

White Paper

Fast-Growing Dell Technologies Improves Its HPC Server Market Leadership Position

Sponsored by: Dell Technologies

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HYPERION RESEARCH OPINION

For decades high performance computing (HPC) has contributed enormously to the advancement of science, industry, national and regional security, and the quality of life. Although HPC is sometimes narrowly seen as limited to government and academic research, this transformational technology is also crucial for a wide range of commercial enterprises, including automotive and aerospace companies, financial institutions, pharmaceutical firms, entertainment companies and others. Global1000 enterprise IT datacenters are also increasingly adopting HPC infrastructure to address their AI and HPDA-related applications.

HPC systems that are specifically designed to handle the demanding computational, data storage, and bandwidth requirements typical of scientific and engineering applications are available in a wide range of price points, ranging from over \$500 million for the fastest systems in the world, to near \$20,000 for systems targeted for small research groups or even single users. Despite the impacts of COVID-19 in 2020, the sale of 83,858 HPC systems in 2020 drove \$27.3 billion in worldwide revenues.

Only the largest, most dedicated vendors are capable of fully addressing a global market this large and diverse. In the past five years, Dell Technologies has grown its position as one of the top vendors in the worldwide HPC market; the company's strong revenue growth rate (CAGR) has enabled Dell Technologies to close in on the number one spot in this strategically important IT market.

This paper looks at Dell Technologies' growth as an HPC leader in recent years. Hyperion Research believes that the company's strategy and market momentum positions Dell Technologies to benefit from (and help drive) the continued growth of this worldwide market as HPC use expands at the forefront of AI, cloud computing and enterprise data center technology.

SITUATION OVERVIEW

The worldwide high performance computing (HPC) market has become increasingly important as an unrivaled venue for advanced R&D and as a revenue opportunity for technology vendors as shown by:

- Global spending on HPC servers, storage, software and technical support grew from \$18.8 billion in 2010 to \$27.3 billion in 2020, en route to a Hyperion Research forecast \$36.6 billion in 2024. Adding revenue from HPC usage in third-party clouds lifts the 2024 total to \$45.4 billion. That's a large enough market for even the largest IT vendors to seriously pursue.

- The market's steady growth is heavily related to HPC's ability to enable innovation in science, engineering and, more recently, data science. Of the \$19.9 billion that Hyperion Research projects will be spent on HPC server systems alone in 2025, \$6.2 billion will be for systems used primarily for data-intensive work such as AI and HPDA.
 - HPC is nearly indispensable today at the forefront of AI R&D for economically important, emerging use cases including automated driving, precision medicine, Smart City development, Internet of Things, edge computing and more. Developments in the HPC-enabled AI market foretell the future direction of the mainstream AI market.
- Yet another factor contributing to the forecast growth of the global HPC market is the movement of this transformational technology into new-to-HPC environments, especially third-party clouds and enterprise data centers.
 - Recent Hyperion Research studies indicate that about 20% of all HPC workloads were being run in external clouds, double the percentage of just a few years prior.
 - In a recent Hyperion Research study, 36% of respondents said they have integrated HPC systems into their enterprise data centers to accelerate challenging business operations such as business intelligence, fraud detection and sales analysis. Half of these users were first-time adopters of HPC.

Given the HPC market's strategic importance and impressive growth, it's no wonder the market has attracted many new vendors and became increasingly competitive. To be a leader in this expanding, increasingly heterogeneous global market requires an astute vision and strategy, a comprehensive portfolio of products and an array of talented personnel.

This paper profiles Dell Technologies' growing presence as a market leader in the worldwide HPC market.

DELL TECHNOLOGIES GROWING HPC LEADERSHIP OVER THE YEARS

Dell Technologies has long been one of the world's leading providers of HPC server systems, with a strong combination of capable hardware/software configurations and a proven range of technical support for key HPC applications sectors.

The company's healthy revenue growth rate in recent years has enabled Dell Technologies to close in on the number one spot. In 2012, Dell Technologies was the number three player in this high-growth market, selling \$1.5 billion worth of HPC server systems. In 2019, Dell's industry-leading 8.7% CAGR (2012-2019) moved the company into the number two position worldwide, with 22% of the global HPC server market revenues, with sales worth more than \$3.0 billion.

