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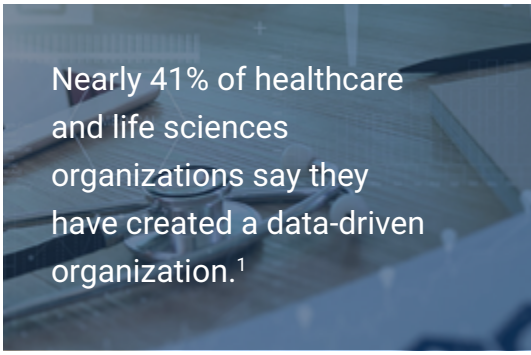
White Paper

How Healthcare Organizations are Improving Time to Insights with Data Fabrics

NVIDIA | DELL Technologies

Healthcare and life sciences organizations churn through mountains of data every minute of every day. This creates great strain on their systems to assemble that data across disparate formats and use it effectively for deep learning algorithms. Using an innovative data fabric—teamed with high-performance infrastructure—can help unleash the power of deep learning to improve time to insights for demanding and essential use cases.

Astonishing advances in healthcare and life sciences have resulted in massive improvements in a wide range of applications, from analyzing sophisticated genomics to finding the key to rapid and safe vaccine development. It has also resulted in the creation of untold amounts of both structured and, especially, unstructured data.



Having all that data is both a blessing and a curse for scientists, technicians, IT professionals and business stakeholders in healthcare and life sciences. With those astounding amounts of raw data comes the opportunity to find ways to cure diseases and improve the physical quality of life for generations to come. Research indicates that healthcare and life sciences organizations are on the cutting edge of using data strategically to achieve critical goals: Nearly 41% of healthcare and life sciences organizations say they have created a data-driven organization—more than twice that of the data-rich financial services sector.[1]

Having all that data also stretches the boundaries of what existing IT systems can do to promote those advances. Enter artificial intelligence—or, as often is the case in healthcare and life sciences, deep learning. Deep learning algorithms are the key to mining and leveraging all that data. But scientists and other technical teams often find they can't access the data tied to those algorithms for a range of technical reasons, especially data management complexity.

That's why healthcare and life sciences organizations are looking for new ways to transform the way their teams use digital data to glean previously unimaginable insights that result in the kinds of clinical improvements that make headlines—and improve healthcare quality around the world.

Two things are essential to unleash the power, utility and functionality of deep learning algorithms: high-performance infrastructure and a flexible, automated data management platform optimized for deep learning in healthcare and life sciences.

1 "Pandemic Shines Spotlight On Big Data And AI In Life Sciences And Healthcare," Forbes, May 26, 2021.

Why deep learning is essential in healthcare and life sciences

The term deep learning is often used interchangeably with artificial intelligence (AI). But deep learning actually is a subset of the AI category, represented as a unique set of algorithms that analyze data in a number of industries and use cases. Deep learning represents a massive functional improvement over earlier iterations of AI. That's a big reason why global spending on deep learning will exceed $93 billion by 2028, spurred in large part by significant advancements in compute infrastructure.[2]

Healthcare and life sciences, in particular, benefit greatly from deep learning because they face a "new urgency to manage and report on data in a timely and accurate manner," according to *Forbes*.[3]

Healthcare and life sciences organizations are already demonstrating impressive uses of deep learning algorithms to mine mountains of data, derived from an expanding number of devices and data sources in the data center, in the cloud and on the edge. Those use cases benefitting from deep learning include new drug engineering and development, expedited clinical trials, breaking down the essence of new-found diseases and human genomics analysis, to name just a few.

In a *Nature Medicine* article, the authors note: "Now is the time to create smarter healthcare systems in which the best treatment decisions are computationally learned from electronic health record data by deep learning methodologies."[4]

2 "Deep Learning System Market Size to Reach USD 93.34 in 2028," Globenewswire.com, March 23, 2021

3 Ibid, Forbes.

4 "A call for deep-learning healthcare," Nature Medicine, January 7, 2019.

