Germany | Healthcare

Helmholtz Munich gears up for scientific computing and AI-based research

HELMHOLTZ MUNICH

Client profile

Helmholtz Munich conducts research on environmentally triggered diseases, with a special focus on the origins, treatment and prevention of diabetes, obesity, allergies and chronic lung diseases. Around 2,500 employees work to accelerate transforming findings from the lab into real-world applications and personalized therapies. Through the use of artificial intelligence and bioengineering, Helmholtz Munich also promotes the prevention and early diagnosis of diseases.

Medical research requires a powerful IT infrastructure. Helmholtz Munich has relied on NTT DATA's expertise for many years. Moving its server infrastructure — including the high-performance computing (HPC) cluster and 360 GPUs — to the NTT Global Data Centers (NTT GDC) Munich 2 colocation site, laid the foundation for efficient next-level scientific computing. Compared with their on-premises data center, Helmholtz Munich benefits from this economically sound and significantly more sustainable solution.

> "With a total of 300 HPC servers — 100 of them equipped with 360 GPUs — we are among the leading IT clusters worldwide. NTT Global Data Centers now provides us with a high-performance, efficient and future-oriented data center infrastructure. Through joint projects, we benefit from their extensive expertise in data center design and liquid cooling. Their strong commitment to sustainable energy usage, and the short distance to the Munich 2 site, further convinced us."
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> **Dr Alf Wachsmann,** Head of DigIT Infrastructure and Scientific Computing, Helmholtz Munich

Business need

Strengthening biomedical research capabilities with a future-proof high-performance data center

Modern research increasingly relies on high-performance computing power. At Helmholtz Munich, their top priority is processing the majority of their scientific data on dedicated in-house infrastructure. Relying on cloud-based resources is not an option — only a few dedicated research tasks that exceed their own computing power are performed on national resources such as the supercomputer in Jülich, Germany. As scientific computing and AI-driven applications have continued to advance, the demand for scalable computational acceleration has increased steadily. In life sciences research — where traditional CPU-based IT must work alongside high-performance GPU computing — this development has led to the deployment of an outstanding onsite HPC cluster.

However, the existing data center had reached its limits in terms of space, and energy-efficient operation could no longer be ensured. GPUs — with their massive parallel processing power — require far more electrical capacity per rack than CPUs, and the resulting heat output exceeded the center's cooling design. To maintain both sustainability and efficiency, a modern, future-ready solution was needed. The midterm plan to switch from air cooling to liquid cooling was another core technical requirement. Internal cost–benefit analyses strongly favored moving to a colocation data center. This was when the IT department began looking for a trusted partner to tackle Helmholtz Munich's current and future challenges.

Solution

Colocation data center enables resilient and sustainable next-level IT infrastructure

Working on a long-term project with NTT DATA to optimize its core IT infrastructure, Helmholtz Munich evaluated several options and ultimately decided to enter into another strategic collaboration within the NTT Group. The new Helmholtz Munich data center is now located at the NTT GDC's Munich 2 site only 10 kilometers from the institute.

Helmholtz Munich drives world-class medical research, exploring critical questions such as how climate change affects human health. It goes without saying that environmental compatibility was a decisive factor that guided Helmholtz Munich when selecting its colocation provider. NTT GDC's Munich 2 site particularly stands out for its sustainable cooling concept. Due to its proximity to the Alps, a large-volume flow of naturally cool groundwater runs beneath the colocation data center. Following successful evaluations, NTT GDC implemented an intelligent and sustainable groundwater cooling system. In addition, the data center is powered exclusively by green electricity. Both factors were key arguments for Helmholtz Munich in building a future-ready data center at this location.

Initially, 15 servers were installed as a learning experience within the leased colocation space. Subsequently, 300 HPC servers already in operation at the previous sit, along with approximately 400 servers and storage devices, were relocated by a specialized service provider in three phases. The transfer of the storage systems was handled by the system manufacturer. Helmholtz Munich is connected to the data center via two redundant dedicated lines, ensuring high bandwidth and reliability.

At present, both CPU and GPU servers are cooled using a conventional air-to-water cooling approach. In the future, the racks for the HPC cluster will be directly liquid cooled. NTT GDC already operates one of the world's largest liquid-cooling data centers in Utah, US. For years, NTT GDC has designed its data centers to allow liquid cooling to be retrofitted at any time. The cooling backbone is separated from customer colocation areas and its architecture is designed to allow the direct installation of liquid-cooling systems.

> “Over the past five decades, we have built up substantial internal computing capacity. In recent years, rapid technological advancements have pushed our onsite data center to its limits. To support our cutting-edge research, we need infrastructure that is powerful, scalable and future-ready — delivering high performance while being energy-efficiency and environmentally responsible.”

Dr Alf Wachsmann, Head of DigIT Infrastructure and Scientific Computing, Helmholtz Munich

Outcomes

Dynamic partnership drives innovation for reliable high-performance computing in bioscience

Until a few years ago, all IT related tasks at Helmholtz Munich were handled by the research teams themselves. A few years ago, the IT organization started transitioning to a centralized model to streamline operations and optimize the use of IT resources. Today, the IT team enables researchers at Helmholtz Munich to focus entirely on their areas of expertise, while they manage the complex computational infrastructure. Typically, 600 to 700 users rely on the research institute's computing power across roughly 500 projects running in parallel. By moving the data center into NTT GDC's colocation space, Helmholtz Munich has reached a new level of efficiency and flexibility.

Computing power can easily be added, resulting in shorter lead times. This higher agility is especially valuable in time-sensitive projects.

New cooling options can be explored with the guidance of NTT GDC's experts. Addressing today's needs and future requirements is key to remaining at the forefront of life sciences research.

Additional services — such as preparing dedicated client reports or handling smaller adaptations at the racks in the data center — simplify the team's day-to-day work.

The collaborative partnership with experts at NTT GDC is already paying off. While many research institutions hesitate to build and operate their own HPC clusters, Helmholtz Munich demonstrates that doing so within a colocation data center is both feasible and worthwhile.

> “Cutting-edge research today requires a powerful IT infrastructure. Running our HPC cluster on-premises in our own data center was no longer a viable option. When we planned a new facility in 2021, we sized it with 2030 requirements in mind — but we expect to reach those power requirements in 2026 — a full four years early. The performance leaps in GPUs are tremendous, and at the same time security demands continue to increase. Experience has proven our decision correct: to keep pace with those developments, you need to partner with a highly capable colocation provider.”

Benjamin Sohn, Head of Digital Transformation and IT, Helmholtz Munich