Lenovo ThinkServer RD550 (E5-2600 v3)
Product Guide

The Lenovo ThinkServer RD550 is an enterprise class, dual-socket server that features Intel Xeon processor E5-2600 v3 product family and supports up to 768 GB of DDR4 memory, 18 cores, and 36 threads per socket.

With the capability to support mix and match internal hard disk drive (HDD) and solid-state drive (SSD) storage with up to 12x 2.5-inch front drive bays, up to five I/O slots with up to 140 GbE networking capability, up to 8 hot-swap dual rotor fans, hot-swap redundant power supplies, and a dedicated Gigabit Ethernet out-of-band management port, the ThinkServer RD550 provides leading features and capabilities in a dense 1U rack-mount design.

The ThinkServer RD550 blends outstanding flexibility and expandability and is the ideal choice for server consolidation/virtualization, heavy web traffic workloads, data analytics, and line-of-business applications.

The ThinkServer RD550 server is shown in the following figure.

Figure 1. Lenovo ThinkServer RD550

Did you know?

Lenovo's distinctive AnyFabric design provides an array of powerful HBA, CNA and 1 Gbps and 10 Gbps Ethernet choices to address growing network bandwidth requirements without the use of a PCIe slot.

This storage-rich server provides up to 26 TB of storage capacity and features an Industry-unique Lenovo AnyBay design that allows multiple storage types in the same drive bay. M.2 and SD card options are available, which enable flexible boot drive choices.

The RD550 provides Lenovo AnyRAID technology, a midplane RAID adapter design that connects directly to the drive backplane without using a PCIe slot. A comprehensive portfolio of AnyRAID controllers is available for various applications, which include software, IO Controller, and RAID on Chip-based controllers.

The RD550 delivers impressive compute power per watt, featuring 80 PLUS Titanium and Platinum redundant power supplies. This server is designed to meet ASHRAE A4 standards, which enable customers to lower energy costs.

Key features

The ThinkServer RD550 offers the following key features:

- **Extremely versatile storage**

  Innovation is built in to the ThinkServer RD550. A cleverly engineered design allows more storage density and I/O connectivity than ever before — giving you the performance and capacity of a 2U system in a 1U form factor. By creating smaller drive trays and a slightly larger chassis within the same 1U space, the RD550 offers a total of up to 12 front drive bays, which can be used for data storage or better performance. Two additional enterprise-class M.2 SSDs are available as an option for secure booting, as well as SD card options for hypervisor booting. Plus, for ultimate performance, the industry-unique Lenovo AnyBay design allows multiple storage types in the same drive bay, including front-accessible PCIe SSD.

- **Highly flexible I/O**

  In the past, 1U servers were constrained by their size and did not have as many I/O slots as larger servers. With the new RD550, networking configurations that traditionally required a larger server can now fit into a 1U form factor. Leveraging the unique Lenovo AnyFabric design, the RD550 can house up to eight 10 Gb Ethernet ports — without taking up any of the available PCIe slots. If you include network adapters in the available slots, the RD550 can support an incredible amount of network bandwidth in a single 1U server. There's even an option for four 10 Gb Ethernet ports with two 16 Gb Fibre Channel ports at the same time, without using any of the PCIe slots — an industry first.

- **Extra-reliable performance**

  Data center cooling costs can be greater than the cost of powering the IT equipment itself. One way to reduce these cooling costs is by operating the data center at a higher temperature. With a dynamic environmental design, the RD550 can run continuously at 45 degrees Celsius — with no impact on reliability. In fact, the system has been carefully architected and tested to support long-term reliability. The RD550 is also perfect for organizations that install servers in less strictly controlled environments. Other high-reliability features include error correcting code (ECC) memory, hot-swap hard-disk drive and SSD capability, and hot-swap and redundant power and cooling.

  The RD550 supports new tools for easy configuration, deployment and power-planning. ThinkServer System Manager enables you to remotely and securely manage your servers via web browser. With the optional ThinkServer System Manager Premium, you can enhance your management functionality with remote keyboard, video, and mouse (KVM) access; and decrease your power usage with an included license for ThinkServer Energy Manager.

Components and connectors

The following figure shows the front of the RD550 3.5-inch drive bay models.

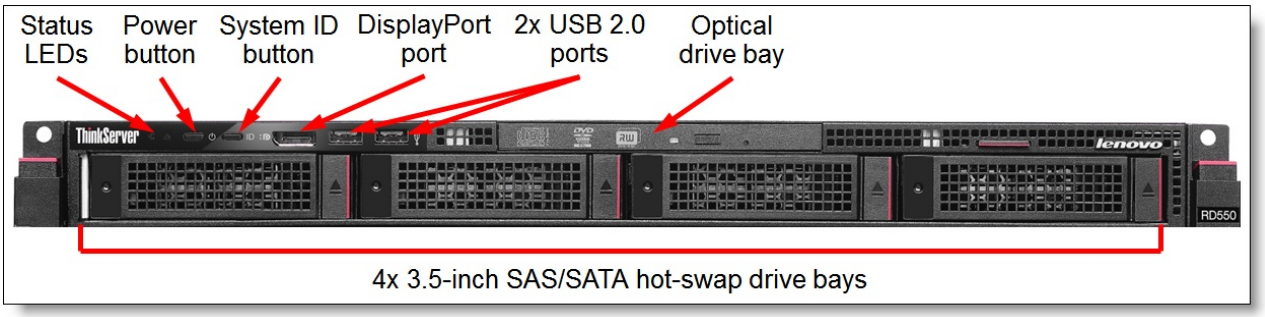

Figure 2. RD550 3.5-inch drive bay model front view

The following figure shows the front of the RD550 2.5-inch drive bay models.