Dell's growth has been even more impressive in the highly competitive supercomputers segment, defined by Hyperion Research as HPC systems sold for \$500,000 and more. In 2012, the company recorded modest sales of \$199 million in this critical segment. By 2019, Dell's Technologies supercomputer segment sales had quintupled to about \$1.0 billion, representing a CAGR of 16.7% (2012-2019). Dell also had 16 installations on the June 2021 version of the TOP500 list (<http://www.top500.org/>) of the world's most powerful supercomputers.

Dell's increasing HPC leadership can also be seen in the upper ranks of HPC performance. On the most recent TOP500 list, Dell provided two of the top ten most powerful HPC systems in the world, including the number-nine-ranked HPC with a theoretical peak performance of over 51 petaflops, installed at Italian global energy company ENI, and the number ten system, Frontera, with a theoretical

peak performance of over 38 petaflops, installed at the Texas Advanced Computing Center at the University of Texas-Austin.

Recognizing the fact that not all enterprises require the level of performance delivered by the TOP500 leadership machines, nor do many have the required budgets, Dell Technologies is delivering HPC on demand capabilities. Partnering with several cloud service providers, Dell Technologies' HPC solutions are available as needed in a pay-as-you-go business model to support burst capabilities, proofs of concept, test/dev environments, as well as full production workloads.

In addition to the company's demonstrated capabilities in HPC hardware, Dell Technologies has deep expertise in scientific and engineering domains important to HPC users. This allows the company to conduct peer-to-peer selling and support customers across a wide range of critical HPC application areas including:

- Healthcare and Life Sciences, such as in precision medicine transformation to accelerate time-to-insight and reduce lengthy technology implementations, as well as provide innovative healthcare solutions that securely connect clinical teams and patients.
- Manufacturing practices that tap into advances in AI, edge computing, and data analytics to speed up manufacturing processes and increase throughput and reliability.
- Oil and Gas exploration and simulation capabilities designed to reduce costs by enabling more comprehensive, accurate, and detailed visualizations and surveys, increase overall productivity to further improve data-driven decision making capabilities, and handle large data-sets and time-critical computing processes.
- Digital Cities capabilities aimed at improving government support through integrated command and control while transforming the strategic planning process and enabling more efficient resource allocation as well as support improved E-Government services through integrated citizen services built on effective aggregation of data generated from multiple sources, formats and protocols onto a single common data platform.

DELL TECHNOLOGIES HPC AND AI SOLUTIONS

Dell reports that customers have experienced multiple successes from deploying Dell Technology HPC and AI solutions, including these examples:

- Mastercard® is using AI to protect its customers from fraud.
- Caterpillar® is applying AI autonomous mining vehicles for safety.
- Taboola® is making billions of content recommendations daily.
- AeroFarms® is using image recognition and classification to adjust nutrients, light and other factors to improve crop yield, taste, and texture.
- Medivis® is utilizing holographic imaging for precision surgery.
- Zenuity® is improving the safety of autonomous driving.

SUCCESS STORIES USING DELL TECHNOLOGIES

Verne Global

Many users are turning to the cloud to run their HPC workloads. Powerful, agile, and efficient environments are required to support their increasingly complex applications. Many also prefer to employ regional cloud service providers (CSPs) and are increasing the priority of sustainable and energy efficient infrastructure.

Verne Global, recently acquired by Digital 9 Infrastructure plc, an HPC-as-a-service CSP, enables its customers to quickly deploy and scale their HPC infrastructure with a 100% energy renewable datacenter in Iceland. Working with Dell Technologies, they are able to provide their users with the high-performance computing, networking, and storage infrastructure required to satisfy the demanding needs of increasingly data-intensive workloads.

Translational Genomics Research Institute (TGen)

Biosciences in general and genomics in particular has been the tip of the spear in leveraging AI and applying training and inferencing techniques to develop the life-changing field of precision medicine. Benefiting researchers and patients alike, precision medicine enables rapid diagnosis of complex symptoms and creating treatments unique to each individual patient. The Translational Genomics Research Institute (TGen) has partnered with Dell Technologies as a prime example of furthering precision medicine advancements by applying HPC-enabled AI infrastructure to cancer, neurological disorder, infectious disease and rare childhood disorder research.

Capturing, retrieving, analyzing, managing and securely processing massive amounts of data requires intelligent systems that incorporate AI and machine learning to identify the proper and accurate diagnosis. The computation, storage and analytics of the Dell Technologies solution accelerates the baseline interrogation of the data enabling the researchers and specialists to provide finer analytics.

