



## Lenovo ThinkSystem SR655 Server

### Product Guide

The Lenovo ThinkSystem SR655 is a 1-socket 2U server that features the new AMD EPYC 7002 "Rome" family of processors. With up to 64 cores per processor and support for the new PCIe 4.0 standard for I/O, the SR655 offers the ultimate in single-socket server performance. With up to 128 PCIe lanes, the server is ideal for workloads that can take advantage of GPU processing and high-performance NVMe drives.

Suggested uses: AI Inference, VDI, OLTP, Analytics, software-defined storage



Figure 1. Lenovo ThinkSystem SR655

### Did you know?

By using a high-performance server with only one processor installed, you can take advantage of lower software costs when the software licensing is using a per-socket model.

The SR655 has been designed to take advantage of the features of the EPYC 7002 "Rome" processors, such as the full performance of 280W 64-core processors, support for 3200 MHz memory and PCIe Gen 4.0 support. Competitive servers that are based on the older EPYC 7001 "Naples" designs may not be able to offer these performance features.

## Key features

Combining performance and flexibility, the SR655 server is a great choice for enterprises of all sizes. The server offers a broad selection of drive and slot configurations and offers high performance features that industries such as finance, healthcare and telco need. Outstanding reliability, availability, and serviceability (RAS) and high-efficiency design can improve your business environment and can help save operational costs.

### Scalability and performance

The SR655 offers numerous features to boost performance, improve scalability and reduce costs:

- Supports the new AMD EPYC 7002 family of processors
- Supports processors with up to 64 cores and 128 threads, core speeds of up to 3.7 GHz, and TDP ratings of up to 280W.
- Support for up to 16 TruDDR4 memory DIMMs, with 8 memory channels and 2 DIMMs per channel. With 1 DIMM installed per channel (8 DIMMs total), memory operates at up to 3200 MHz. With 2 DIMMs per channel (16 DIMMs total), memory operating at up to 2933 MHz.
- Using 128GB 3DS DIMMs, the server supports up to 2TB of system memory.
- Supports 3 double-width GPUs up to 300W each, or 6 single-width GPUs up to 75W each. A 6:1 ratio of GPUs to CPUs means substantial processing power is available with just one CPU.
- Supports up to 32x 2.5-inch hot-swap drive bays, by using combinations of front-accessible (up to 24 bays), mid-accessible (up to 8), and rear-accessible (up to 4) drive bays.
- Supports 3.5-inch drive bays for lower-cost high-capacity storage. 2.5-inch and 3.5-inch drive bays can be mixed in several combinations.
- Supports 16x SATA drives using the onboard SATA controller (no additional adapter needed), enabling lower cost, high capacity storage solution for cold storage workloads.
- Supports up to 28x NVMe drives without oversubscription of PCIe lanes (1:1 connectivity), or up to 32x NVMe drives with a 2:1 oversubscription. The use of NVMe drives maximizes drive I/O performance, in terms of throughput, bandwidth, and latency.
- Supports high-speed RAID controllers from Broadcom providing 12 Gb SAS connectivity to the drive backplanes. A variety of RAID adapters are available, with cache and support for up to 24 drives on a single controller.
- Supports M.2 drives for convenient operating system boot functions or data storage. Available M.2 adapters support either one M.2 drive or two M.2 drives in a RAID 1 configuration for performance and reliability.
- The server has a dedicated industry-standard OCP 3.0 small form factor (SFF) slot, with a PCIe 4.0 x16 interface, supporting a variety of Ethernet network adapters. Simple-swap mechanism with thumbscrews and pull-tab enables tool-less installation and removal of the adapter. Supports shared BMC network sideband connectivity to enable out-of-band systems management.
- The server offers PCI Express 4.0 I/O expansion capabilities that doubles the theoretical maximum bandwidth of PCIe 3.0 (16GT/s in each direction for PCIe 4.0, compared to 8 GT/s with PCIe 3.0). A PCIe 4.0 x16 slot provides 64 GB/s bandwidth, enough to support a 400GbE network connection.
- A total of up to 9 PCIe 4.0 slots (8 with rear access, 1 internal for a RAID adapter) plus a slot dedicated to the OCP adapter.

