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Lenovo expands leadership class HPC system at Leibniz Supercomputer Center, integrating AI to accelerate research

- *Lenovo is expanding its partnership with Leibniz Supercomputing Center (LRZ), delivering Phase Two of its next-generation supercomputer*
- *Phase Two will integrate advanced artificial intelligence (AI) methods of computation into the current high-performance computing (HPC) system, SuperMUC-NG*
- *Lenovo is delivering a combination of a warm- water cooled, 100% accelerated compute system, based on Lenovo ThinkSystem SD650, and distributed asynchronous object storage, based on Lenovo ThinkSystem SR630 V2*

June 16, 2021 – RESEARCH TRIANGLE PARK – Lenovo Infrastructure Solutions Group, Intel and the [Leibniz Supercomputing Center](#) (LRZ) of the Bavarian Academy of Sciences and Humanities, announce Phase Two of the LRZ’s SuperMUC-NG supercomputer. The system will deliver high performance integrated solutions to the LRZ user community, utilising artificial intelligence to implement advanced simulations, modelling, and data analysis that will accelerate research to help solve humanity’s greatest challenges.

With funding from the Free State of Bavaria and the German Federal Ministries of Education and Research, Phase Two sees the expansion of SuperMUC-NG, part of the Gauss Center for Supercomputing (GCS), so as to continue as one of the fastest, most energy-efficient supercomputers in the world.

AI enabling Integrated Solutions

Since SuperMUC-NG [Phase One was launched](#), practitioners have used the supercomputer not only for traditional simulation and modelling, but also to automate image and pattern recognition in planet observations, climate data from satellites, medical visuals and health records, and data demographics. Given the successful utilisation of SuperMUC-NG in these projects, the demand for high performance data analytics, machine learning and fast memory performance has further increased.

To meet these demands and ensure researchers are supported, SuperMUC-NG will now be enhanced with next-generation Intel Xeon Scalable processors (codenamed Sapphire Rapids) and Intel’s upcoming HPC GPUs based on the X^e HPC architecture, codenamed “Ponte Vecchio”.

Phase Two will also use distributed asynchronous object storage (DAOS), leveraging 3rd Gen Intel Xeon Scalable processors (codename “Ice Lake”) integrated into [Lenovo's ThinkSystem](#) SR630 V2 platform. DAOS provides 1 petabyte of data storage, and will enable fast throughput of large data volumes, while the system architecture can deliver highly scalable, compute and data-intensive workloads and artificial intelligence applications. Overall, the SuperMUC-NG Phase Two compute nodes will deliver four times higher performance per Watt (High Performance Linpack) than Phase One.

"The Leibniz Supercomputing Center has long been an important innovation partner for both Lenovo and Intel. Phase Two is an exciting opportunity to share our expertise in what Lenovo calls ‘Exascale for Everscale’- solutions using advanced exascale technologies in any size cluster- and provide researchers

with the specialist resources needed to accelerate projects,” explains Scott Tease, Vice President, HPC and AI, Lenovo Infrastructure Solutions Group. “Through the implementation of our Neptune™ warm-water cooling and a smarter integrated system for artificial intelligence and deep learning, LRZ can continue to be a thought leader in advanced technologies for many years to come, and set new standards for research and development.”

Ensuring a sustainable approach

The enhancements made in Phase Two will ensure SuperMUC-NG is now capable of performing additional tasks in a way that’s as energy-efficient as possible. The key to this is the integration of 240 Intel compute nodes into [Lenovo's ThinkSystem SD650](#) leveraging Neptune™ warm water cooling and connected to the DAOS storage system via a high-speed network. [Lenovo's innovative Neptune™ direct water-cooling technology](#) removes approximately 90% of the heat from the compute system, reducing overall energy consumption, significantly increasing overall efficiency and ultimately allowing the processors to perform at their peak.

In addition, the components for SuperMUC-NG Phase Two will be manufactured within Europe, in [Lenovo's new dedicated manufacturing facility in Hungary](#), to help further improve the eco-footprint of the project’s supply chain.

“Delivering resources and services that empower researchers to accelerate their projects is at the heart of everything we do at LRZ,” says Prof. Dr. Dieter Kranzlmüller, Director of the LRZ. “Our work with Lenovo and other partners to integrate advanced AI capabilities into this next phase will help the center better achieve this, and ensure researchers are given what they need to excel in their scientific fields. Not only that, but with Lenovo’s warm-water cooling technology we’re able to deliver these enhancements in a way that’s as sustainable, and energy-efficient as possible.”

Phase Two kick off

LRZ will receive the DAOS storage system in the last quarter of 2021, and the compute system will follow in the 2nd quarter of 2022. The LRZ team are preparing their user community for Phase Two’s enhancements by offering support and consultations for adapting and optimizing codes and AI algorithms, and giving researchers access to GPU systems specialized in AI applications. The LRZ training program also offers a wide variety of machine and deep learning courses, educating users in how they can adapt existing algorithms or develop and train their own.

SuperMUC-NG is currently listed 15th in the [Top 500 supercomputers](#) in the world.

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About Lenovo

Lenovo (HKSE: 992) (ADR: LNVGY) is a US\$60 billion revenue Fortune Global 500 company serving customers in 180 markets around the world. Focused on a bold vision to deliver smarter technology for all, we are developing world-changing technologies that power (through devices and infrastructure) and empower (through solutions, services and software) millions of customers every day and together create a more inclusive, trustworthy and sustainable digital society for everyone, everywhere. To find out more visit <https://www.lenovo.com> and read about the latest news via our [StoryHub](#).

About LRZ

The Leibniz Supercomputing Centre (LRZ) proudly stands at the forefront of its field as a world-class IT service and computing user facility serving Munich's top universities as well as research institutions in Bavaria, Germany and Europe. As an institute of the Bavarian Academy of Sciences and Humanities, LRZ has provided a robust, holistic IT infrastructure for its users throughout the scientific community for nearly sixty years. It offers the complete range of resources, services, consulting and support—from email, web servers and Internet access to virtual machines, cloud solutions, data storage and the Munich Scientific Network (MWN). Home to SuperMUC-NG, LRZ is part of Germany's Gauss Centre for Supercomputing (GCS) and serves as part of the nation's backbone for the advanced research and discovery possible through high-performance computing (HPC). In addition to current systems, LRZ's Future Computing Group focuses on the evaluation of emerging Exascale-class architectures and technologies, development of highly scalable machine learning and artificial intelligence applications, and system integration of quantum acceleration with supercomputing systems.

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