Cross-Industry | Germany

Accelerating new discoveries

Merck KGaA, Darmstadt, Germany

Merck KGaA, Darmstadt, Germany partnered with Lenovo to deploy a new HPC solution to accelerate research breakthroughs. Powered by Lenovo ThinkSystem SD665 V3 and Lenovo ThinkSystem SR780a V3 servers with Lenovo Neptune® liquid cooling, the solution delivers high performance for cutting-edge AI workloads.

1 Customer background

Who is Merck KGaA, Darmstadt, Germany?

Merck, a leading science and technology company, operates across life science, healthcare, and electronics. More than 62,000 employees work to make a positive difference to millions of people's lives every day by creating more joyful and sustainable ways to live. From providing products and services that accelerate drug development and manufacturing as well as discovering unique ways to treat the most challenging diseases to enabling the intelligence of devices—the company is everywhere.

Scientific exploration and responsible entrepreneurship have been key to Merck's technological and scientific advances. This is how Merck has thrived since its founding in 1668.

Merck KGaA
Darmstadt, Germany

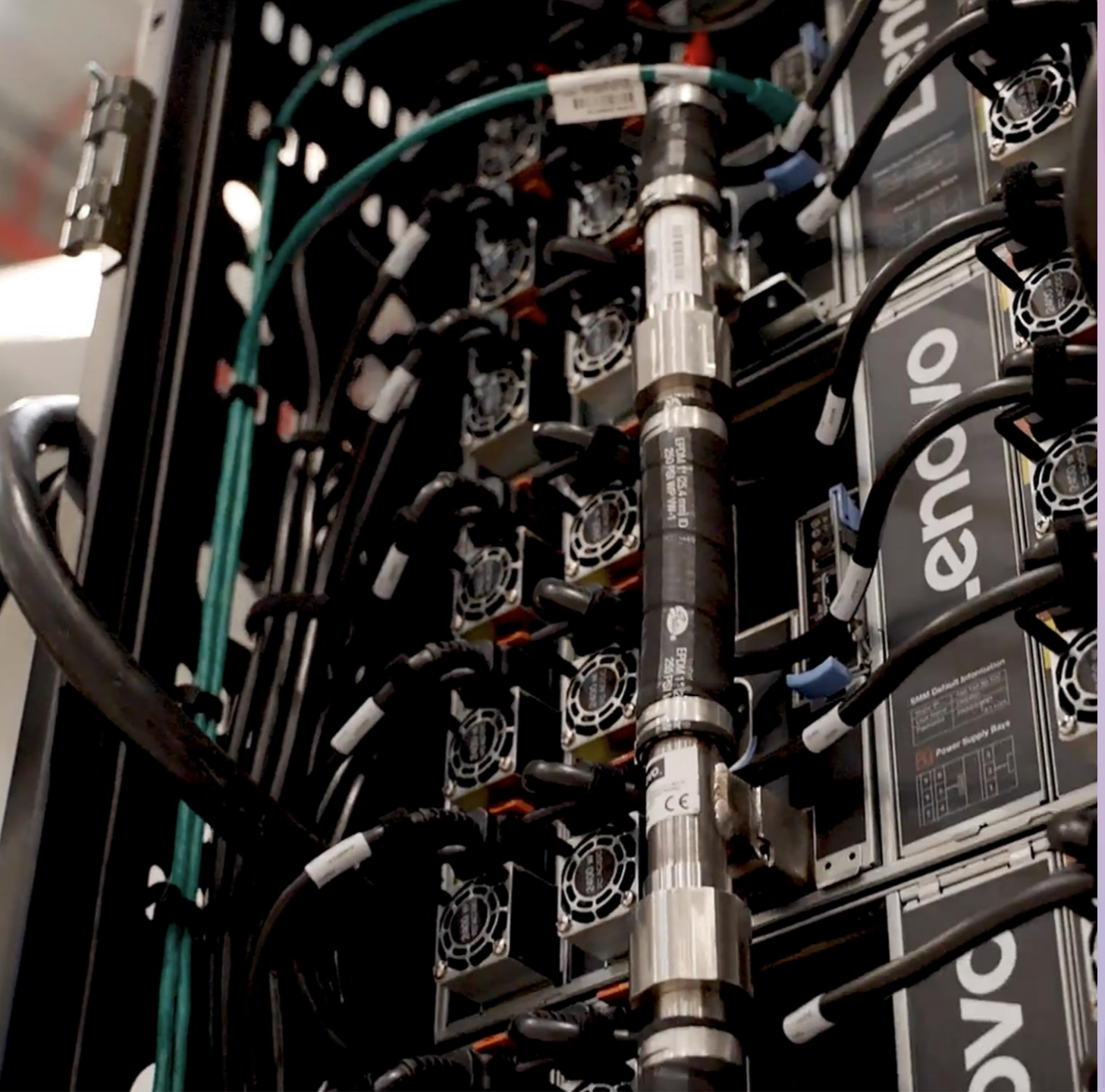
2 The challenge

To stay at the leading edge of all its fields, Merck KGaA, Darmstadt, Germany provides high-performance computing (HPC) resources to support and accelerate its teams' research activities. For example, by using AI to analyze vast datasets, researchers can identify potential drug candidates more quickly and accurately.

Over the years, Merck KGaA, Darmstadt, Germany deployed isolated HPC systems to support each of its business units. However, as time went by, this fragmented approach significantly increased the overall cost and complexity of infrastructure management and maintenance. With internal demand for HPC resources on the rise and Merck KGaA, Darmstadt, Germany's existing landscape approaching end of life, the company decided to refresh its clusters.

2 The challenge