## Availability and serviceability

The SR655 provides many features to simplify serviceability and increase system uptime:

- The server uses ECC memory and supports memory RAS features including Single Device Data Correction (SDDC, also known as Chipkill), Patrol/Demand Scrubbing, DRAM Address Command Parity with Replay, and DRAM Uncorrected ECC Error Retry.
- The server offers hot-swap drives, supporting RAID redundancy for data protection and greater system uptime.
- The M.2 SATA RAID Boot Adapter supports RAID-1 which enables two installed M.2 drives to be configured as a redundant pair.
- The server has up to two hot-swap redundant power supplies and six hot-swap redundant fans to provide availability for business-critical applications.
- The power-source-independent light path diagnostics uses LEDs to lead the technician to failed (or failing) components, which simplifies servicing, speeds up problem resolution, and helps improve system availability.
- Solid-state drives (SSDs) offer more reliability than traditional mechanical HDDs for greater uptime.
- The built-in ASPEED AST2500 baseboard management controller (BMC) continuously monitors system parameters, triggers alerts, and performs recovery actions in case of failures to minimize downtime.
- Proactive Platform Alerts: Voltage regulators, memory, fans, power supplies, server ambient and subcomponent temperatures. Alerts can be surfaced through the BMC to managers such as Lenovo XClarity Administrator. These proactive alerts let you take appropriate actions in advance of possible failure, thereby increasing server uptime and application availability.
- Web-based ThinkSystem System Manager (TSM) provides remote access to the BMC for remote management.
- Lenovo XClarity Provisioning Manager Lite (LXPM Lite) tool can be used to install an operating system on the server and perform system diagnostics.
- Three-year or one-year customer-replaceable unit and onsite limited warranty, 9 x 5 next business day. Optional service upgrades are available.

## Manageability and security

Systems management features simplify local and remote management of the SR655:

- Supports Lenovo XClarity Provisioning Manager Lite (LXPM Lite) for system setup and firmware upgrades.
- An integrated industry-standard Unified Extensible Firmware Interface (UEFI) enables improved setup, configuration, and updates, and simplifies error handling.
- Support for industry standard management protocols, IPMI 2.0, SNMP 3.0, Redfish REST API, serial console via IPMI
- An integrated hardware Trusted Platform Module (TPM) supporting TPM 2.0 enables advanced cryptographic functionality, such as digital signatures and remote attestation.
- Administrator and power-on passwords help protect from unauthorized access to the server.
- Support for Lenovo XClarity Energy Manager, which captures real-time power and temperature data from the server and integrates with Redfish-based applications to provide automated controls to lower energy costs.
- Supports AMD Secure Root-of-Trust, Secure Run and Secure Move features to minimize potential attacks and protect data as the OS is booted, as applications are run and as applications are migrated from server to server.
- Supports Secure Boot to ensure only a digitally signed operating system can be used.

- Industry-standard Advanced Encryption Standard (AES) NI support for faster, stronger encryption.

### **Energy efficiency**

The SR655 offers the following energy-efficiency features to save energy, reduce operational costs, and increase energy availability:

- Energy-efficient planar components help lower operational costs.
- High-efficiency power supplies with 80 PLUS Platinum and Titanium certifications
- Low-voltage 1.2 V DDR4 memory offers energy savings compared to 1.35 V and 1.5 V DDR3 DIMMs.
- Solid-state drives (SSDs) consume as much as 80% less power than traditional spinning 2.5-inch HDDs.
- The server uses hexagonal ventilation holes, which can be grouped more densely than round holes, providing more efficient airflow through the system and thus keeping your system cooler.
- Optional Lenovo XClarity Energy Manager provides power and thermal monitoring to help achieve lower heat output and reduced cooling needs.

## Components and connectors

The following figure shows the front of the server.