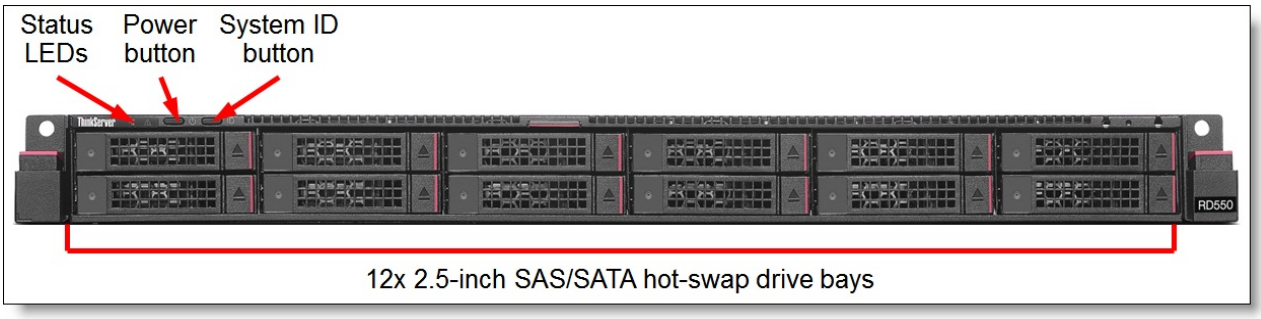

Figure 3. RD550 2.5-inch drive bay model front view

The following figure shows the rear of the RD550 3.5-inch drive bay models.

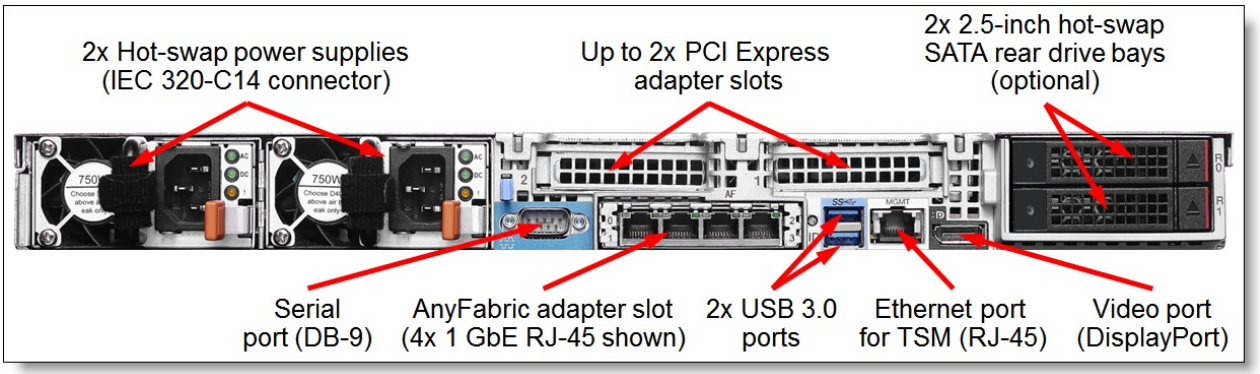

Figure 4. RD550 3.5-inch drive bay model rear view

The following figure shows the rear of the RD550 2.5-inch drive bay models.

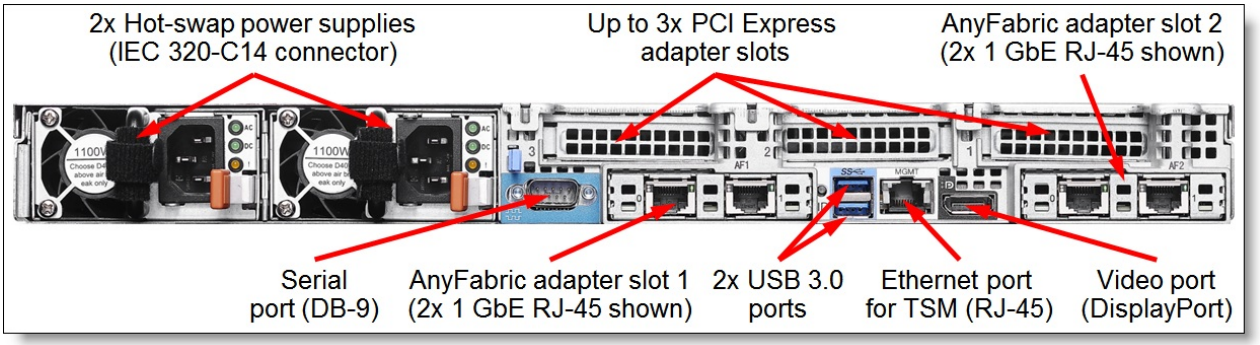

Figure 5. RD550 2.5-inch drive bay model rear view

The following figure shows the internal components of the RD550 3.5-inch drive bay models.

