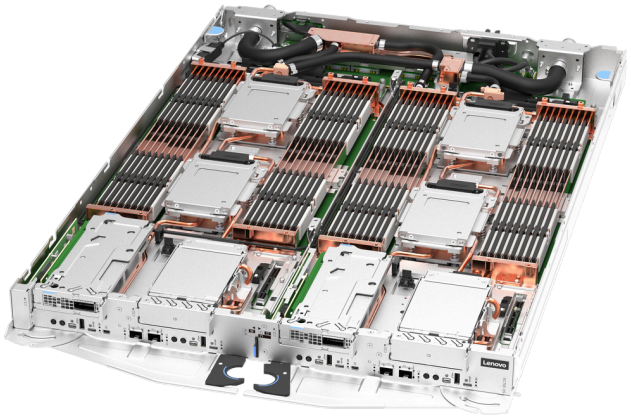
Lenovo ThinkSystem SC755 V5

Empowering Exascale to Everyscale™: Your Lenovo Neptune Supercomputer featuring 6th Generation AMD EPYC™ 9006 SP7 Server CPUs.



Revolutionary Lenovo Neptune® Design

The Lenovo ThinkSystem SC755 V5 Neptune® redefines modern supercomputing infrastructure. Combining breakthrough thermal engineering with high-density compute design, it enables researchers, engineers, and innovators to accelerate discovery while reducing operational complexity.

Powered by Lenovo Neptune® liquid-cooling technology, the system utilizes direct warm-water cooling to efficiently remove 100% of the system heat. This innovative approach enables higher sustained performance, exceptional energy efficiency, and quieter system operation when compared to conventional air-cooled designs.

Integrated into the ThinkSystem N1380 Neptune® chassis with patented blind-mate dripless connections, the SC755 V5 is designed to slide into the N1380 and connect to power, water and network without tools or connecting any cables, for simplified serviceability, rapid deployment, and seamless scalability. Each N1380 supports eight compute trays, with three chassis per standard 19” rack. The ThinkSystem SC755 V5 can be the building block of the world's most advanced supercomputing environments.

Optimal Performance for HPC Workloads

Supporting the 6th Generation AMD EPYC™ SP7 Server processor, the Lenovo ThinkSystem SC755 V5 is purpose-built for next-generation HPC and AI environments. Lenovo's industry-leading Neptune direct water-cooling technology enables sustained operation of high-core-count processors at up to 600W TDP, maximizing performance while improving energy efficiency for the most demanding compute-intensive workloads.

The EPYC™ SP7 processor, boasting up to 256 Performance-cores, delivering a significant increase in computational throughput over previous generations. Preliminary performance projections indicate up to 2x or greater improvements across key industry-standard benchmarks, including floating-point, integer, dense linear algebra, and memory bandwidth performance.

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AMD EPYC

These capabilities make the platform exceptionally well suited for highly parallel scientific and technical computing domains, including molecular dynamics, computational chemistry, materials science, physics research, engineering simulation, and weather and climate modeling. Representative applications include NAMD, GROMACS, LAMMPS, CP2K, Quantum ESPRESSO, OpenFOAM, OpenRadioss, and WRF.

In addition to standard memory DIMMs, the EPYC™ SP7 architecture also introduces support for next-generation MRDIMM memory operating at speeds of up to 12,800 MT/s, significantly increasing memory bandwidth for data-intensive HPC and AI applications.

Preliminary projections demonstrate more than 2x higher memory bandwidth performance versus the previous generation, helping accelerate memory-bound workloads common in weather forecasting, computational fluid dynamics, finite element analysis, and large-scale scientific simulation. This flexibility enables customers to tailor the SC755 V5 Neptune to a wide range of HPC and AI deployment requirements.

Completing the platform is support for high-performance NVMe storage and the latest generation of high-speed, low-latency networking technologies, including InfiniBand, Omni-Path, and Ethernet. Together, these capabilities make the ThinkSystem SC755 V5 Neptune a comprehensive solution for modern HPC and AI workloads, delivering the compute, memory, storage, and networking performance required for next-generation research, simulation, and AI innovation.