Rather than deploying like-for-like replacements for the existing HPC systems, Merck KGaA, Darmstadt, Germany saw an opportunity to build a central platform that would support the entire business. The aim was to create a unified, easy-to-use HPC system optimized for a wide range of workloads, including traditional HPC jobs and cutting-edge generative AI use cases.



> **“This platform replaces isolated systems with a unified, user-centric platform that supports simulation, machine learning, and GenAI across our individual sectors. It delivers scale, speed, and energy efficiency—all in one platform.”**

Laura Matz

Chief Science and Technology Officer,
Merck KGaA, Darmstadt, Germany

3 The solution

One platform, many workloads

Merck KGaA, Darmstadt, Germany engaged Lenovo to help it realize the vision of its new HPC initiative.

The new, central HPC solution is based on latest-generation Lenovo ThinkSystem SD665 V3 and Lenovo ThinkSystem SR780a V3 servers, logically partitioned to create separate environments for HPC and AI workloads.

These servers are water cooled using Lenovo Neptune®—a liquid-cooling solution that removes heat much more effectively than conventional air cooling, delivering higher performance from compute resources.

Hardware

Lenovo ThinkSystem SD665 V3
Lenovo ThinkSystem SR780a V3
Lenovo ThinkSystem DM3010H Hybrid Flash Array
Lenovo Neptune® Liquid Cooling
AMD EPYC 9005 Series Processors
NVIDIA HGX Blackwell GPUs
NVIDIA L40s GPUs
NVIDIA Spectrum SN3420
NVIDIA QM97XX 1U NDR 400Gbps InfiniBand Switch Systems
5th Gen Intel Xeon Scalable processors

Software

Energy Aware Runtime
Lenovo XClarity Controller
Lenovo XClarity One
NICE DCV
NVIDIA AI Enterprise
Open OnDemand
Red Hat Enterprise Linux
Slurm Workload Manager

Services

Lenovo EveryScale
Lenovo Managed Services for HPC Clusters

3 The solution

Harnessing private cloud data

Merck KGaA, Darmstadt, Germany's HPC strategy is designed to combine the strengths of both private and public cloud environments, ensuring the company can remain agile, secure, and innovative in a highly regulated industry. With these objectives in mind, the company decided to co-locate the new HPC environment with Equinix, a world-leading digital infrastructure company with a strong presence in the German market.

