI asset within Britain. This initiative involves procurement from prominent chip manufacturers like Intel, AMD, and

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Nvidia. As part of this effort, the government has ordered 5,000 graphics processing units (GPUs), commonly called graphics cards, from Nvidia. These GPUs are essential for executing the intricate tasks artificial intelligence (AI) demands.

Impact of COVID-19

The COVID-19 pandemic had a favorable impact on the market. As a result of lockdowns and social distancing measures, individuals spent more time at home, leading to a surge in the demand for digital content and entertainment. This resulted in a heightened interest in computer graphics and visual effects within the realms of television, gaming, and cinema. Additionally, to adhere to social distancing guidelines, numerous companies operating in the computer graphics industry shifted toward remote work, effectively sustaining production through remote collaboration tools. The market experienced increased demand, primarily driven by the widespread adoption of virtualization and cloud-based technologies. While businesses and individuals adapted to remote work setups and increased online engagement, the demand for enhanced digital experiences grew significantly. This heightened the importance of Computer Graphics, particularly in the gaming sector, which saw remarkable growth during the pandemic. With more people seeking entertainment options at home, the gaming industry experienced a notable upswing, driving increased demand for Computer Graphics to deliver immersive visuals and seamless gameplay.

Furthermore, the market witnessed a spike in demand for animation and visual effects, particularly for original programming, largely due to the proliferation of online streaming platforms like Amazon, Netflix, and Disney+. Simultaneously, the demand for gaming laptops and graphics cards experienced a notable uptick, in direct response to the escalating popularity of gaming activities.

Key Players Landscape and Outlook

The Computer Graphics Market is witnessing a swift growth trajectory due to the increasing emphasis placed by companies worldwide on establishing advanced digital infrastructure. Furthermore, the market expansion is greatly facilitated by increasing users in the gaming industry, along with significant investments made by companies to enhance research and development resources, engage in collaboration projects, bolster marketing efforts, and expand distribution networks. These factors collectively contribute to the rapid expansion of the market.

In March 2022, Intel entered the discrete graphics business, unveiling its Intel Arc

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graphics product range, tailored for laptops. Intel has introduced the Arc A-series graphics within this product lineup, built on the new Xe HPG architecture. The company has introduced three GPUs as part of the Arc series — the Arc 3, Arc 5, and Arc 7. The Arc 3 represents the entry-level GPU in the company's portfolio, while the Arc 5 occupies a mid-range position, and the Arc 7 stands as the flagship GPU offering from Intel.

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Contents

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*All segments will be provided for all regions and countries covered

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7. MARKET MAPPING, 2022

8. MACRO ENVIRONMENT AND INDUSTRY STRUCTURE

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9. MARKET DYNAMICS

9.1. Growth Drivers
9.2. Growth Inhibitors (Challenges, Restraints)

10. KEY PLAYERS LANDSCAPE

10.1. Competition Matrix of Top Five Market Leaders
10.2. Market Revenue Analysis of Top Five Market Leaders (in %, 2022)
10.3. Mergers and Acquisitions/Joint Ventures (If Applicable)
10.4. SWOT Analysis (For Five Market Players)
10.5. Patent Analysis (If Applicable)

11. CASE STUDIES (IF APPLICABLE)

12. KEY PLAYERS OUTLOOK

12.1. NVIDIA Corporation
  12.1.1. Company Details
  12.1.2. Key Management Personnel
  12.1.3. Products & Services
  12.1.4. Financials (As reported)
  12.1.5. Key Market Focus & Geographical Presence
  12.1.6. Recent Developments
12.2. Advanced Micro Devices, Inc.
12.3. Intel Corporation
12.4. Apple Inc.
12.5. ASUSTeK Computer Inc.
12.6. GIGA-BYTE Technology Co., Ltd.
12.7. Micro-Star International Co., Ltd.
12.8. SAPPHIRE Technology Limited
12.9. Qualcomm Technologies, Inc.
12.10. Matrox Graphics, Inc.
*Companies mentioned above DO NOT hold any order as per market share and can be changed as per information available during research work

13. STRATEGIC RECOMMENDATIONS

14. ABOUT US & DISCLAIMER

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