Emerging Agentic AI Workloads

Beyond traditional HPC and AI applications, SC755 V5 provides the CPU compute infrastructure required for agent runtimes, workflow orchestration, retrieval services, and tool-based execution environments. High core density, large memory capacity, and flexible multi-node configurations enable scalable deployment of emerging agentic AI architectures.

Lenovo Dynamic Partitioning™

The ThinkSystem SC755 V5 allows customers to repartition the two systems on a compute tray from two-processor systems into two discrete one-processors systems, for a total of four single processor systems per tray. This allows for more efficient use of compute resources for smaller HPC or Agentic AI workloads that do not require high core counts.

Simplifying System Management and Operation

The Lenovo ThinkSystem SC755 V5 Neptune is equipped with the new XClarity Controller 4 (XCC4). Leveraging the power of OpenBMC, XCC4 combines the flexibility of open-source with Lenovo's advanced capabilities, offering an unprecedented level of efficiency and control in system management. XCC4 advanced security features include Post-Quantum Security Readiness, for future-ready cryptography that helps protect against advance cybersecurity threats, and Advanced Platform Hardening, for enhanced OS-level protections that reduce attack surfaces.

For higher level management and orchestration, the Lenovo HPC & AI Software Stack provides a fully tested and supported open-source software environment. It enables your administrators and users to utilize Lenovo's supercomputing capabilities in the most effective and environmentally sustainable manner.

Modern HPC and AI infrastructures continue to grow in scale and complexity. Administrators need a management platform that can provision, monitor, secure, and maintain large-scale server fleets while reducing operational overhead and time-to-production.

Our Confluent management Software is an open-source cluster provisioning and management platform developed by Lenovo for large-scale HPC and AI environments. It provides a unified framework for hardware discovery, bare-metal provisioning, operating system deployment, lifecycle management, and automation.

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Lenovo Neptune® Technology

Since 2012, Lenovo's direct water-cooling has consistently led the industry with advanced cooling innovations. The dedication to quality-engineering and performance-design is demonstrated by over a decade of delivering reliable water-cooled solutions worldwide.

Lenovo Neptune utilizes superior materials, including custom copper water loops and patented CPU cold plates, for full system water-cooling. Unlike systems that use low-quality FEP plastic, Neptune features durable stainless steel and reliable EPDM hoses. N1380 features an integrated manifold that offers a patented blind-mate mechanism with aerospace-grade drip-less connectors to the compute trays, ensuring safe and seamless operation.

Neptune is designed to operate at water inlet temperatures as low as the dew point allows, up to 45°C. This design eliminates the need for additional chilling and allows for efficient reuse of the generated heat energy in building heating or adsorption cold water generation. It uses treated de-ionized water as a coolant, a much safer and more efficient alternative to the commonly used PG25 Glycol liquid, reflecting our commitment to environmental responsibility.

Compared to an equivalent air-cooled system, the ThinkSystem SC755 V5 Neptune provides:

- Up to 40% data center energy use reduction from server and infrastructure
- Up to 100% heat removal by water directly on the heat sources
- Up to 100% noise reduction by server fans in the data center

Streamlined Infrastructure for Every Scale

Each 13U Lenovo ThinkSystem N1380 Neptune enclosure houses eight Lenovo ThinkSystem SC755 V5 Neptune trays. Up to three N1380 enclosures fit into a standard 19″ rack cabinet, packing 24 trays, 48 nodes, 96 processors with over 24,000 compute cores, and 192TB of DDR5 Memory into just two 60x60 datacenter floor tiles.

Beyond Neptune liquid cooling, the N1380 enclosure integrates up to four 15kW Titanium Power Conversion Stations (PCS), internal 48V power distribution, and water distribution infrastructure into a unified design, reducing infrastructure complexity and streamlining power, cooling, and cabling within the datacenter.