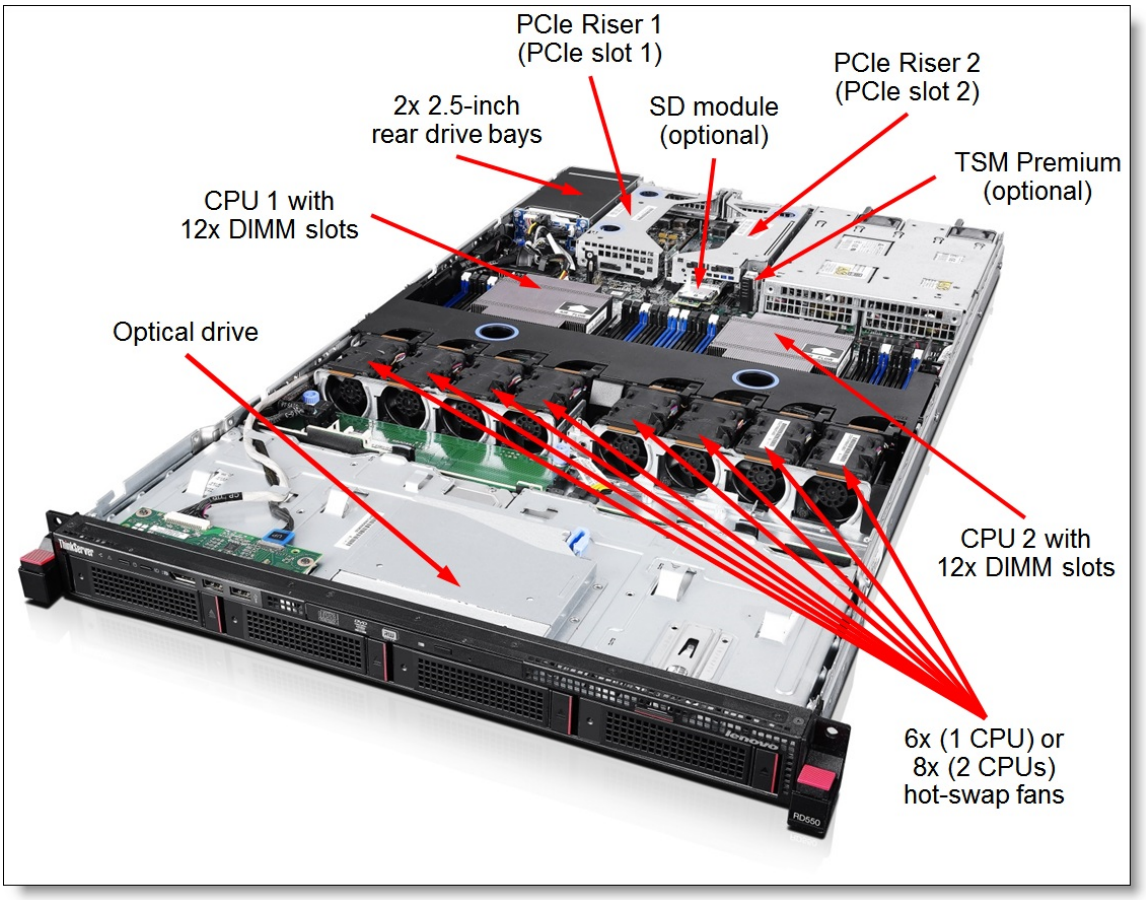

Figure 6. RD550 3.5-inch drive bay model internal view

The following figure shows the internal components of the RD550 2.5-inch drive bay models.

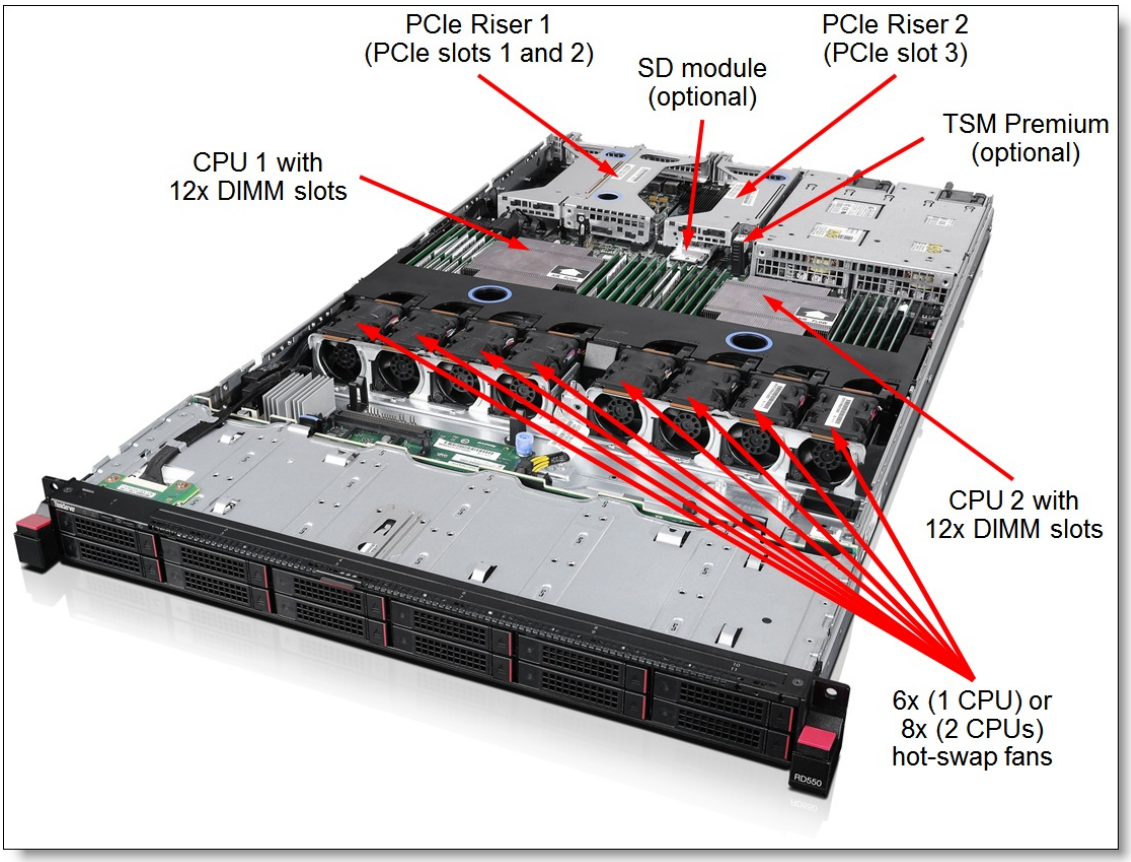

Figure 7. RD550 2.5-inch drive bay model internal view

System specifications

The following table lists the system specifications.

Table 1. System specifications

Components	Specification
Form factor	1U rack-mount
Processor	Up to two Intel Xeon processor E5-2600 v3 product family CPUs with 18 or 16 cores (2.3 GHz core speeds); or 14, 12, or 10 cores (up to 2.6 GHz core speeds); or 8 cores (up to 3.2 GHz core speeds); or 6 cores (up to 3.4 GHz core speeds); or 4 cores (up to 3.5 GHz core speeds). Two QPI links up to 9.6 GT/s each. Up to 2133 MHz memory speed. Up to 45 MB L3 cache.
Chipset	Intel C610 Series.
Memory	24 DIMM sockets (up to 12 DIMMs per processor). RDIMMs and LRDIMMs (Load Reduced DIMMs) are supported. Memory types cannot be intermixed. Memory speed up to 2133 MHz.
Memory maximums	Up to 768 GB with 24x 32 GB RDIMMs or LDIMMs and with two processors.
Memory protection	Error-correcting code (ECC), Patrol Scrubbing, Demand Scrubbing, Sparing, Mirroring, and Lockstep Mode.