"The Equinix data center in Munich is very close to our own private cloud, which offers the low latency we need to harness internal data sets for AI workloads," says Laura Matz, Chief Science and Technology Officer at Merck KGaA, Darmstadt, Germany. "Equinix also offers scalable, production-ready liquid-cooling infrastructure at its Munich data center, making it much easier to deploy Lenovo Neptune."

3 The solution

Enabling a seamless deployment

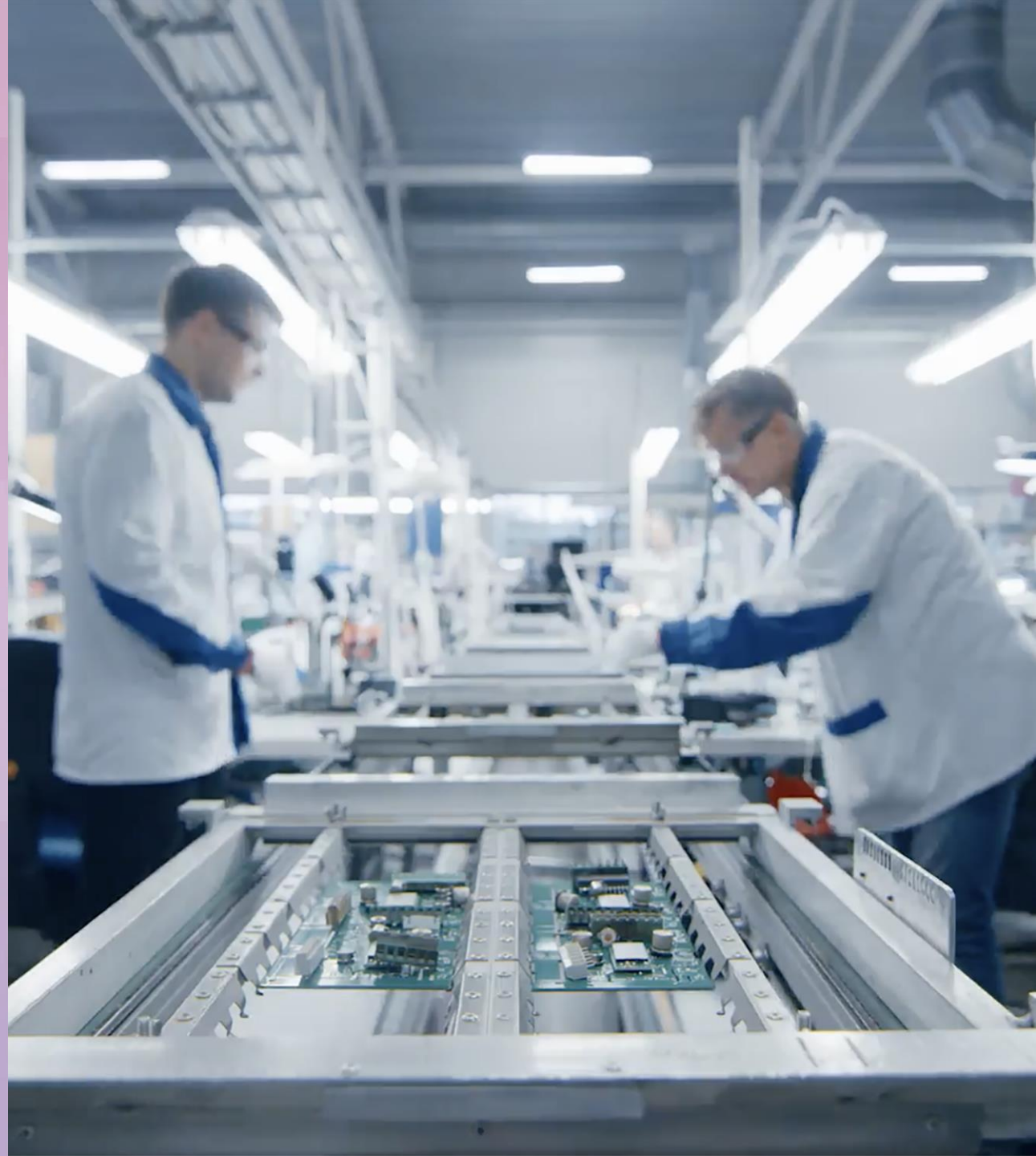
Lenovo designed, delivered, and deployed the new HPC environment using the Lenovo EveryScale framework. With factory integration and testing from Lenovo EveryScale, Merck KGaA, Darmstadt, Germany received a pre-tested, pre-integrated, and pre-cabled solution, tested to ensure high quality and fast installation time.

