

Lenovo ThinkSystem SD650 V2

Liquid cooling innovation for a
highly efficient data center



Innovative Design

The Lenovo ThinkSystem SD650 V2 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, grid deployments, analytics, and is ideally suited for fields such as research, life sciences, energy, simulation, and engineering.

The unique design of ThinkSystem SD650 V2 provides the optimal balance of serviceability, performance, and efficiency.

By using a standard rack with the ThinkSystem DW612 enclosure equipped with patented stainless steel drip less quick connectors, the SD650 V2 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 water loops, so you have peace of mind implementing a platform with liquid cooling at the core of the design.

Compared to other technology the ThinkSystem SD650 V2'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 with its fan-less design
- Enables data center growth without adding CRACs

Maximum Performance, Simplified Management

Designed to run the highest core-count 3rd-generation Intel® Xeon® Platinum processor, the SD650 V2 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 V2 uses 3200MHz DDR4 memory and supports NVMe storage, high-speed HDR InfiniBand, and Omni Path adapters.

The SD650 V2 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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Extreme Density

One 6U ThinkSystem DW612 Enclosure accommodates up to 12 SD650 V2 compute nodes. With up to 6 chassis in a traditional 42U rack, the enclosure houses up to 144 processors, 144TB of DDR4 Memory, and up to 144x PCIe Gen4 x16 adapters on just two data center floor tiles. The ThinkSystem SD650 V2 offers up to 48 more cores per U than the previous generation SD650 server.

Savings and Efficiency

With up to 90% heat removal efficiency, the ThinkSystem SD650 V2 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 cooler CPUs
- 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 (two SD650 V2 nodes per tray, six per DW612 Enclosure)
Chassis	DW612 Enclosure (6U)
Processors	Two third-generation Intel® Xeon® Scalable processors per node; 2x nodes per 1U tray
Memory	Up to 2TB using 16x 128GB 3200MHz TruDDR4 DIMMs per node
I/O Expansion	Up to 2x PCIe Gen4 x16 low-profile adapter slots (2x supported without internal storage) per node for HDR InfiniBand or Intel Omni Path. SharedIO supported.
Internal Storage	Up to 2x 2.5-inch SATA SSDs (7mm height) or 1x 2.5-inch NVMe SSDs (15mm height) per node; up to 2x M.2 SATA SSDs for operating system boot functions
RAID Support	Onboard SATA controller with SW RAID or Intel VROC
Network Interfaces	Two onboard Ethernet interfaces: 1x 25GbE SFP28 LOM (1Gb, 10Gb or 25Gb capable; supports NC-SI) and 1x 1GbE RJ45 (supports NC-SI)
Power Management	Rack-level power capping and management via Extreme Cloud Administration Toolkit (xCAT)
Systems Management	Systems management using Lenovo Intelligent Computing Orchestration (LiCO) and XClarity Controller (XCC). Supports TPM 2.0 for advanced cryptographic functionality. SMM management module in the enclosure, supports daisy chaining to reduce cabling requirements
Front access	All adapters and drives are accessible from the front of the server. Front ports include KVM breakout connector and External Diagnostics Handset port for local management.
Rear access	2x RJ45 on the SMM management module in the enclosure for XCC with daisy chain support; USB 2.0 for SMM FFDC log collection
Power Supply	6x hot-swap power supplies, either 1800W or 2400W, supporting N+1 redundancy
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 V2, contact your Lenovo representative or Business Partner or visit www.lenovo.com/thinksystem. For detailed specifications, consult the [SD650 V2 product guide](#).

§ Based on Lenovo internal testing.

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