Components	Specification
Drive bays	• 12x 2.5-inch SAS/SATA hot-swap front drive bays; or • 4x 3.5-inch SAS/SATA hot-swap front drive bays and optional 2x 2.5-inch SATA hot-swap rear drive bays.
Drive types	2.5-inch drives: • SAS HDDs up to 1.8 TB • Nearline (NL) SATA HDDs up to 2 TB • SAS SSDs up to 800 GB • SATA SSDs up to 1.6 TB • PCIe 3.0 SSDs up to 1.6 TB 3.5-inch drives: • SAS HDDs up to 1.8 TB • NL SAS HDDs up to 8 TB • NL SATA HDDs up to 8 TB • SAS SSDs up to 800 GB • SATA SSDs up to 1.6 TB M.2 Read-Optimized SSDs up to 120 GB. SD Cards up to 32 GB. Intermix of SAS and SATA HDDs and SSDs is supported within a system, but not within a RAID array.
Maximum internal storage	Up to 36 TB with 4x 8 TB 3.5-inch NL SATA HDDs and 2x 2 TB 2.5-inch NL SATA HDDs.
RAID support	• 6 Gbps SATA: RAID 0, 1, 10, and 5 with RAID 110i. • 6 Gbps SAS/SATA: RAID 0, 1, and 10 with RAID 510i. Optional RAID 5 and 50 upgrade is available. • 12 Gbps SAS/6 Gbps SATA: RAID 0, 1, 10, 5, and 50 with RAID 720i or 720ix. Optional (for 720i) or mandatory (for 720ix) cache memory upgrades are available: 1 GB non-backed; 1 GB, 2 GB, or 4 GB flash-backed. Cache upgrades include RAID 6 and 60 support. Flash backup upgrades include FastPath and CacheCade Pro 2.0 features.
Optical drive bays	• 2.5-inch models: None; support for an external optical drive. • 3.5-inch models: One; support for DVD-ROM or DVD-RW.
Tape drive bays	None.
Network interfaces	One (3.5-inch drive bay models) or two (2.5-inch drive bay models) AnyFabric slots for optional AnyFabric adapters: • Dual-port 10 GbE RJ-45 • Dual-port 10 GbE SFP+ • Quad-port 10 GbE SFP+ • Quad-port GbE RJ-45
I/O expansion slots	2.5-inch drive bay models: • Slot 1: PCIe 3.0 x8; low profile, half-length • Slot 2: PCIe 3.0 x8; low profile, half-length • Slot 3: PCIe 3.0 x16; low profile, half-length (requires the second CPU) 3.5-inch drive bay models: • Slot 1: PCIe 3.0 x16; low profile, half-length • Slot 2: PCIe 3.0 x16; low profile, half-length (requires the second CPU)

Components	Specification
Ports	• Front (3.5-inch drive bay models only): Two USB 2.0 ports, one DisplayPort video port. • Rear: Two USB 3.0 ports, one DisplayPort video port, one DB-9 serial port, one RJ-45 GbE management port for TSM.
Cooling	Six (with one CPU) or eight (with two CPUs) redundant hot-swap cooling fans with dual rotors.
Power supply	Up to two redundant hot-swap 550 W, 750 W, or 1100 W 100-240 V AC Platinum power supplies or 750 W 200-240 V AC Titanium power supplies.
Hot-swap parts	Drives, power supplies, and fans.
Systems management	UEFI, status and diagnostic LEDs, ThinkServer System Manager (TSM) (also known as Baseboard Management Controller [BMC]), ThinkServer EasyStartup, ThinkServer EasyUpdate, ThinkServer Power Planner, and ThinkServer Diagnostics. Optional TSM Premium upgrade for remote presence (keyboard, video, mouse, and remote drive) and ThinkServer Energy Manager support.
Security features	Administrator's password, optional Trusted Platform Module (TPM), optional intrusion switch.
Video	ASPEED AST2400 with 16 MB memory integrated into the ThinkServer System Manager. Maximum resolution is 1920x1200 at 60 Hz.
Operating systems	Microsoft Windows Server 2012 R2, 2012, and 2008 R2; Red Hat Enterprise Linux (RHEL) Server 6 and 7; SUSE Linux Enterprise Server (SLES) 11; VMware vSphere (ESXi) 5.1, 5.5, and 6.0.
Limited warranty	Three-year or one-year customer-replaceable unit (CRU) and on-site limited warranty with 9x5 next business day (NBD).
Service and support	Optional service upgrades (country-specific) are available through Lenovo Services offerings: 8-hour or 4-hour response time, warranty extension up to 5 years, Priority Technical Support, and Keep Your Drive Multi-Drive.
Dimensions	Height: 43 mm (1.7 in.), width: 447 mm (17.6 in.), depth: 780 mm (30.7 in.)
Weight	Minimum: 13.5 kg (29.8 lb), maximum: 21.0 kg (46.3 lb)

The RD550 server package includes the following items:

- RD550 server
- Rail kit
- Cable management arm (some models)
- One or two rack power cords or country-specific power cords
- *Read Me First* printed publication
- Rack installation instructions
- Documentation DVD containing the *RD550 User's Guide*

Relationship models

For a list of the RD550 relationship models, refer to the RD550 PSREF webpage (Machine Types 70CW and 70CY):
http://psref.lenovo.com/Product/24

TopSeller models

For a list of the RD550 TopSeller models, refer to the RD550 PSREF webpage (Machine Types 70CV and 70CX):
http://psref.lenovo.com/Product/24

Processors

The RD550 supports up to two processors. The following table lists the specifications of the processors that are available for the RD550.