“Lenovo rapidly engineered and assembled our cluster, and Equinix helped us to deploy the solution at the co-location site,” says Laura Matz. “With Lenovo Managed Services for HPC, we don’t need to worry about monitoring and management. Lenovo handles all the day-to-day tasks on our behalf, which means we can focus on research, not infrastructure.”

“High-performance computing is helping us push boundaries, accelerate breakthroughs, and bring science to life—faster, smarter, more sustainably, and with greater purpose. Together with our partners Lenovo and Equinix we’re building more than a platform—we’re unlocking the power of discovery.”

Laura Matz

Chief Science and Technology Officer,
Merck KGaA, Darmstadt, Germany



4 The results

With the new HPC cluster from Lenovo, Merck KGaA, Darmstadt, Germany is helping its teams to accelerate research and bring new discoveries to market faster.

“In healthcare, we’re leveraging our new HPC resources to transform drug discovery processes, helping us to identify new drug candidates more effectively and ultimately to bring new treatments to patients more quickly,” says Laura Matz. “In electronics, we’re supercharging our AI and data analytics capabilities, reducing quality deviations and enabling high-volume, high-quality manufacturing for our customers. And in life sciences, we are using the new capabilities to help us better anticipate and meet evolving customer needs.”

- High-density HPC footprint
- Ultra-efficient water cooling
- End-to-end management and monitoring

