

## What's New - ThinkSystem SR665 and SR645

### Article

Lenovo has announced two new servers, the ThinkSystem SR665 and SR645, based on AMD EPYC 7002 processors. The 2U SR665 and 1U SR645 have up to 128 cores, up to 4TB of system memory, and 128 PCIe Gen4 lanes, to maximize compute capacity in the data center.

### ThinkSystem SR665

The Lenovo ThinkSystem SR665 server, with AMD EPYC 7002 Series processors, delivers outstanding TCO for transactional database, ERP, virtualization, big data & analytics and software-defined deployments. The combination of two EPYC processors with class-leading memory speed, storage, and GPU density rapidly outpaces the power of prior-generation two-socket servers. It offers an unprecedented 128 total cores with 128 PCIe Gen4 lanes to reduce bottlenecks and increase server utilization.



Figure 1. Lenovo ThinkSystem SR665

#### Key features:

- 128 cores across two processors to handle heavy-lift ERP, CRM, and virtualization workloads; provides cutting edge application efficiency in health care applications such as medical imaging, EMR, and PACS, or electronic trading platforms for financial services applications.
- Multi-GPU optimized rack server, providing support for up to 8 single-wide GPUs that offer more workload acceleration in AI Inference, and virtualized desktop infrastructure (VDI).
- Support for up to 32 NVMe solid-state drives; when paired with high speed networking, make the system an excellent choice for workloads that need large amounts of low-latency high-bandwidth storage, including virtualized clustered SAN solutions, software-defined storage (SDS), and applications leveraging NVMe over Fabrics.

Learn more about the SR665 with these resources:

- [Datasheet](#)
- [Walkthrough video](#) (the "social distancing" edition)
- [3D Tour](#)
- [Product Guide](#)
- [Product web page](#)

## ThinkSystem SR645

The Lenovo ThinkSystem SR645 is a 2-socket 1U server that features the AMD EPYC 7002 family of processors. With up to 64 cores per processor and support for the new PCIe 4.0 standard for I/O, the SR645 offers the ultimate in two-socket server performance in a space-saving 1U form factor. The server is ideal for dense workloads that can take advantage of GPU processing and high-performance NVMe drives.



Figure 2. Lenovo ThinkSystem SR645

Key features:

- 128 cores across two processors for ERP, CRM, and virtualization workloads; provides cutting edge application efficiency in database applications, or electronic trading platforms for financial services applications.
- Compact 1U server with dense NVMe storage is an ideal platform for software defined storage or a hyperconverged solution
- Class-leading core density in the 1U form factor coupled with high speed 3200 MHz memory and PCIe Gen4 IO makes an ideal platform for advanced analytics

Learn more about the SR645 with these resources:

- [Datasheet](#)
- [Walkthrough video](#) ("social distancing" edition)
- [3D Tour](#)
- [Product Guide](#)
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## Performance Benchmarks

Here are the 39 #1 benchmarks that the SR665 and SR645 have achieved:

- [SAP SD Two-Tier result for SR665 on Windows](#)
- Five SPECmpiM results on SR665: [1-node](#), [2-node](#), [3-node](#), [5-node](#), [6-node](#)
- Six SPECmpiL results on SR665: [1-node](#), [2-node](#), [3-node](#), [4-node](#), [5-node](#), [6-node](#)
- Three SPECaccel results on SR665:
  - [2-socket SPEC ACCEL OpenACC](#)
  - [1-socket SPEC ACCEL OpenACC](#)
  - [2-socket SPEC ACCEL OpenMP](#)
- 14 SPECcpu results:
  - [10 results for the SR645](#)
  - [4 results for the SR665](#)
- 5 SPECjbb results:
  - [1 result for the SR645](#)
  - [4 results for the SR665](#)
- 1 new [SPECCompG result on SR665](#)
- 4 SPECpower results:
  - [2U 2-socket on Windows](#) - SR665
  - [2U 2-socket on Linux](#) - SR665
  - [1U 2-socket on Windows](#) - SR645
  - [1U 2-socket on Linux](#) - SR645

To see a summary of all #1 benchmarks that Lenovo ThinkSystem servers have achieved, see the article "Lenovo ThinkSystem Servers Continue to Lead the Industry in Performance and Customer Value", <https://lenovopress.com/lp1145>.

## ThinkAgile MX1021 Certified Node

Lenovo ThinkAgile MX1021 Certified Node for Microsoft Azure Stack HCI is designed for deploying a highly available, 2-node hyper-converged infrastructure (HCI) from Microsoft on purpose-built Lenovo edge servers in the remote offices/branch offices (ROBO) and at the edge.

The ThinkAgile MX1021 Certified Nodes deliver fully validated and integrated Lenovo hardware and firmware that is certified for Microsoft Azure Stack HCI solutions.



Figure 3. Lenovo ThinkAgile MX1021 Certified Node

The ThinkAgile MX1021 Certified Nodes are optimized for various types of edge and ROBO workloads that need compute power, data storage, and network closer to where data is generated, such as IoT, and require small compute footprint and operations in rugged environments.

Learn more about the MX1021 with these resources:

- [Article "A New Class of Edge Servers from Lenovo, Powered with Azure Stack HCI"](#)
- [Datasheet](#)
- [3D Tour](#)
- [Product Guide](#)
- [ThinkAgile MX Product web page](#)

## New 7mm hot-swap drive offerings

Both the SR665 and SR645 include support for a new 7mm form-factor hot-swap drive. These hot-swap SSDs are 2.5-inches wide but only 7mm thick, and two drives can be installed in the space of just one PCIe slot.