Table 2. CPU specifications (HT = Hyper-Threading, TB = Turbo Boost, VT = Virtualization Technology)

Processor model	Core frequency (Base / TB Max)	Number of cores / threads	Cache	Max DDR4 frequency	QPI speed	TDP	HT	TB	VT-x	VT-d
E5-2603 v3	1.6 GHz	6 / 6	15 MB	1600 MHz	6.4 GT/s	85 W	No	No	Yes	Yes
E5-2609 v3	1.9 GHz	6 / 6	15 MB	1600 MHz	6.4 GT/s	85 W	No	No	Yes	Yes
E5-2620 v3	2.4 / 3.2 GHz	6 / 12	15 MB	1866 MHz	8 GT/s	85 W	Yes	Yes	Yes	Yes
E5-2623 v3	3 / 3.5 GHz	4 / 8	10 MB	1866 MHz	8 GT/s	105 W	Yes	Yes	Yes	Yes
E5-2630 v3	2.4 / 3.2 GHz	8 / 16	20 MB	1866 MHz	8 GT/s	85 W	Yes	Yes	Yes	Yes
E5-2630L v3	1.8 / 2.9 GHz	8 / 16	20 MB	1866 MHz	8 GT/s	55 W	Yes	Yes	Yes	Yes
E5-2637 v3	3.5 / 3.7 GHz	4 / 8	15 MB	2133 MHz	9.6 GT/s	135 W	Yes	Yes	Yes	Yes
E5-2640 v3	2.6 / 3.4 GHz	8 / 16	20 MB	1866 MHz	8 GT/s	90 W	Yes	Yes	Yes	Yes
E5-2643 v3	3.4 / 3.7 GHz	6 / 12	20 MB	2133 MHz	9.6 GT/s	135 W	Yes	Yes	Yes	Yes
E5-2650 v3	2.3 / 3 GHz	10 / 20	25 MB	2133 MHz	9.6 GT/s	105 W	Yes	Yes	Yes	Yes
E5-2650L v3	1.8 / 2.5 GHz	12 / 24	30 MB	2133 MHz	9.6 GT/s	65 W	Yes	Yes	Yes	Yes
E5-2660 v3	2.6 / 3.3 GHz	10 / 20	25 MB	2133 MHz	9.6 GT/s	105 W	Yes	Yes	Yes	Yes
E5-2667 v3	3.2 / 3.6 GHz	8 / 16	20 MB	2133 MHz	9.6 GT/s	135 W	Yes	Yes	Yes	Yes
E5-2670 v3	2.3 / 3.1 GHz	12 / 24	30 MB	2133 MHz	9.6 GT/s	120 W	Yes	Yes	Yes	Yes
E5-2680 v3	2.5 / 3.3 GHz	12 / 24	30 MB	2133 MHz	9.6 GT/s	120 W	Yes	Yes	Yes	Yes
E5-2683 v3	2 / 3 GHz	14 / 28	35 MB	2133 MHz	9.6 GT/s	120 W	Yes	Yes	Yes	Yes
E5-2685 v3	2.6 / 3.3 GHz	12 / 24	30 MB	2133 MHz	9.6 GT/s	120 W	No	Yes	No	No
E5-2690 v3	2.6 / 3.5 GHz	12 / 24	30 MB	2133 MHz	9.6 GT/s	135 W	Yes	Yes	Yes	Yes
E5-2695 v3	2.3 / 3.3 GHz	14 / 28	35 MB	2133 MHz	9.6 GT/s	120 W	Yes	Yes	Yes	Yes
E5-2697 v3	2.6 / 3.6 GHz	14 / 28	35 MB	2133 MHz	9.6 GT/s	145 W	Yes	Yes	Yes	Yes
E5-2698 v3	2.3 / 3.6 GHz	16 / 32	40 MB	2133 MHz	9.6 GT/s	135 W	Yes	Yes	Yes	Yes
E5-2699 v3	2.3 / 3.6 GHz	18 / 36	45 MB	2133 MHz	9.6 GT/s	145 W	Yes	Yes	Yes	Yes

For RD550 server models that come standard with one processor, the second processor can be ordered, if required (see the following table for ordering information). The second processor must be of the same model as the first processor. The part number for the second processor includes a CPU, a heatsink, and two system fans.

Table 3. Processor options

Description	Part number
Lenovo ThinkServer RD550 Intel Xeon E5-2603 v3 (6C, 85W, 1.6GHz) Processor Option Kit	4XG0F28804
Lenovo ThinkServer RD550 Intel Xeon E5-2609 v3 (6C, 85W, 1.9GHz) Processor Option Kit	4XG0F28803
Lenovo ThinkServer RD550 Intel Xeon E5-2620 v3 (6C, 85W, 2.4GHz) Processor Option Kit	4XG0F28802
Lenovo ThinkServer RD550 Intel Xeon E5-2623 v3 (4C, 105W, 3.0GHz) Processor Option Kit	4XG0F28832
Lenovo ThinkServer RD550 Intel Xeon E5-2630 v3 (8C, 85W, 2.4GHz) Processor Option Kit	4XG0F28801
Lenovo ThinkServer RD550 Intel Xeon E5-2630L v3 (8C, 55W, 1.8GHz) Processor Option Kit	4XG0F28806

Description	Part number
Lenovo ThinkServer RD550 Intel Xeon E5-2637 v3 (4C, 135W, 3.5GHz) Processor Option Kit	4XG0F28831
Lenovo ThinkServer RD550 Intel Xeon E5-2640 v3 (8C, 90W, 2.6GHz) Processor Option Kit	4XG0F28800
Lenovo ThinkServer RD550 Intel Xeon E5-2643 v3 (6C, 135W, 3.4GHz) Processor Option Kit	4XG0F28830
Lenovo ThinkServer RD550 Intel Xeon E5-2650 v3 (10C, 105W, 2.3GHz) Processor Option Kit	4XG0F28799
Lenovo ThinkServer RD550 Intel Xeon E5-2650L v3 (12C, 65W, 1.8GHz) Processor Option Kit	4XG0F28805
Lenovo ThinkServer RD550 Intel Xeon E5-2660 v3 (10C, 105W, 2.6GHz) Processor Option Kit	4XG0F28798
Lenovo ThinkServer RD550 Intel Xeon E5-2667 v3 (8C, 135W, 3.2GHz) Processor Option Kit	4XG0F28829
Lenovo ThinkServer RD550 Intel Xeon E5-2670 v3 (12C, 120W, 2.3GHz) Processor Option Kit	4XG0F28797
Lenovo ThinkServer RD550 Intel Xeon E5-2680 v3 (12C, 120W, 2.5GHz) Processor Option Kit	4XG0F28796
Lenovo ThinkServer RD550 Intel Xeon E5-2683 v3 (14C, 120W, 2.0GHz) Processor Option Kit	4XG0F28795
Lenovo ThinkServer RD550 Intel Xeon E5-2685 v3 (12C, 120W, 2.6GHz) Processor Option Kit	4XG0F28833
Lenovo ThinkServer RD550 Intel Xeon E5-2690 v3 (12C, 135W, 2.6GHz) Processor Option Kit	4XG0F28794
Lenovo ThinkServer RD550 Intel Xeon E5-2695 v3 (14C, 120W, 2.3GHz) Processor Option Kit	4XG0F28793
Lenovo ThinkServer RD550 Intel Xeon E5-2697 v3 (14C, 145W, 2.6GHz) Processor Option Kit	4XG0F28792
Lenovo ThinkServer RD550 Intel Xeon E5-2698 v3 (16C, 135W, 2.3GHz) Processor Option Kit	4XG0F28791
Lenovo ThinkServer RD550 Intel Xeon E5-2699 v3 (18C, 145W, 2.3GHz) Processor Option Kit	4XG0F28790

Memory

Lenovo DDR4 memory is compatibility tested and tuned for optimal ThinkServer performance and throughput. From a service and support standpoint, Lenovo memory automatically assumes the system warranty, and Lenovo provides service and support worldwide.