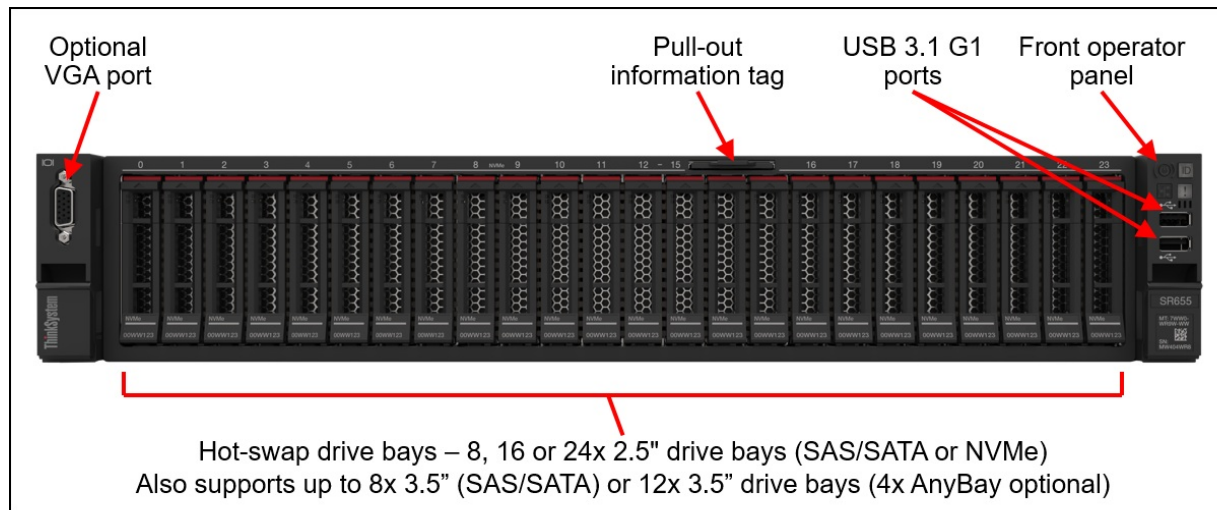


Figure 2. Front view of the Lenovo ThinkSystem SR655

The following figure shows the components visible from the rear of the server. As shown, there are three different configurations available

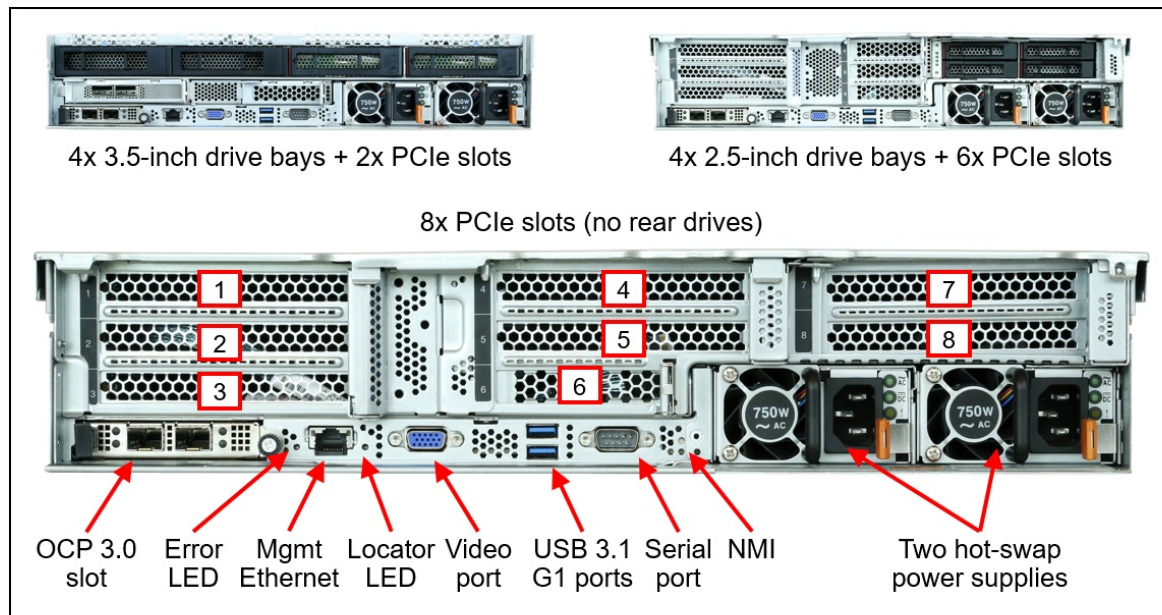


Figure 3. Rear view of the Lenovo ThinkSystem SR655

The following figure shows the locations of key components inside the server.