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Specifications

Form Factor	• 2 nodes in one vertical 21" compute tray • 16 nodes per enclosure (N1380)
Chassis	• 8 compute trays per 13U Enclosure (N1380) for 19" rack cabinets • Up to 3 enclosures per rack
Processors	2x 6th Generation AMD EPYC™ 9006 SP7 Server CPUs, up to 256 cores
Memory	• 16 memory channels per CPU • Up to 4TB using 32x 128GB 8000MHz RDIMMs or 12800MHz MRDIMM per node
I/O Expansion	Up to 2x PCIe Gen6 x16 low-profile adapter slots per node for NVIDIA NDR InfiniBand with support for Shared I/O and SocketDirect
Internal Storage	Up to 6x E3.S SSDs per node; two in place of low-profile adapter each, two on CPU coldplate
RAID Support	OS level RAID
Network Interfaces	Two onboard Ethernet interfaces: • 2x 25GbE SFP28 LOM (10Gb or 25Gb capable; supports NC-SI)
Power Management	Advanced power monitoring, management, and power capping capabilities via Lenovo XClarity Energy Manager (LXEM)
Systems Management	• 1x DC-SCM with XClarity Controller (XCC) 4 per node based on OpenBMC with support for TPM 2.0 for advanced cryptographic functionality per node. Embedded chip for Root of Trust (RoT) - the server can only be booted with Lenovo trusted firmware. • 1x System Management Module (SMM) 3 in the enclosure connected directly to server BMCs • Orchestration and Management using Lenovo HPC & AI Software stack and Confluent open-source cluster management software.
Front access	All adapters and drives are accessible from the front of the server. Front ports include: • Network interfaces, Power button, USB-C for USB data or DisplayPort video output, as well as on the DC-SCM 2x USB 3.0, 2x mini DP, and Location, Error, Status LEDs. Servers are inserted to the N1380 enclosure from the front.
Rear access	Water connection, Power and System Management Module (SMM3) are accessible from the rear of the enclosure populated by the server tray. Rear ports include: • 2x RJ45 on the SMM for XCC with daisy chain support and an USB-A for SMM FFDC log collection.
Power Supply	Up to 4x HS 15kW Titanium Power Conversion Stations (PCS) with fully balanced phases, N+1 redundancy. Each PCS providing a 32A 380-480V – or two PCS sharing a 63A 380-480V, 3-Phase IEC 60309 3P+N+E IP67 connection to Datacenter power.
Cooling Design	Direct water cooling at the heat source with treated clean water supporting inlet temperature from dew point to up to 45°C. Servers connected through blind mate quick disconnect to manifold in enclosure. Each enclosure providing an inlet and an outlet connection with dual-interlock FD83 ball valve.
OS Support	Red Hat, SUSE (Supported & Certified), Ubuntu (Partial Support & Certified) and Rocky Linux (Tested); Visit lenovopress.com/osig for more information.
Limited Warranty	• 3-year customer replaceable unit and onsite limited warranty • Next business day 9 to 5 • Service extensions and upgrades available

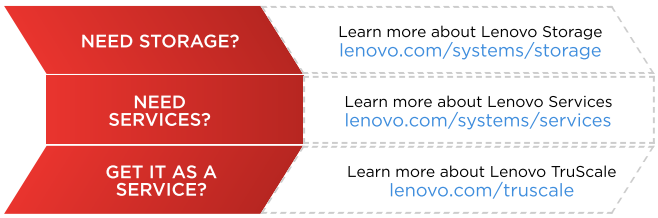
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About Lenovo

Lenovo is a US$83 billion revenue global technology powerhouse, ranked #153 in the Fortune Global 500, and serving millions of customers every day in 180 markets. Guided by its **vision** of "Smarter Technology for All", Lenovo is executing a **Hybrid AI strategy** that spans Personal AI – one personal AI, multiple devices; and Enterprise AI – helping customers turn data into insights and value. This strategy is delivered through the Group's commitment to **world-class innovation** and a full-stack AI portfolio, including devices, infrastructure solutions, software, and services. Lenovo is widely recognized for its **operational excellence**, with a global footprint spanning more than 20 R&D locations and a supply chain that includes more than 30 manufacturing sites across 10 markets.

For More Information

To learn more about the ThinkSystem SC755 V5, contact your Lenovo representative or Business Partner or visit www.lenovo.com/thinksystem. For detailed specifications, consult the SC755 V5 product guide.



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