The RD550 server supports up to 12 DIMMs when one processor is installed and up to 24 DIMMs when two processors are installed. Each processor has four memory channels and there are three DIMMs per channel. The RD550 supports up to 768 GB of memory at up to 1866 MHz when fully populated. The actual memory speed in the system is determined as the lowest of the memory speed that is supported by the specific CPU or the maximum operating speeds for the memory configuration that is based on the number of DIMMs per channel.

ThinkServer engineering tested and validated system designs that support memory speeds beyond Intel's original plan, which provides benefits for workloads that require memory speed and density. Lenovo ThinkServer memory is fully supported up to the rated speeds that are shown in the following table.

Table 4. RD550 maximum memory speeds and capacities

DIMMs per channel	RDIMM		LRDIMM	
	Memory bus speed	Maximum capacity	Memory bus speed	Maximum capacity
1 DPC	2133 MHz	256 GB (8x 32 GB)	2133 MHz	256 GB (8x 32 GB)
2 DPC	2133 MHz	512 GB (16x 32 GB)	2133 MHz	512 GB (16x 32 GB)
3 DPC	1600 MHz	768 GB (24x 32 GB)	1866 MHz	768 GB (24x 32 GB)

The following rules apply when the memory configuration is selected:

- The server supports RDIMMs and LRDIMMs.
- Mixing different types of memory (RDIMMs and LRDIMMs) is not supported.
- DIMM capacities and rank can be mixed.

The following memory protection technologies are supported:

- ECC
- Lockstep (SDDC x4/x8)
- Memory mirroring
- Memory sparing
- Patrol scrubbing
- Demand scrubbing

If lockstep or memory mirroring is used, RDIMMs must be installed in pairs (a minimum of one pair per each processor), and both RDIMMs in a pair must be identical in type, size, and rank.

If memory sparing is used, one rank of a DIMM in each populated channel is reserved as spare memory; therefore, single-rank DIMMs cannot be used. DIMMs in a pair must be identical in type, size, and rank.

Lockstep, memory mirroring, and memory sparing modes are mutually exclusive. Only one operational memory mode can be enabled on the server, and it is a system-wide setting.

The following table lists available memory options for the RD550.

Table 5. Memory options

Description	Part number	Maximum supported
RDIMMs		
Lenovo ThinkServer 4GB DDR4-2133MHz (1Rx8) RDIMM	4X70F28588	24 (12 per CPU)
Lenovo ThinkServer 8GB DDR4-2133MHz (1Rx4) RDIMM	4X70F28589	24 (12 per CPU)
Lenovo ThinkServer 16GB DDR4-2133MHz (2Rx4) RDIMM	4X70F28590	24 (12 per CPU)
Lenovo ThinkServer 32GB DDR4-2133MHz (2Rx4) RDIMM	4X70G88311	24 (12 per CPU)
LRDIMMs		
Lenovo ThinkServer 32GB DDR4-2133MHz (4Rx4) LRDIMM	4X70F28591	24 (12 per CPU)

Internal storage

The RD550 server supports the following internal storage configurations:

- Server models without any drive bays that can be upgraded to 4x 3.5-inch SAS/SATA hot-swap drive bays
- Server models with 4x 3.5-inch SAS/SATA hot-swap drive bays that can be expanded with 2x 2.5-inch SATA hot-swap rear drive bays
- Server models with 12x 2.5-inch SAS/SATA hot-swap drive bays; two of these SAS/SATA drive bays can be converted to 2x 2.5" AnyBay drive bays.

The 3.5-inch drive bay models of the RD550 also support an optional internal optical drive.

The following figure shows the internal drive configurations.

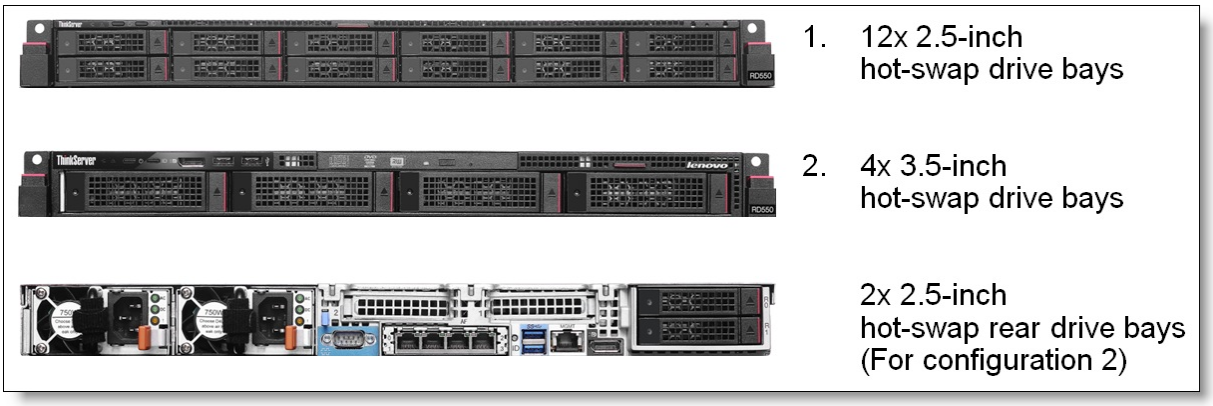

Figure 8. Internal drive configurations

In addition, the RD550 server models can be upgraded with 2x SD card internal slots, or 2x M.2 SSD internal slots, or both. The SD card slots are connected to the Intel Platform Controller Hub (PCH) via USB; therefore, they do not require a RAID controller. The M.2 SSD slots require a supported RAID controller (for details, see Controllers for internal storage).