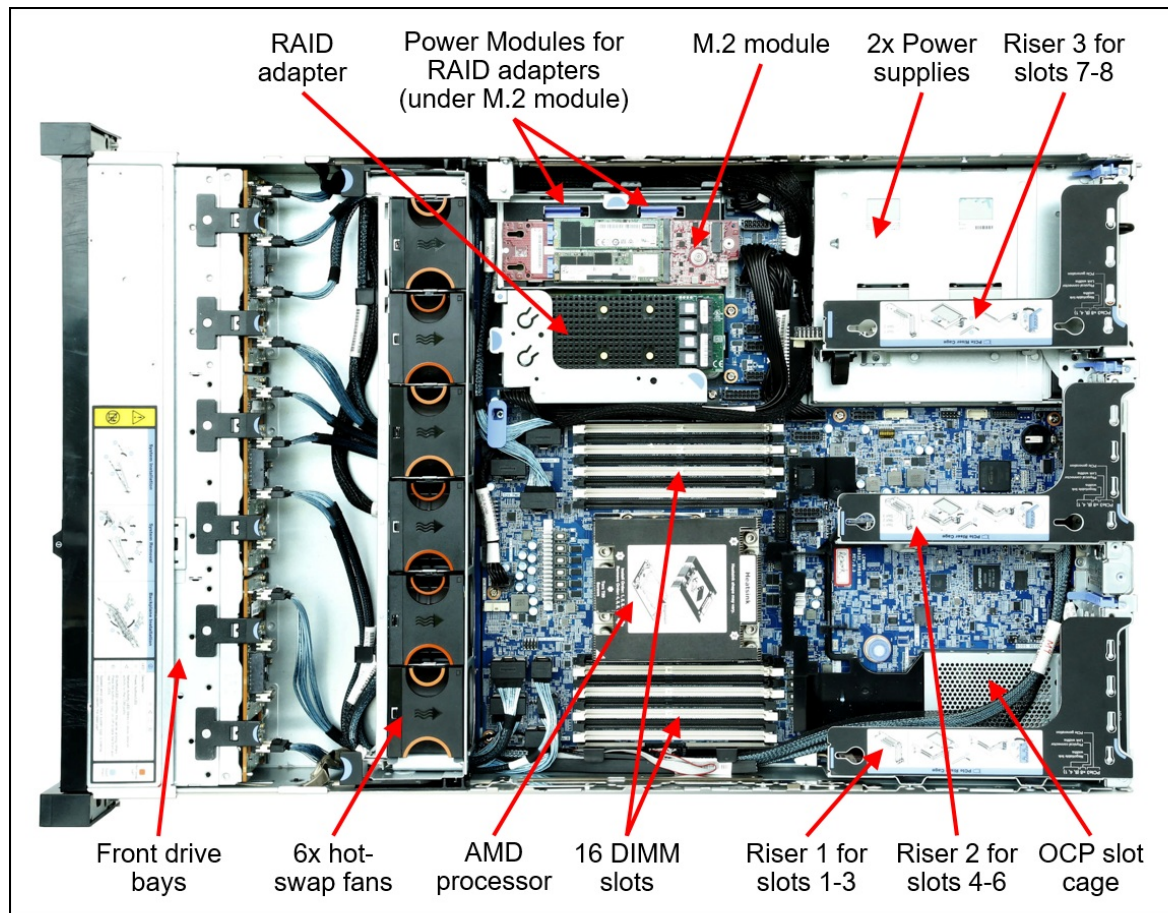


Figure 4. Internal view of the Lenovo ThinkSystem SR655

## System architecture

The following figure shows the architectural block diagram of the SR655, showing the major components and their connections.