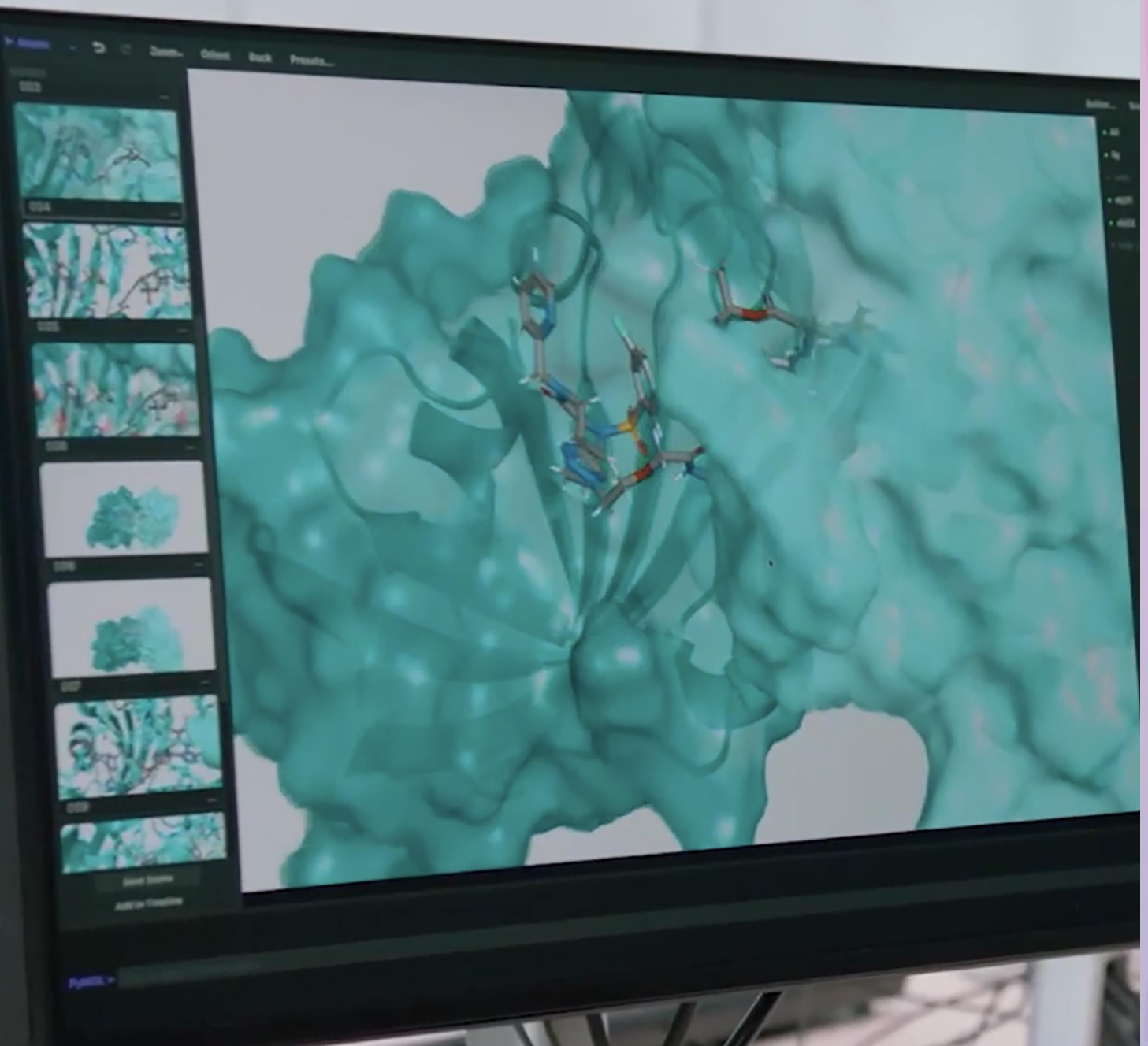
4 The results

Ultra-efficient liquid cooling

Lenovo has been a pioneer in direct water cooling for over a decade. With Lenovo Neptune technology and Equinix water-cooling infrastructure in the data center, Merck KGaA, Darmstadt, Germany can run demanding workloads without compromising on performance.

“Efficient thermal management from Lenovo Neptune means we can have a higher-density HPC footprint with significantly lower power consumption,” says Matz. “Sustainability is core to how we do business, and working with Lenovo and Equinix helps us to provide HPC resources to our teams much more efficiently than before.”

To help further reduce power consumption, Merck KGaA, Darmstadt, Germany uses Energy Aware Runtime (EAR), a software solution that helps optimize and tune the sustainability of supercomputers using application power monitoring.



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Philipp Harbach

Global Head of Group Digital Innovation,
Merck KGaA, Darmstadt, Germany

Why Lenovo?

When looking for a technology partner, innovation and proven expertise were both key selection criteria for Merck KGaA, Darmstadt, Germany. With more than a third of the TOP500 supercomputers around the world built on Lenovo technology, Merck KGaA, Darmstadt, Germany saw Lenovo as a clear leader in warm-water cooled HPC technology.

“We feel strongly that Lenovo shares our commitment to excellence and understands our unique challenges,” says Laura Matz. “One of the things that we value most about our partnership is the spirit of collaboration that Lenovo brought to the project. Lenovo helped us create a HPC solution that will enable teams across Merck KGaA, Darmstadt, Germany to push boundaries, accelerate breakthroughs, and bring new ideas to life.”

How can researchers accelerate their work?

Merck KGaA, Darmstadt, Germany cuts time to insight with a brand-new, water-cooled HPC solution from Lenovo and Equinix.

Explore Lenovo HPC Solutions

EQUINIX

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