Note: M.2 SSD slots and 2x 2.5-inch rear drive bays are mutually exclusive, that is, either M.2 SSD slots or 2x 2.5-inch rear drive bays can be selected in the configuration, but not both.

The following table shows the internal storage options available for the RD550 server.

Table 6. Internal storage options

Description	Part number	Maximum supported
Lenovo ThinkServer Gen 5 1U 3.5" 4-Drive Backplane Kit	4XF0G45885	1
Lenovo ThinkServer Gen 5 2.5" 2-Drive Rear Backplane Kit	4XF0G45877	1
Lenovo ThinkServer RD550 AnyBay Enablement Kit	4XF0G88927	1
Lenovo ThinkServer SDHC Flash Assembly Module	4XF0G45865	1
Lenovo ThinkServer RD550 M.2 Enablement Kit to Motherboard	4XF0G45892	1
Lenovo ThinkServer M.2 Enablement Kit for RD550 3.5" Chassis	4XF0G45890	1
Lenovo ThinkServer RD550 2.5" Chassis M.2 Enablement Kit to RAID720ix	4XF0G45889	1

For additional configuration guidelines, refer to Controllers for internal storage.

Controllers for internal storage

The following table lists the RAID controllers and the additional options used for the internal storage of the RD550 server.

Table 7. RAID controller options for internal storage

Description	Part number	Maximum supported
Lenovo ThinkServer RAID 110i RAID 5 Upgrade	4XB0F28690	1
Lenovo ThinkServer RAID 510i AnyRAID Adapter	4XB0F28691	1
Lenovo ThinkServer RAID 510i RAID 5/50 Upgrade	4XB0F28692	1
Lenovo ThinkServer RAID 720i AnyRAID Adapter	4XB0F28693	1
Lenovo ThinkServer RAID 720ix AnyRAID Adapter with Expander	4XB0F28694	1
Lenovo ThinkServer RAID 720i 1GB Modular DRAM Upgrade	4XB0F28695	1
Lenovo ThinkServer RAID 720i 1GB Modular Flash and Supercapacitor Upgrade	4XB0F28696	1
Lenovo ThinkServer RAID 720i 2GB Modular Flash and Supercapacitor Upgrade	4XB0F28697	1
Lenovo ThinkServer RAID 720i 4GB Modular Flash and Supercapacitor Upgrade	4XB0F28698	1

The following table summarizes features of supported drive controllers.

Table 8. Drive controller features and specifications summary

Feature	RAID 110i	RAID 510i	RAID 720i	RAID 720ix
Part number	None	4XB0F28691	4XB0F28693	4XB0F28694
Form factor	Onboard	AnyRAID	AnyRAID	AnyRAID
Controller chip	Not applicable	LSI SAS2008	LSI SAS3108	LSI SAS3108
Host interface	Not applicable	PCIe 2.0 x8	PCIe 3.0 x8	PCIe 3.0 x8
Port interface	6 Gbps SATA	6 Gbps SAS	12 Gbps SAS	12 Gbps SAS
Drive interface	SATA	SAS, SATA	SAS, SATA	SAS, SATA
Drive type	HDD, SSD	HDD, SSD	HDD, SSD	HDD, SSD
Drive form factor	SFF, LFF, M.2	SFF, LFF, M.2	SFF, LFF, M.2	SFF, M.2
Number of drives	8*	8	8	26**
RAID levels	0/1/10, Optional 5 (4XB0F28690)	0/1/10, Optional 5/50 (4XB0F28692)	0/1/10/5/50, Optional 6/60 w/ cache upgrade	0/1/10/5/50/6/60 (cache upgrade required)
JBOD mode	Yes	Yes	Yes (without cache)	Yes (w/ non-backed cache)
Cache	None	None	1 GB non-backed (4XB0F28695) 1 GB flash-backed (4XB0F28696) 2 GB flash-backed (4XB0F28697) 4 GB flash-backed (4XB0F28698)	1 GB non-backed (4XB0F28695) 1 GB flash-backed (4XB0F28696) 2 GB flash-backed (4XB0F28697) 4 GB flash-backed (4XB0F28698)
FastPath	No	No	Yes (with flash backup)	Yes (with flash backup)
CacheCade Pro	No	No	Yes (with flash backup)	Yes (with flash backup)

* Up to 6 drives can be configured in a RAID array, and the remaining two drives operate in JBOD mode.
** Includes SAS Expander.

The following tables list drive types and internal bays supported by the RAID controllers.

Table 9. RAID controllers, drive types, and internal drive bays: 3.5-inch drive bay models

Drive controller	Drive type	3.5-inch chassis drive bays		
		4x 3.5-inch (front)	2x 2.5-inch (rear)*	2x M.2 slots (internal)*
RAID 110i	M.2 SSD	No	No	Yes (Requires 4XF0G45892)
	SAS HDD	No	No	No
	SAS SSD	No	No	No
	SATA HDD	Yes	Yes (Requires 4XF0G45877)	No
	SATA SSD	Yes	Yes (Requires 4XF0G45877)	No
RAID 510i RAID 720i	M.2 SSD	No	No	Yes (Requires 4XF0G45890)
	SAS HDD	Yes	No	No
	SAS SSD	Yes	No	No
	SATA HDD	Yes	Yes (Requires 4XF0G45877)	No
	SATA SSD	Yes	Yes (Requires 4XF0G45877)	No

* M.2 SSD slots and 2x 2.5-inch rear drive bays are mutually exclusive, that is, either M.2 SSD slots or 2x 2.5-inch rear drive bays can be selected in the configuration, but not both.

