

# Lenovo ThinkSystem SD650-N V2

## Exascale technology made available at every scale.

### Lenovo Neptune™ accelerated

Lenovo ThinkSystem SD650-N V2 is based on our fourth generation Lenovo Neptune™ direct water cooling platform based on two 3rd Gen Intel® Xeon® Scalable processors with NVIDIA HGX A100 4-GPU acceleration and NVIDIA HDR InfiniBand networking.

The combination of market leading NVIDIA acceleration technology with the market leading water cooling solution from Lenovo results in extreme performance in an extreme dense packaging. A single rack of Lenovo ThinkSystem SD650-N V2 provides up to 2.8 PetaFLOPS High Performance Computing (HPC) or 45 PetaFLOPS Artificial Intelligence (AI) peak performance on just 0.72m<sup>2</sup> - less than 8 ft<sup>2</sup> - footprint.

### Accelerating your applications

On the SD650-N V2 four NVIDIA A100 Tensor Core GPU are interconnected through NVLink delivering substantial performance improvements for HPC, AI training, and inference workloads. The A100 supports the Lenovo HPC philosophy to enable customers From Exascale to Everscale™. Together with NVIDIA InfiniBand networking it scales efficiently to thousands of GPUs or, with NVIDIA Multi-Instance GPU (MIG) technology, can be partitioned into seven GPU instances to accelerate smaller workloads.



With NVIDIA CUDA the most widely used parallel computing platform and programming model for GPUs is available free of charge to help you accelerate the more than 700 supported HPC applications and every major deep learning framework, for example:

- Chemistry like Gaussian and GROMACS
- Finite Elements like LS-DYNA and Simulia Abaqus
- Fluid Dynamics like OpenFOAM and ANSYS Fluent
- Molecular Dynamics like NAMD and AMBER
- Weather and Climate like WRF and ICON

The Lenovo ThinkSystem SD650-N V2 also supports NVIDIA NGC providing pre-trained models, training scripts, optimized framework containers and inference engines for popular deep learning models.

Lenovo

## Lenovo Neptune™: Leading water cooling technology

A decade of experience in direct water cooling sets Lenovo apart. With a meticulous focus on low-pressure drop and highest quality materials Lenovo achieves the best-in-class reliability. The SD650-N V2 leverages copper and brazed connections guaranteeing leak-free operations at extreme scale even at high pressure.

Another important differentiation is superior water loop design enabling up to 50°C inlet temperatures for the highest energy reuse efficiency. The new water loop design allows to optimize performance with increased frequency while ensuring temperature uniformity preventing Thermal Jitter for consistent application performance.

Water Cooling is an end to end process that already starts at manufacturing. Through Helium and Nitrogen pressure tests from the node to the full rack build the SD650-N V2 provides consistent quality at the highest standards. This approach also allows Lenovo to ship the systems pressurized without needing to send hazardous antifreeze-components to our customers.

## Solutions That Scale

Lenovo ThinkSystem SD650-N V2 is delivered as fully integrated Lenovo Scalable Infrastructure (LeSI) solution. LeSI provides Best Recipe guides to warrant interoperability of hardware, software and firmware among a variety of Lenovo and third-party components. In addition to interoperability testing, LeSI hardware is pre-integrated, pre-cabled, pre-loaded with the best recipe and optionally an OS-image and tested at the rack level in manufacturing, to ensure a reliable delivery and minimize installation time in the customer data center.

Enabled with Lenovo intelligent Computing Orchestration (LiCO), you can support multiple users and scaling within a single cluster environment. LiCO is a powerful platform that manages cluster resources for HPC and AI applications. LiCO provides workflows for both AI and HPC, and supports multiple AI frameworks, allowing you to leverage a single cluster for diverse workload requirements.

## Data Center Reliability Leader

At Lenovo, we take a customer-centric approach, which is why ThinkSystem servers consistently rank #1 in reliability. Also, Lenovo is the leading provider of Supercomputers in the TOP500. The ThinkSystem SD650-N V2 provides the latest in performance and reliability in a scalable solution for enterprise and research.

## Specifications

Form Factor	6U rack-mount with 6 nodes
Processor	2x 3rd Gen Intel® Xeon® Scalable processors per node
Memory	Up to 1.0TB using 16x 64GB 3200MHz TruDDR4 RDIMMs per node
Storage	2x 2.5-inch slim SATA / NVMe U.2 SSD and 2x M.2 SATA SSD SW RAID and Intel VROC for Intel drives only
NIC	1x SFP28 25Gb LOM, NCSI 1x RJ45 1GbE, NCSI
PCIe	2x x16 PCIe Gen4 LP per node
Power	6/9 N+1 redundant hot-swap PSUs (up to 2400W Platinum)
Cooling	Direct Water Cooling with up to 50°C inlet water temperature
Management	Lenovo XClarity Controller (XCC) and Lenovo Intelligent Computing Orchestration (LiCO)
OS Support	Red Hat Enterprise Linux, SUSE Linux Enterprise Server Tested on CentOS

## For More Information

To learn more about the Lenovo ThinkSystem SD650-N V2, contact your Lenovo representative or Business Partner or visit [lenovo.com/thinksystem](https://lenovo.com/thinksystem).

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