Server accelerators

Turbo-charge your applications
Accelerate insight and innovation

For the digital enterprise, success hinges on leveraging big, fast data. But as data sets grow, traditional data centers are starting to hit performance and scale limitations — especially when it comes to ingesting and querying real-time data sources.

While some have long taken advantage of accelerators for speeding visualization, modeling and simulation, today, more mainstream applications than ever before can leverage accelerators to boost insight and innovation. Accelerators such as graphics processing units (GPUs) and field programmable gate arrays (FPGAs) complement and accelerate CPUs, using parallel processing to crunch large volumes of data faster. Accelerated data centers can also deliver better economics, providing breakthrough performance with fewer servers, resulting in faster insights and lower costs.

Organizations in multiple industries are adopting server accelerators to outpace the competition — honing product and service offerings with data-gleaned insights, enhancing productivity with better application performance, optimizing operations with fast and powerful analytics, and shortening time to market by doing it all faster than ever before.

Dell EMC offers a choice of server accelerators in Dell EMC PowerEdge servers, so you can turbo-charge your applications.

Use cases for accelerators

- **Machine and deep learning** — Accelerators have taken AI from theory to mainstream by enabling the parallel processing power required to speed both training and inferencing workloads.
- **Predictive analytics** — AI, enabled by accelerators, can supercharge analytics, enabling dynamic correlation and delivering predictive outcomes with staggering speed, accuracy and scale.
- **Accelerated databases** — Accelerators can help speed aggregations, sorts and grouping operations to solve complex analytics operations that overload traditional databases.
- **Streaming data** — The Internet of Things (IoT) has created a firehose of data. Accelerators enable simultaneous ingestion, exploration and visualization of streaming data for real-time analysis.

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2 "NVIDIA Tesla V100 Tensor Core GPU," May 2019.
3 "NVIDIA Tesla P100," May 2019.

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7 in 10 execs ranked AI in the top 3 most significant technologies over the next 5-10 years

up to 100x CPUs in a single GPU

>600 applications accelerated and all deep learning frameworks
• **Visualization** — Accelerators enhance performance for 3D visualization applications such as computer-aided design, enabling software to draw models in real time as the user moves them.

• **Modeling and simulation** — Accelerators can provide faster-than-real-time modeling simulation for early evaluation, fast testing of design modifications and more iterations on designs.

• **Financial modeling** — Accelerated HPC and artificial intelligence (AI) solutions are revolutionizing analytics tools, enabling the industry to leverage massive data points to better understand risk and return.

• **Seismic processing** — Oil & Gas companies are finding new and better ways to extract information from massive seismic data stores, leveraging accelerators to speed time to results and shave costs.

• **Signal processing** — Accelerators enable providers to model and analyze massive signal data streams coming in from computers, radios, videos and cell phones in real time.

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**GPUs and FPGAs for Dell EMC PowerEdge servers**

Turbo-charge your applications with performance accelerators available in select Dell EMC PowerEdge tower and rack servers. The following table shows the number and models of accelerators (GPUs and FPGAs) that fit in PowerEdge servers. Xilinx® Alveo™ U200 and Intel® Programmable Acceleration Card (PAC) with Arria® 10 GX are FPGAs and the remainder are NVIDIA® GPUs.

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U = rack units, S = sockets or CPUs

The number of accelerators listed in the table is for double-width, full-height cards. The T4 is a low-profile, half-height card.

GPU specifications include embedded and off-chip memory capacity ranging from 35 to 64MB using from 10 to 225 watts.
NVIDIA Tesla GPUs
NVIDIA Tesla GPUs deliver the horsepower needed to run visualizations and other workloads faster than ever before. Plus, Tesla delivers high performance and user density for virtual desktop infrastructure (VDI).

- **T4 Tensor Core GPU**
- **Tesla V100 GPU Accelerator**
- **NVIDIA NVLink™ Fabric** interconnect
- **NVIDIA GPU CLOUD™** containers
- **Software application catalog**
- **NVIDIA developer resources**

NVIDIA GPUs are available in [Dell EMC PowerEdge servers](#) including the R640, R740, R740xd, R7425, R840, R940xa, C4140, and in [Dell EMC Ready Solutions for HPC and AI](#).

Intel FPGAs
Intel FPGAs can be dynamically reprogrammed with a data path that exactly matches your workloads, such as data analytics, image inference, encryption and compression.

- **Intel PAC with Intel Arria 10 GX FPGA**
- **Software acceleration stack**
- **Intel FPGA Acceleration Hub**

Available in [Dell EMC PowerEdge servers](#) including the R640, R740, R740xd, R840 R940xa and in [HPC and AI solutions](#). Download the [configuration guide](#).

Xilinx FPGAs
Built on the Xilinx 16nm UltraScale™ architecture, Xilinx Alveo accelerator cards are adaptable to changing acceleration requirements and algorithm standards, capable of accelerating any workload without changing hardware, and reduce total cost of ownership.

