ThinkSystem SD650
Liquid cooling innovation for a highly efficient data center

Innovative Design

The Lenovo ThinkSystem SD650 dual-node tray is designed for High Performance Computing (HPC), large-scale cloud, heavy simulations and modeling.

It supports Lenovo Neptune Direct to Node (DTN) technology as well as workloads from technical computing to grid deployments to analytics, and is ideally suited for fields such as research, life sciences, energy, simulation, and engineering.

The unique ThinkSystem SD650 design provides the optimal balance of serviceability, performance, and efficiency.

By using a standard rack with the NeXtScale n1200 enclosure equipped with patented stainless steel dripless quick connectors, the SD650 provides easy serviceability and extreme density that is well suited for clusters—ranging from small enterprises to the world's largest supercomputers.

The Lenovo Neptune DTN doesn't use risky plastic retrofitting but custom-designed copper waterloops, so you have peace of mind implementing a platform with liquid cooling at the core of the design.

Compared to other technology, the SD650's direct water cooling:

- Can reduce data center energy costs by up to 40%
- Increases system performance by up to 10%
- Can deliver up to 90% heat removal efficiency[§]
- Creates a quieter data center through fanless design
- Enables data center growth without adding CRACs

Maximum Performance, Simplified Management

Designed to run the highest core-count second-generation Intel® Xeon® Processor Scalable family CPUs, the SD650 powers through demanding HPC workloads. Because water cooling removes more heat constantly, CPUs can run in accelerated mode nonstop, getting up to 10% greater performance from the CPU.

For even greater system performance, the SD650 uses 2933MHz DDR4 memory and supports NVMe storage, high-speed EDR and HDR InfiniBand, and Omni Path adapters.

The SD650 is supported by Lenovo Intelligent Computing Orchestrator (LiCO), a powerful management suite with an intuitive GUI, that helps to easily orchestrate large HPC cluster resources and accelerate development of AI applications. LiCO works with the most common AI frameworks, including TensorFlow, Caffe, MxNet, and Neon.

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intel® XEON® PLATINUM inside™

Extreme Density

One 6U NeXtScale n1200 Enclosure accommodates up to 12 SD650 compute nodes. With up to 6 chassis in a traditional 42U rack, the enclosure houses up to 144 processors, 2TB of Intel® Optane™ DC Persistent Memory, 144 2.5″ SSDs or 72 2.5″ NVMe drives, 144 M.2 boot drives, and 72 x16 PCIe Gen3 adapters on just two data center floor tiles. Each SD650 offers up to 12 more cores per U than the previous generation.*

Savings and Efficiency

With up to 90% heat removal efficiency, the SD650 provides up to a 40% savings in data center energy expense including:

- A 25% reduction in annual air conditioning use
- A 5% energy savings by running CPUs cooler
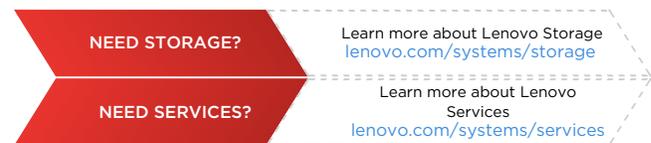- A 4% savings by eliminating fans in the compute nodes

A large supercomputing center reusing hot water from direct water cooling can save an estimated 45% in electricity costs.

Specifications

Form Factor	Full-wide 1U tray (six per n1200 Enclosure)
Chassis	NeXtScale n1200 Enclosure (6U)
Processors	2 second-generation Intel® Xeon® Processor Scalable family CPUs per node; 2x nodes per 1U tray
Memory	Up to 1.5TB using 12x 2933MHz TruDDR4 DIMMs per node or up to 2TB (512GB x4) using Intel® Optane™ DC Persistent Memory
I/O Expansion	1x 50mm width ML2 slot and 1x PCIe x16 slot for EDR InfiniBand or Intel Omni Path, per server node
Internal Storage	Up to 2x 2.5" SATA SSDs (7mm height) or 1x 2.5" NVMe SSDs (15mm height) per node; up to 2x M.2 SATA SSDs
RAID Support	Onboard SATA controller with SW RAID; optional Dual M.2 SSD adapter with HW RAID 1
Network Interface	2x 1GbE BaseT NIC per node; additional high-speed network adapters (InfiniBand or Omni Path) can be installed in available front-accessible PCIe x16 adapter slot
Power Management	Rack-level power capping and management via Extreme Cloud Administration Toolkit (xCAT)
Systems Management	Supported by LICO and XCC
OS Support	Red Hat, SUSE, CentOS (with LeSI support); Visit lenovopress.com/osig for more information.
Limited Warranty	3-year customer replaceable unit and onsite limited warranty, next business day 9x5, service upgrades available

For More Information

To learn more about the ThinkSystem SD650, contact your Lenovo representative or Business Partner or visit www.lenovo.com/thinksystem. For detailed specifications, consult the Product Guide.

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§ Based on Lenovo internal testing. * Compared to Lenovo NeXtScale nx360 M5.