Figure 4. 7mm drives installed in an SR665

These 7mm drives can be used as additional data drives, but the typical use will be as a RAID-1-protected boot drive. The advantage of using the 7mm drives for boot drives instead of M.2 drives (which the server also supports), is that the 7mm drives are hot-swap and in the case of a drive failure, can easily be replaced without opening the server.

## New RAID controllers and HBAs

Also announced are new PCIe 4.0 RAID adapters and HBAs. PCIe 4.0 (PCIe Gen4) doubles the bandwidth of each lane which means these adapters have greater performance compared to their PCIe 3.0 equivalents.

- RAID adapters for internal drives:
  - ThinkSystem RAID 940-8i 4GB Flash PCIe Gen4 12Gb Adapter, 4Y37A09728
  - ThinkSystem RAID 940-8i 8GB Flash PCIe Gen4 12Gb Adapter, 4Y37A09729
  - ThinkSystem RAID 940-16i 8GB Flash PCIe Gen4 12Gb Adapter, 4Y37A09730
  - ThinkSystem RAID 940-16i 8GB Flash PCIe Gen4 12Gb Internal Adapter, 4Y37A09735
  - ThinkSystem RAID 940-32i 8GB Flash PCIe Gen4 12Gb Adapter, 4Y37A09733
- HBAs for internal drives or external storage connectivity
  - ThinkSystem 440-16i SAS/SATA PCIe Gen4 12Gb Internal HBA, 4Y37A09725
  - ThinkSystem 440-16e SAS/SATA PCIe Gen4 12Gb HBA, 4Y37A09724

The announcement includes two Internal Adapters (look for Internal in the name). These adapters are cabled adapters rather than installing in a PCIe slot, meaning that they don't consume a PCIe slot in the rear of the server. The following figure shows the RAID 940-16i 8GB Internal Adapter installed in the SR665.



Figure 5. ThinkSystem RAID 940-16i 8GB Flash PCIe Gen4 12Gb Internal Adapter

Details of these adapters can be found in the new product guides:

- [Lenovo ThinkSystem RAID 940 Series Internal RAID Adapters](#)
- [Lenovo ThinkSystem 440-16i Internal SAS HBA](#)
- [Lenovo ThinkSystem 440-16e External SAS HBA](#)

All RAID adapters and HBAs can be compared in the new [Lenovo ThinkSystem RAID Adapter and HBA Reference](#).

## New Ethernet and Fibre Channel adapters

We announced the following new Ethernet and Fibre Channel adapters:

- 10GBASE-T Ethernet adapters
  - ThinkSystem Broadcom 57416 10GBASE-T 2-port + 5720 1GbE 2-port OCP Ethernet Adapter, 4XC7A08239
  - ThinkSystem Broadcom 57416 10GBASE-T 2-port OCP Ethernet Adapter, 4XC7A08236
  - ThinkSystem Broadcom 57454 10GBASE-T 4-port OCP Ethernet Adapter, 4XC7A08240
  - ThinkSystem Broadcom 57454 10GBASE-T 4-port PCIe Ethernet Adapter, 4XC7A08245
- 25Gb Ethernet adapters
  - ThinkSystem Broadcom 57454 10/25GbE SFP28 4-port PCIe Ethernet Adapter, 4XC7A08241
- 32Gb Fibre Channel adapters
  - ThinkSystem QLogic QLE2770 32Gb 1-Port PCIe Fibre Channel Adapter, 4XC7A08279
  - ThinkSystem QLogic QLE2772 32Gb 2-Port PCIe Fibre Channel Adapter, 4XC7A08276

The following figure shows the ThinkSystem Broadcom 57416 10GBASE-T 2-port + 5720 1GbE 2-port OCP Ethernet Adapter, which has two 10GbE ports and two Gigabit ports, in the OCP 3.0 form factor.



Figure 6. ThinkSystem Broadcom 57416 10GBASE-T 2-port + 5720 1GbE 2-port OCP Ethernet Adapter

Learn about these new adapters in these new and updated product guides:

- [ThinkSystem Broadcom 57416 10GBASE-T Ethernet Adapters](#)
- [ThinkSystem Broadcom 57454 10GBASE-T Ethernet Adapters](#)
- [ThinkSystem Broadcom 57454 10/25GbE SFP28 Ethernet Adapters](#)
- [ThinkSystem QLogic 2770 Series 32Gb Fibre Channel Adapters](#)

## New HDDs, SSDs and Flash Storage Adapters

We've also announced the following storage devices:

- HDDs
  - New 12Gb SAS and 6Gb SATA HDDs for the SR635 server
- 2.5-inch and 3.5-inch SSDs:
  - ThinkSystem Multi Vendor Entry SATA 6Gb Hot Swap SSDs
  - [ThinkSystem PM1733 Entry NVMe PCIe 4.0 x4 SSDs](#)
- Flash storage adapters:
  - [ThinkSystem PM1735 Mainstream NVMe PCIe 4.0 x8 Flash Adapters](#)
  - [ThinkSystem Kioxia CM5-V Mainstream NVMe PCIe 3.0 x4 Flash Adapters](#)

The following figure show the PM1735 flash adapter with a PCIe 4.0 x8 host interface for maximum sequential bandwidth performance. Available in 1.6TB and 3.2TB capacities.



Figure 7. PM1735 Mainstream NVMe Flash Adapters

The following pages provide a summary of HDDs and SSDs:

- [Lenovo ThinkSystem HDD Summary](#)
- [Lenovo ThinkSystem SSD Portfolio](#)

## Related product families

Product families related to this document are the following:

- [ThinkSystem SR645 Server](#)
- [ThinkSystem SR665 Server](#)

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