- **Alveo U200**
- **Software ecosystem**
- **Developer tools**

Available in [Dell EMC PowerEdge servers](#) including the R740, R740xd, R7425, R840, R940xa and in [HPC and AI solutions](#).

**Accelerated Dell EMC Solutions**
Save time with Dell EMC and partner solutions with GPUs and FPGAs inside.

**Dell EMC Ready Solutions**
[Dell EMC Ready Solutions for HPC](#) make adopting advanced computing faster and simpler. Dell EMC delivers a choice of flexible and scalable high performance computing solutions, with servers, networking, storage, solutions and services optimized together to address use cases in a variety of industries.

[Dell EMC Ready Solutions for AI](#) include everything you need to accelerate your AI initiatives. Making AI simpler, these integrated systems are ideal for machine and deep learning so you can get faster, deeper insights into your customers and your business.

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1. [“NVIDIA Tesla V100 Tensor Core GPU,” May 2019.](#)
2. [“Intel Arria 10 FPGAs Features,” May 2019.](#)
3. [“Alveo U200 Data Center Accelerator Card,” May 2019.](#)
Solutions available with Dell EMC partners

Amulet Hotkey® virtual desktop solutions combine enterprise-class servers with virtual GPU accelerators to deliver high-density, data center-optimized solutions to simplify the transition to Windows® 10. In addition, virtual GPUs help address the growing demand for graphics-accelerated virtualization of everyday programs like Windows 10, Microsoft® Office 365®, YouTube® and more for an exceptional virtual desktop experience. Read about Amulet Hotkey customer successes.

The BittWare Stratix® 10 based FPGA Accelerated Compute Node allows you to run the most demanding data center workloads using a high-density rackmount server optimized for FPGA accelerators — up to four Intel Stratix 10 FPGAs per 1U. Systems can be purchased directly from BittWare or Dell EMC. Watch the video.

Kinetica® is an insight engine that includes a GPU-accelerated database, visual discovery and machine learning capabilities, and accelerated parallel computing. Running on Dell PowerEdge servers and NVIDIA GPUs, Kinetica helps organizations meet the challenges that come with huge quantities of complex, unpredictable data. Read the article: Explaining GPUs to Your CEO: The Power of Productization.

Tracewell Systems® deliver powerful, off-the-shelf computing technology for businesses, government agencies and OEMs in places where environmental factors create unique computing challenges, such as in the air, at sea or on the ground, in fixed and mobile installations, or in situations where integration with specialty hardware or software is required. Get data sheets, videos and resources.

Dell EMC Acceleration Software partners

NVIDIA GRID™ Virtual PC and GRID® Virtual Apps improve virtual desktops and applications, with proven performance built on NVIDIA® Tesla® GPUs.

Kinetica software dramatically speeds up traditional online analytics processing (OLAP) workloads using GPUs for parallel computing.

BitFusion software disaggregates GPUs, FPGAs and/or ASICs and dynamically attaches them anywhere in the data center.

SQream Technologies® GPU-accelerated data warehouse is capable of scaling from terabytes to petabytes, adapting to any scale and workload.

FASTDATA.io PlasmaENGINE® GPU-native software enables real-time processing of infinite data in motion, over multiple nodes, with multiple GPUs.

RAPIDS is a suite of data science libraries built on NVIDIA CUDA-X for executing end-to-end data science training pipelines in NVIDIA GPUs.

Become a Dell Technologies Partner

When you join the Dell Technologies Partner Program, you are joining a partner ecosystem that together is making digital, IT, workforce, and security transformation real to organizations across the globe - every single day. Underpinning the industry's most robust portfolio from the edge to the core to the cloud is the Dell Technologies Partner Program, designed to be Simple. Predictable. Profitable.
Resources

Ready your data center to handle any workload with PowerEdge Servers. PowerEdge tower servers are designed to grow with your organization, at your pace. PowerEdge rack servers combine a highly scalable architecture and optimum balance of compute and memory to maximize performance across the widest range of applications.

See performance results
Get benchmarking data by workload, reference architectures and blogs from engineering at [hpcatdell.com](http://hpcatdell.com) and [Support for Servers Solution Resources](http://support.forservers.dell.com). Explore the following white papers:

- Deep Learning Performance Comparison — PowerEdge C4140 Scale-up vs. Scale-out
- GPU Database Acceleration on PowerEdge R940xa
- Deep Learning Inference on PowerEdge R7425
- Deep Learning Inferenceing with Intel Programmable Acceleration Card on Dell EMC Infrastructure

Access Education Services
Get the skills, training and certifications you need at [education.emc.com](http://education.emc.com). Learn how to solve problems with deep learning at the Deep Learning Institute by Dell EMC.

Visit the HPC and AI Innovation Lab
World-class solution engineering, technology testing and collaboration: [dell EMC Innovation Lab](http://dell EMC Innovation Lab).

Connect with Centers of Excellence
Global hubs for innovation and expertise: [dell EMC COE](http://dell EMC COE).

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To learn more, visit dell EMC.com/accelerators, dell EMC.com/servers or contact your local representative or authorized reseller.