Leveraging the benefits of data fabric for deep learning

For all the impressive and potentially earth-shaking benefits of deep learning algorithms, healthcare and life sciences enterprises need help to fully leverage those tools. Without a modernized, flexible and scalable data management platform, scientists and other personnel will not be able to properly access all the essential data embedded in deep learning algorithm. Manually surfacing and integrating data from multiple sources and data structures takes far too long, and often is too costly, for many of today's data management platforms.

What is needed is a powerful, purpose-built data fabric that uses a network design architecture to facilitate the management of data. This has become particularly essential in industries such as healthcare and life sciences where data volumes have exploded and now are made up of many different formats and structures. Data fabrics deliver numerous other benefits to data scientists looking to glean true insights from data, such as faster data analysis and improved collaboration among stakeholders.

Data fabrics are particularly useful for deep learning use cases because they reduce "fuzziness" that often results from algorithmic training across numerous different types of data—such as patents, clinical trials and patient outcomes—simultaneously. This makes data fabric extremely useful in complex, interconnected and data-rich use cases in healthcare and life sciences.

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Infrastructure matters for deep learning use cases: The Dell/NVIDIA/Vyasa collaborative approach

Without state-of-the-art compute, storage and graphics processing infrastructure to support the data fabric and to ensure the timely, secure and reliable surfacing of data from algorithms, healthcare and life sciences enterprises will encounter challenges in getting the most from their investments in AI, deep learning and analytics.

Dell EMC, NVIDIA® and Vyasa have collaborated to create an innovative deep learning platform optimized for healthcare and life sciences use cases. The combination of the NVIDIA DGX™ A100 AI computing system, Dell compute

and storage, and the Vyasa Layar deep learning platform gives organizations a powerful platform upon which to build and run real-world solutions to deliver real-time, deep insights.

A key element of the solution is Vyasa's data fabric solution. When integrated with existing enterprise data frameworks, this highly scalable fabric extends functionality in a cost efficient manner. The data fabric also can be deployed as a standalone layer for text, image and data steam integration, and for big data analytics.

Vyasa's data fabric also supports a knowledge graph application that takes data directly from multiple sources and creates a graphical rendering of data insights. Additionally, it comes with an image analytics layer, as well as "smart table" technology that connects spreadsheet content to the analytics engine of the data fabric.

Vyasa's data fabric is optimized to work with NVIDIA's GPU-based servers, including the NVIDIA DGX A100 system, which features eight NVIDIA A100 Tensor Core GPUs and two second-generation AMD EPYC™ processors.

Dell EMC's Isilon F800 all-flash scale out network-attached storage and NVIDIA DGX A100 is a purpose-built solution designed to scale and accelerate deep learning training workloads for healthcare and life sciences applications. This solution—which also includes the NVIDIA Mellanox Ethernet switch for storage and InfiniBand switch for GPU interconnection—helps healthcare and life sciences organizations take maximum advantage of deep learning algorithms with high-performance, scalable and easily deployed infrastructure. The high-bandwidth, low-latency storage speeds algorithmic training and avoids data bottlenecks often associated with huge data sets such as those found in life sciences and healthcare. The NVIDIA GPU servers are architected for multi-GPU training and to power deep learning workflows without performance snags or scalability challenges as workflows expand.

Conclusion

With the massive amounts of data created in healthcare and life sciences applications, enterprises need to make thoughtful and well-planned decisions on modernizing and upgrading their underlying hardware infrastructure. However, the major catalyst for strategic infrastructure investment is the need for real-time insights to make life-affirming decisions through artificial intelligence and deep learning.

The synergistic collaboration of Dell EMC, NVIDIA and Vyasa provides a unique and powerful framework for next-generation infrastructure to support important use cases in healthcare and life sciences. Through a data fabric approach to delivering those insights, organizations can make major strides toward their goals in an efficient, flexible and scalable architecture.

For more information on how Dell EMC, NVIDIA and Vyasa can address your deep learning challenges with state-of-the-art infrastructure and a tightly integrated data fabric, please visit:

Dell Healthcare Solutions **Vyasa Layar Data Fabric**

NVIDIA Healthcare Solutions

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