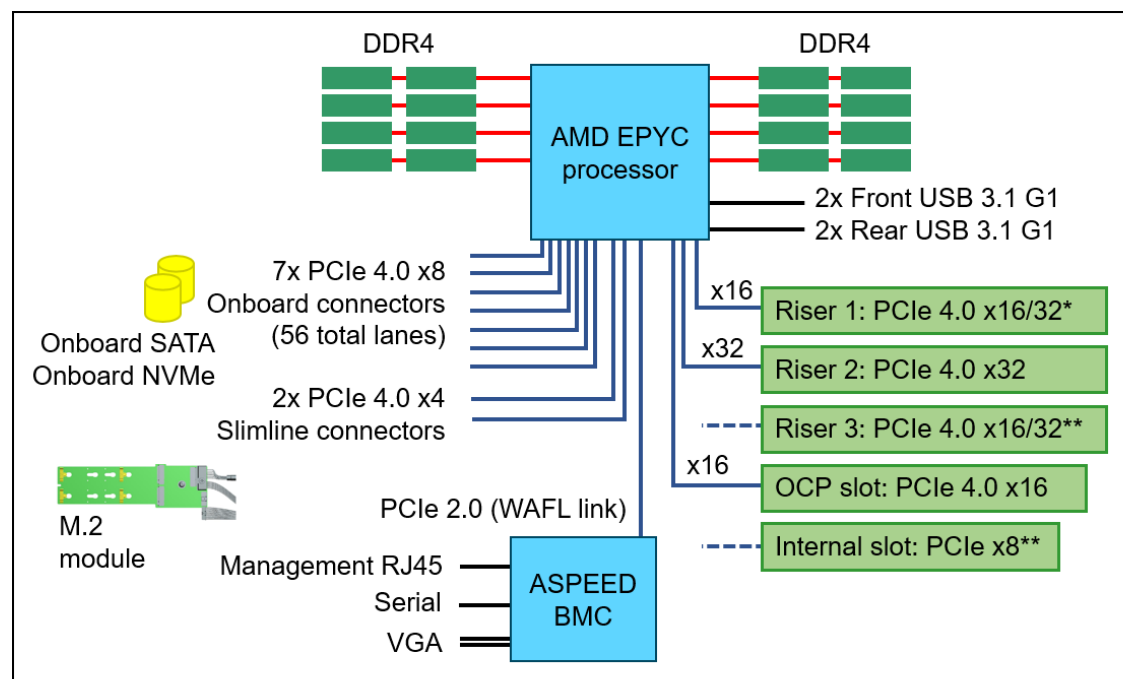


Figure 5. SR655 system architectural block diagram

\* Riser 1 has a x16 system board connection. For 32 lanes, the riser receives 16 lanes from two x8 onboard slimline connectors via cables

\*\* Riser 3 and Internal slot are connected to onboard connectors; no system board slots

## Standard specifications

The following table lists the standard specifications.

Table 1. Standard specifications

| Components        | Specification                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Machine types     | 7Y00 - 1 year warranty<br>7Z01 - 3 year warranty                                                                                                                                                                                                                                                                                                                                                 |
| Form factor       | 2U rack.                                                                                                                                                                                                                                                                                                                                                                                         |
| Processor         | One AMD EPYC 7002 Series processor (formerly codenamed "Rome"). Supports processors up to 64 cores, core speeds of up to 3.7 GHz, and TDP ratings of up to 280W.                                                                                                                                                                                                                                 |
| Memory            | 16 DIMM slots. The processor has 8 memory channels, with 2 DIMMs per channel. Lenovo TruDDR4 RDIMMs are supported. DIMMs are available in two speeds: 3200 MHz and 2933 MHz. With 3200 MHz memory, the server supports a 3200 MHz memory bus speed at 1 DIMM per channel (DPC) and 2933 MHz at 2 DPC. With 2933 MHz memory, the server supports a 2933 MHz memory bus speed at both 1 and 2 DPC. |
| Memory maximum    | Up to 2TB with 16x 128GB 3DS RDIMMs                                                                                                                                                                                                                                                                                                                                                              |
| Persistent memory | Not supported.                                                                                                                                                                                                                                                                                                                                                                                   |

