

IBM Spectrum Conductor Deep Learning Impact

Highlights

- Accelerate training times with optimized software
 - Reduce time spent importing, transforming and preparing data
 - Improve ROI by sharing resources among data scientists and models
 - Improve model accuracy with hyper-parameter search and optimization
 - Faster time to results with distributed training on multiple servers & GPUs
 - Create more accurate models with training visualization and tuning
 - Simplify administration with integrated UI for AI workflow management
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Quickly put deep learning to work with an easy-to-install, end-to-end, enterprise solution

Deep learning, from data ingestion and preparation to training and tuning, doesn't have to be complex or time consuming. Neither does scaling applications and moving them into production. IBM Spectrum Conductor Deep Learning Impact software extends IBM Spectrum Conductor *and* enables you to build a deep learning environment providing an end-to-end workflow that allows data scientists to focus on training, tuning and deploying models into production.

With IBM Spectrum Conductor Deep Learning Impact, organizations can get started working with their data for deep learning while avoiding highly manual and repetitive steps and bypassing the need for specialized domain knowledge. The solution deploys with simple software downloads that give data scientists everything needed to build a distributed deep learning environment in hours rather than days or weeks—and manage it easily as the environment grows.

IBM Spectrum Conductor Deep Learning Impact is designed to address the deep learning lifecycle with a focus on the steps that are the most time consuming or require highly specialized knowledge—whether the iterative and time-consuming nature of the workflow, the lack of skills to train and tune models, the need to implement open-source frameworks, the high demands for computing capacity or the challenges of scale.

In addressing these issues, IBM Spectrum Conductor Deep Learning Impact not only enables powerful deep learning capabilities, it makes achieving them a greater reality for more organizations.

End-to-end support for the deep learning workflow

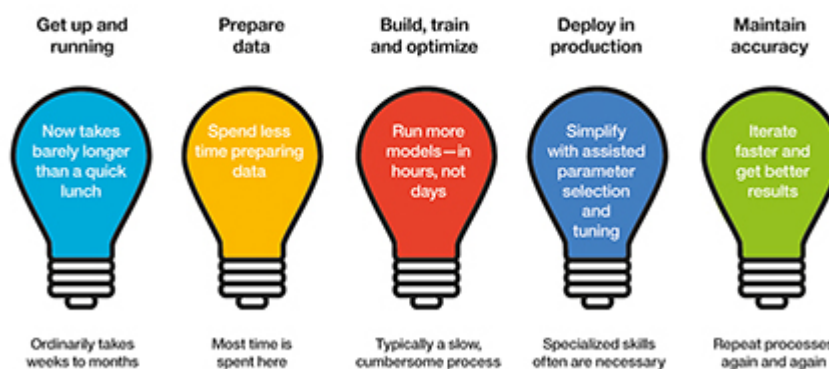
Financial services firms use deep learning for fraud detection and market prediction. Healthcare organizations use it to assist in disease detection and diagnostics. Transportation companies use it for autonomous assisted driving. In fact, for virtually any industry, deep learning presents radical new possibilities.

An electrical power company in Asia, for example, deployed IBM technologies to create a deep learning analysis system for checking 40,000 high-voltage transmission towers with drones. The system is trained to take images of components and analyze them to identify damage. The result has increased the number of inspections possible in a day by 10 times¹—while reducing the electrical dangers faced by inspection and repair personnel.

But while deep learning can produce exciting results, implementing the technology can be a challenge. Each step in the deep learning workflow can create obstacles that organizations find hard to overcome.

To meet these challenges, IBM Spectrum Conductor Deep Learning Impact provides simplifications and optimizations in an end-to-end workflow. This is a process that stretches from installing and configuring the environment to ingestion of data; data preparation and transformation to meet the requirements of deep learning frameworks; building, training and optimizing the neural models that make deep learning possible; deploying the model in production; and improving the model by retraining using new data as needs evolve.

Improving the steps to deep learning



Stages of the deep learning workflow

Taking advantage of a distributed server architecture, IBM Spectrum Conductor Deep Learning Impact enables data scientists to quickly ingest, transform, train and iterate by running the

processes in parallel. IBM Spectrum Conductor Deep Learning Impact is built to take advantage of IBM Spectrum Conductor, a highly available multitenant framework designed to build a shared, enterprise-class Apache Spark environment, and provide centralized management and monitoring, along with end-to-end security. IBM Spectrum Conductor Deep Learning Impact runs on x86 servers and IBM Power Systems servers.