McLaren

Achieving success on the professional racing circuit requires far more than having skilled drivers at the wheel. Traditional HPC modelling and simulation was, and still is, the predominant technique utilized to determine the optimum aerodynamics of the racecar. More advanced techniques are now being employed to support more precise simulations via digital twins of the entire racing environment (e.g., car, track, weather), capturing hundreds of thousands of edge datapoints from the car during practice runs, and allowing subsequent analysis to optimize race performance leveraging data analytics.

McLaren partnered with Dell Technologies to develop a unique high performance computing infrastructure deployed as an edge datacenter. In addition to optimizing racecar design, digital twin creating, and accurate data analytics, this collaboration also supported addressing new, tightened restrictions on racecar team spending and testing.

Dubai Electricity and Water Authority

Once thought as futuristic, the concept of a "smart city" is developing into a reality. Dubai Electricity and Water Authority (DEWA) selected Dell Technologies as their foundational partner in supporting the Smart Dubai Initiative to make Dubai the smartest city in the world.

Managing energy consumption and utilization is a key element in developing a smart city. DEWA is working with Dell to:

- Apply IoT technologies to connect solar energy to houses and building
- Create smart applications that use smart meters and grids that contribute to fast-service connection, predictive analytics for fast response, and for proper energy use rationing

DEWA is also leveraging Dell Technologies to store, manage and protect data generated from Rammas, DEWA's virtual robotic being deployed to learn and understand the needs of customers according to their enquiries.

Lastly, Dell Technologies is powering Moro, the UAE's digital hub. Moro will utilize essential functions of Dell's infrastructure such as cloud, security, machine learning, AI, big data and analytics, storage and servers to provide IT services to the public and private sectors within the UAE, including DEWA.

DELL TECHNOLOGIES LEVERAGES ITS LEADERSHIP IN OTHER IT AREAS TO BOOST ITS HPC OFFERINGS

Dell Technologies has many advanced technologies across multiple IT areas that it applies to support HPC. Most broadly, Dell is the number one branded provider in servers to the overall IT sector. According to IDC¹, Dell represented approximately 21% of the overall branded server revenue share for the second quarter of 2021, approximately \$1B more than the second highest named vendor.

Dell's storage leadership stems from the integration of EMC's performant storage products and the Dell storage lineup of products. In 2CQ21, Dell led the OEM Storage Systems Market with \$1.9B in revenue, representing 26.8% of the market, more than double the share of the next nearest vendor.²

According to an ITBrand³ annual survey that ranks networking vendors on a variety of categories, Dell Technologies was selected as the market leader for their open networking switch technology for the fifth time.

Additionally, Dell has a heritage in working directly with large, leading technology companies to develop custom racks and systems to satisfy their unique requirements. Technology developed and deployed from these engagements makes its way into Dell's HPC and mainstream product offerings. Examples include the PowerEdge C, DSS 8840, and Dell's line of Modular Data Centers.

¹IDC Worldwide Quarterly Enterprise Infrastructure Tracker®, 2Q21

²IDC's Worldwide Quarterly Enterprise Storage Systems Tracker®, 2Q21

³<https://itbrandpulse.com/it-pros-vote-2019-networking-brand-leaders/>

FUTURE OUTLOOK

The worldwide HPC market is forecast to continue at a steady, healthy growth rate for the foreseeable future. Growth will be driven by organic expansion for established applications and new, economically important use cases in artificial intelligence (e.g., precision medicine, automated driving, smart cities and Internet of Things), cloud computing and enterprise data centers.

Thanks to their leading growth rate among major HPC vendors, Dell Technologies has been closing in on HPC market leadership in recent years. Equally important, the company is heavily involved in each of the significant new HPC use cases that present new revenue opportunities for capable vendors. Dell Technologies is one of only a few companies in the world with sufficient resources and proven determination to pursue the attractive HPC market in all of its growing diversity and across all price points, up to the world's most powerful supercomputers.

Dell Technologies' strategy and market momentum position the company well to benefit from (and help drive) the continued growth of this worldwide market as HPC use expands at the forefront of AI, cloud computing and enterprise data center technology.

LEARN MORE

- Dell Technologies Key Facts: https://www.dellemc.com/en-me/collaterals/unauth/offering-overview-documents/solutions/key_facts_about_dell_technologies.pdf
- Dell Technologies solutions for HPCA and AI: <https://www.delltechnologies.com/en-us/solutions/high-performance-computing/index.htm#scroll=off>
- Dell Technologies HPC on Demand: <https://www.delltechnologies.com/asset/en-us/products/ready-solutions/technical-support/hpc-on-demand-overview.pdf>

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 & 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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