| Components               | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Memory protection        | ECC, SDDC, Patrol/Demand Scrubbing, DRAM Address Command Parity with Replay, DRAM Uncorrected ECC Error Retry, Post Package Repair                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Disk drive bays          | <p>Up to 20x 3.5-inch or 32x 2.5-inch hot-swap drive bays:</p> <ul style="list-style-type: none"> <li>• Front: up to 12x 3.5-inch or 24x 2.5-inch, hot-swap bays</li> <li>• Mid (internal): up to 4x 3.5-inch or 8x 2.5-inch, hot-swap bays</li> <li>• Rear: up to 4x 3.5-inch or 4x 2.5-inch hot-swap bays</li> </ul> <p>With 2.5-inch drive bays, mid (internal) bays and rear drives are mutually exclusive. See <a href="#">Supported drive bay combinations</a> for details. Mid bays are hot-swap drive bays and are accessible by removing the top cover of the server. 4x 3.5-inch front drive bays can be configured as AnyBay supporting SAS, SATA or NVMe. 2.5-inch drive bays can be configured as NVMe, supporting 28x NVMe drives with direct connections (no oversubscription), or 32x NVMe drives with 2:1 oversubscription.</p> |
| Maximum internal storage | <ul style="list-style-type: none"> <li>• All NVMe: 184.32 TB using 24x 6.4 TB NVMe (front) + 8x 3.84TB NVMe SSDs (mid)</li> <li>• All SSDs: 245.76 TB using 32x 7.68TB SSDs (24x front, 8x mid)</li> <li>• All HDDs: 280 TB using 20x 14TB 3.5-inch HDDs (12x front, 4x mid, 4x rear)</li> <li>• Mix of SSDs/HDDs supported but not in the same array</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Storage controller       | <ul style="list-style-type: none"> <li>• Onboard SATA supporting up to 16 SATA drives (no RAID)</li> <li>• 12 Gb SAS/SATA RAID adapters: <ul style="list-style-type: none"> <li>◦ RAID 530i (cacheless) supports RAID 0, 1, 10, 5, 50</li> <li>◦ RAID 730-8i with 1GB cache supports RAID 0, 1, 10, 5, 50</li> <li>◦ RAID 730-8i with 2GB flash-backed cache supports RAID 0, 1, 10, 5, 50, 6, 60</li> <li>◦ RAID 930-8i with 2GB flash-backed cache supports RAID 0, 1, 10, 5, 50, 6, 60</li> <li>◦ RAID 930-16i and 24i with 4GB or 8GB flash-backed cache supports RAID 0, 1, 10, 5, 50, 6, 60</li> </ul> </li> <li>• 12 Gb SAS/SATA non-RAID: 430-8i and 430-16i HBAs</li> </ul>                                                                                                                                                             |
| Optical drive bays       | No internal optical drive.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Tape drive bays          | No internal backup drive.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Network interfaces       | Dedicated OCP 3.0 SFF slot with PCIe 4.0 x16 host interface. Supports a variety of 2-port and 4-port adapters with 1GbE, 10GbE and 25GbE network connectivity. One port can optionally be shared with the ASPEED management processor for Wake-on-LAN and NC-SI support.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

| Components                  | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PCI Expansion slots         | <p>A total of up to 9 PCIe 4.0 slots (8 with rear access, 1 internal for a RAID adapter) plus a slot dedicated to the OCP adapter. Slot availability is based on riser selection.</p> <p>Slot length is dependent on the use of a mid-chassis drive cage: If the mid drive cage is present then slots are half-length; if the mid drive cage is not present, then slots are full-length.</p> <ul style="list-style-type: none"> <li>• Riser 1: Slots 1, 2 and 3 - all FHHL or FHFL (16 or 32 lanes) <ul style="list-style-type: none"> <li>◦ Option 1*: 1=x16, 2=x8, 3=x8</li> <li>◦ Option 2*: 1=x16, 2=x16 (no slot 3)</li> <li>◦ Option 3: 3=x16 (no slot 1 or slot 2)</li> <li>◦ Option 4: 1=x16 (no slot 2 or slot 3)</li> </ul> </li> <li>• Riser 2: Slots 4, 5, and 6 - slot size varies (32 lanes) <ul style="list-style-type: none"> <li>◦ Option 1: 4=x16, 5=x8, 6=x8</li> <li>◦ Option 2: 4=x16, 5=x16 (no slot 6)</li> <li>◦ Option 3: 6=x16 (no slot 4 or slot 5)</li> </ul> </li> <li>• Riser 3: Slots 7 and 8 - both FHHL or FHFL (16 or 32 lanes) <ul style="list-style-type: none"> <li>◦ Option 1*: 7=x8, 8=x8</li> <li>◦ Option 2*: 7=x16, 8=x16</li> </ul> </li> <li>• Slot 9: Internal PCIe 4.0 x8 low-profile slot for internal drive controller</li> </ul> <p>* The use of 32 lanes with Riser 1 or the use of Riser 3 imposes restrictions on the use of the onboard SATA controller or the use of the M.2 Module or both. See the <a href="#">I/O expansion</a> section for details.</p> |
| Ports                       | <p>Front: Two USB 3.1 G1 (5 Gb/s) ports, optional VGA port.</p> <p>Rear: USB 3.1 G1 (5 Gb/s) ports, one VGA video port, one DB-9 serial port, and one RJ-45 1GbE systems management port.</p> <p>Internal: Optional M.2 module supporting up to two M.2 drives (for OS boot and drive storage support; not available in all configurations).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Cooling                     | Five or six N+1 redundant hot swap 60 mm fans, configuration dependent. One fan integrated in each power supply.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Power supply                | Up to two hot-swap redundant AC power supplies (all 80 PLUS Platinum certification): 550 W, 750 W, 1100 W and 1600 W AC options, supporting 220 V AC. 550 W, 750 W and 1100 W options also support 110V input supply. In China only, all power supply options support 240 V DC. Also available is a 1100W power supply with a -48V DC input.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Video                       | Onboard graphics with 512 MB memory with 2D hardware accelerator, integrated into the ASPEED AST2500 BMC management processor. Maximum resolution is 1920x1200 at 60Hz, 32bpp                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Hot-swap parts              | Drives, power supplies, and fans.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Systems management          | ASPEED AST2500 embedded management processor, XClarity Provisioning Manager Lite (LXPM Lite) for system setup and firmware upgrades. XClarity Administrator centralized infrastructure management, and XClarity Energy Manager centralized server power management. Light path diagnostics for local failure detection and reporting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Security features           | Power-on password, administrator's password, Trusted Platform Module (TPM), supporting TPM 2.0. In China only, optional Nationz TPM 2.0. Optional lockable front security bezel. Optional chassis intrusion switch.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Operating systems supported | Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, VMware ESXi. See the <a href="#">Operating system support</a> section for specifics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

