

Deep Learning, Defined

Deep learning uses artificial neural networks (ANNs), inspired by the human brain, to process huge volumes of data, allowing a machine to train itself without human intervention. Researchers can use AI, ML and DL to gain deeper, more accurate and more cost-effective insights that can help solve some of the world's greatest challenges.

Simplify and Scale Deep Learning with Impressive Performance

Deep Learning with NVIDIA on Dell EMC Infrastructure

An integrated solution stack for deep learning with NVIDIA, including GPU-aware cluster management and modelling frameworks

With this Dell Technologies Validated Design for AI, designed in collaboration with NVIDIA, organizations across every industry can harness the power of artificial intelligence (AI), machine learning (ML) and deep learning (DL) to reach their business goals.

Deep Learning with NVIDIA is an integrated solution stack designed to support all phases of DL. It incorporates the latest CPU, GPU, memory, network, storage and software technologies with impressive performance for both training and inference phases. This level of throughput and efficiency makes it simpler to scale out ML and DL.

Solution highlights

AI is a complex set of technologies, underpinned by ML and DL algorithms. As AI adoption increases, there has been an explosion of interest in ML and DL. DL techniques have enabled great success in many fields such as computer vision, natural language processing (NLP), gaming and autonomous driving by enabling a model to learn from existing data and make corresponding predictions and adjustments.

To be effective at enterprise scale, the computational intensity of DL training requires highly powerful and efficient parallel architectures. The system components need to be carefully selected, designed and tuned for DL use cases. However, the plethora of choices available makes designing a solution complex and time consuming.

In addition to several options for processors, accelerators and storage technologies, there are multiple DL software frameworks and libraries that must be considered. These software components are under active development, updated frequently and cumbersome to manage. This makes it complicated to build and run DL applications successfully, leaving little time for data scientists to focus on innovation.

To resolve the challenges of deploying DL solutions at enterprise scale, Dell Technologies has developed an integrated system for AI, optimized for DL using PowerEdge servers with NVIDIA® GPUs, PowerSwitch and PowerScale.

Learn more

- [Deep Learning with NVIDIA Design Guide](#)
- delltechnologies.com/ai
- [Infohub](#)

Solution benefits

The Validated Design for Deep Learning with NVIDIA includes carefully selected technologies across all aspects of DL processing capabilities, memory, storage and network technologies as well as the software ecosystem.

The solution helps you:

- **Deliver high performance for DL** — Built around Dell EMC PowerEdge servers with NVIDIA V100 GPUs and NVIDIA NVLink™ connecting multiple V100 GPUs at up to 300GB/s to deliver higher inference performance.
- **Save time and risk** — A GPU-optimized and validated solution shaves valuable time from DL projects to help data scientists discover insights from data more quickly.
- **Achieve success with a services ecosystem** — Dell Technologies engineers can help you configure, test and tune GPU-enabled hardware and software with included services for faster time to value.

Specifications

The [Deep Learning with NVIDIA Design Guide](#) presents the architecture of the solution, including details on the design choice for each component. The infrastructure comprises a cluster with a master node, compute nodes, shared storage and network infrastructure.

Configuration options

Servers	Storage	Networking	Software
<ul style="list-style-type: none">• Dell EMC PowerEdge R740xd (master node)• PowerEdge C4140 with 4x wNVIDIA V100 GPUs (compute nodes)	<ul style="list-style-type: none">• Dell EMC PowerScale F800 all-flash scale-out NAS	<ul style="list-style-type: none">• Dell EMC PowerSwitch S3048-ON• Mellanox® SB7800 100GB/s EDR InfiniBand®• Mellanox SX6710G FDR InfiniBand to 40Gb/s Ethernet Gateway	<ul style="list-style-type: none">• Data Science Provisioning Portal• Bright Cluster Manager® for Data Science

Adopt or expand deep learning with confidence.

Give data scientists the power to drive more business value, faster with AI. Contact your Dell Technologies representative to learn more about how the Validated Design for Deep Learning with NVIDIA can help you simplify and scale deep learning with impressive performance.