“The IBM POWER platform is a great cognitive platform, if not the best out there. The IBM Power team identified the need for and implemented acceleration before anyone else in the industry and are already on their third generation with the highest speed accelerator interconnects (i.e., NVLink) and a coherent architecture (i.e., CAPI) that can share main memory with the accelerator.”²

Faster training on accelerated clusters

IBM Spectrum Conductor Deep Learning Impact, running with IBM Spectrum Conductor, provides an enterprise-grade solution designed to meet the needs of high-performance deep learning applications, including support for:

- Multitenancy, driving higher utilization and ROI by dynamically sharing server resources among many data scientists running multiple models
- Elastic resource allocation, which dynamically adds resources to a model without interrupting the training
- Distributed data ingest, transformation and training, so jobs are processed in parallel over a cluster of servers—helping reduce the time spent manipulating data
- A distributed training fabric designed to allow most applications to run in parallel without the need for code changes
- Training visualization and tuning for monitoring the accuracy of the model while training is in progress and for making adjustments or stopping if the model is not converging or has low accuracy
- Hyper-parameter search and optimization to improve accuracy with suggestion-based logic while training is running
- Large model support, leveraging CPU and GPU memory across a single large model
- Lifecycle support for the deep learning frameworks and Spark infrastructure

With conventional deep learning solutions, most of a data scientist’s time is spent importing, transforming and preparing data for training. By contrast, IBM Spectrum Conductor Deep Learning Impact is designed to reduce that time with a rich set of tools, automation and workflows, enabling the data scientist to spend more time training and optimizing models. Importantly, the distributed implementation of IBM Spectrum Conductor Deep Learning Impact makes it possible to reduce the amount of time needed to import and execute transformations

by running the tasks simultaneously.

With software and frameworks optimized to take full advantage of IBM Power servers with NVLink CPUs and NVIDIA GPUs, IBM benchmarks have seen 50 times improvements, cutting training times down from days to hours.³

¹ Based on IBM customer experience.

² Patrick Moorhead, ““IBM CEO Ginni Rometty Makes Her Case At InterConnect Why IBM Is The Right Business Platform,” Forbes, March 26, 2017.
<https://www.forbes.com/forbes/welcome/?toURL=https://www.forbes.com/sites/patrickmoorhead/2017/03/24/ibm-ceo-ginni-rometty-made-her-case-at-interconnect-why-ibm-is-the-right-business-platform/&refURL=https://www.google.com.hk/&referrer=https://www.google.com.hk/>

³ Sumi Gupta, “Scaling TensorFlow and Caffe to 256 GPUs,” *IBM Systems Blog: In the Making*, August 7, 2017 <https://www.ibm.com/blogs/research/2017/08/distributed-deep-learning/>

IBM Spectrum Conductor Deep Learning Impact at a glance

Hardware requirements	x86 servers IBM Power Systems S822LC for HPC (8335-GTB) servers
Software requirements	IBM Spectrum Conductor v2.2.1 IBM PowerAI v1.5 base package IBM Power Systems S822LC for HPC Red Hat Enterprise Linux v7.3 or Ubuntu server v16.04 running on x86 servers Red Hat Enterprise Linux v7.4 operating system running on IBM Power Systems servers
Scalability	Up to 64 nodes with up to 256 GPUs
Distribution	Electronic download in multiple eAssemblies Physical media not available

Why IBM?

For the rapidly growing and quickly evolving artificial intelligence category of deep learning, IBM Spectrum Conductor Deep Learning Impact enables organizations to achieve a faster time to results with simplified management. IBM services and support provide distributed deep learning based on parallel processing and elastic training that more easily and effectively deliver the performance advantages of Spark application management with optimized performance and improved time to result.

For more information

To learn more about IBM Spectrum Conductor Deep Learning Impact, please contact your IBM representative or IBM Business Partner, or visit: ibm.com/us-en/marketplace/spectrum-conductor-deep-learning-impact

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