| Components          | Specification                                                                                                                                                                                                                  |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Limited warranty    | Three-year or one-year (model dependent) customer-replaceable unit and onsite limited warranty with 9x5 next business day (NBD).                                                                                               |
| Service and support | Optional service upgrades are available through Lenovo Services: 4-hour or 2-hour response time, 6-hour fix time, 1-year or 2-year warranty extension, software support for Lenovo hardware and some third-party applications. |
| Dimensions          | Width: 445 mm (17.5 in.), height: 87 mm (3.4 in.), depth: 764 mm (30.1 in.). See <a href="#">Physical and electrical specifications</a> for details.                                                                           |
| Weight              | Maximum: 35.4 kg (78.0 lb)                                                                                                                                                                                                     |

## Models

ThinkSystem SR655 models can be configured by using the Lenovo Data Center Solution Configurator (DCSC), <https://dcsc.lenovo.com>.

Server models are region-specific; that is, each region may define their own server models, and not all server models are available in every region. Configure-to-order (CTO) models can also be created for factory-integrated server customization. The following table lists the base CTO models of the ThinkSystem SR655 server.

Table 2. Base CTO models

| Description                         | Machine Type/Model |
|-------------------------------------|--------------------|
| ThinkSystem SR655 - 3 year Warranty | 7Z01CTO1WW         |
| ThinkSystem SR655 - 1 year Warranty | 7Y00CTO1WW         |

Models of the SR655 are defined based on whether the server has 2.5-inch drive bays at the front (called the 24x 2.5" chassis) or whether it has 3.5-inch drive bays at the front (called the 12x 3.5" chassis). For models, the feature codes for these chassis bases are as listed in the following table.

Table 3. Chassis base feature codes

| Feature code | Description                       |
|--------------|-----------------------------------|
| B5VK         | ThinkSystem SR655 12x3.5" Chassis |
| B5VJ         | ThinkSystem SR655 24x2.5" Chassis |

The following tables list the available models, grouped by region.

- [Models for Australia and New Zealand](#)
- [Models for South East Asian countries \(ASEAN\)](#)
- [Models for Brazil](#)
- [Models for EMEA countries](#)
- [Models for Hong Kong, Taiwan, Korea \(HTK\)](#)
- [Models for India](#)
- [Models for Japan](#)
- [Models for Latin American countries \(except Brazil\)](#)
- [Models for USA and Canada](#)

Refer to the Specifications section for information about standard features of the server.