Table 10. RAID controllers, drive types, and internal drive bays: 2.5-inch drive bay models

Drive controller	Drive type	2.5-inch chassis drive bays		
		12x 2.5-inch (front)	2x 2.5-inch AnyBay (front)*	2x M.2 slots (internal)
RAID 110i	M.2 SSD	No	No	No
	SAS HDD	No	No	No
	SAS SSD	No	No	No
	SATA HDD	Yes (up to 8 drives)**	No	No
	SATA SSD	Yes (up to 8 drives)**	No	No
RAID 510i RAID 720i	M.2 SSD	No	No	No
	SAS HDD	Yes (up to 8 drives)	No	No
	SAS SSD	Yes (up to 8 drives)	No	No
	SATA HDD	Yes (up to 8 drives)	No	No
	SATA SSD	Yes (up to 8 drives)	No	No
RAID 720ix	M.2 SSD	Yes	Yes (Requires 4XF0G88927)	Yes (Requires 4XF0G45889)
	SAS HDD	Yes	Yes (Requires 4XF0G88927)	No
	SAS SSD	Yes	Yes (Requires 4XF0G88927)	No
	SATA HDD	Yes	Yes (Requires 4XF0G88927)	No
	SATA SSD	Yes	Yes (Requires 4XF0G88927)	No
PCIe Interposer (Included in 4XF0G88927)	PCIe SSD	No	Yes (Requires 4XF0G88927)	No

* The last two of the existing 12x 2.5-inch SAS/SATA drive bays are converted to 2x AnyBay drive bays with the AnyBay Enablement Kit (4XF0G88927). The remaining ten 2.5-inch drive bays are used for the same SAS and SATA drives that are supported by the RAID 720ix in the 12x 2.5-inch drive configurations.
** Up to 6 drives can be configured in a RAID array, and the remaining two drives operate in JBOD mode.

Important:

- A cache upgrade is required for the 720ix AnyRAID adapter operations, and it must be purchased together with the controller.
- RAID 110i is not supported by virtualization hypervisors, including VMware vSphere (ESXi), Linux KVM, Xen, and Microsoft Hyper-V.

Drives for internal storage

The RD550 server supports the internal drive options that are listed in the following tables.

Table 11. Internal drive options: 3.5-inch drives

Description	Part number	Maximum supported
3.5-inch hot-swap HDDs (2.5-inch HDDs in 3.5-inch drive trays) - 12 Gbps SAS		
ThinkServer Gen 5 2.5" 300GB 10K Enterprise SAS 12Gbps HS HDD in 3.5" tray	4XB0G88733	4
ThinkServer Gen 5 2.5" 300GB 15K Enterprise SAS 12Gbps HS HDD in 3.5" tray	4XB0G88740	4
ThinkServer Gen 5 2.5" 450GB 15K Enterprise SAS 12Gbps HS HDD in 3.5" tray	4XB0G88744	4
ThinkServer Gen 5 2.5" 600GB 10K Enterprise SAS 12Gbps HS HDD in 3.5" tray	4XB0G88761	4
ThinkServer Gen 5 2.5" 600GB 15K Enterprise SAS 12Gbps HS HDD in 3.5" tray	4XB0G88746	4
ThinkServer Gen 5 2.5" 900GB 10K Enterprise SAS 12Gbps HS HDD in 3.5" tray	4XB0G88762	4
ThinkServer Gen 5 2.5" 1.2TB 10K Enterprise SAS 12Gbps HS HDD in 3.5" tray	4XB0G88763	4
ThinkServer Gen 5 2.5" 1.8TB 10K Enterprise SAS 12Gbps HS HDD in 3.5" tray	4XB0G88738	4
3.5-inch hot-swap HDDs (2.5-inch HDDs in 3.5-inch drive trays) - 6 Gbps SAS		
ThinkServer Gen 5 2.5" 300GB 10K Enterprise SAS 6Gbps HS HDD in 3.5" tray	4XB0G88728	4
ThinkServer Gen 5 2.5" 600GB 10K Enterprise SAS 6Gbps HS HDD in 3.5" tray	4XB0G88729	4
ThinkServer Gen 5 2.5" 900GB 10K Enterprise SAS 6Gbps HS HDD in 3.5" tray	4XB0G88742	4
ThinkServer Gen 5 2.5" 1.2TB 10K Enterprise SAS 6Gbps HS HDD in 3.5" tray	4XB0G88745	4
3.5-inch hot-swap HDDs - 12 Gbps NL SAS		
ThinkServer Gen 5 3.5" 1TB 7.2K Enterprise SAS 12Gbps Hot Swap HDD (512N)	4XB0K12270	4
ThinkServer Gen 5 3.5" 2TB 7.2K Enterprise SAS 12Gbps Hot Swap HDD (512N)	4XB0K12278	4
ThinkServer Gen 5 3.5" 2TB 7.2K Enterprise SAS 12Gbps Hot Swap HDD (512E)	4XB0G88730	4
ThinkServer Gen 5 3.5" 4TB 7.2K Enterprise SAS 12Gbps Hot Swap HDD (512N)	4XB0K12279	4
ThinkServer Gen 5 3.5" 4TB 7.2K Enterprise SAS 12Gbps Hot Swap HDD (512E)	4XB0G88731	4
ThinkServer Gen 5 3.5" 6TB 7.2K Enterprise SAS 12Gbps Hot Swap HDD (512E)	4XB0G88715	4
ThinkServer Gen 5 3.5" 8TB 7.2K Enterprise SAS 12Gbps Hot Swap HDD (512E)	4XB0K12254	4
3.5-inch hot-swap HDDs - 6 Gbps NL SAS		
ThinkServer Gen 5 3.5" 1TB 7.2K Enterprise SAS 6Gbps Hot Swap HDD	4XB0G45716	4
ThinkServer Gen 5 3.5" 2TB 7.2K Enterprise SAS 6Gbps Hot Swap HDD	4XB0G45717	4
ThinkServer Gen 5 3.5" 3TB 7.2K Enterprise SAS 6Gbps Hot Swap HDD	4XB0G45718	4
ThinkServer Gen 5 3.5" 4TB 7.2K Enterprise SAS 6Gbps Hot Swap HDD	4XB0G45719	4
3.5-inch hot-swap HDDs - 6 Gbps NL SATA		
ThinkServer Gen 5 3.5" 1TB 7.2K Enterprise SATA 6Gbps Hot Swap HDD	4XB0F28712	4
ThinkServer Gen 5 3.5" 2TB 7.2K Enterprise SATA 6Gbps Hot Swap HDD	4XB0F28713	4
ThinkServer Gen 5 3.5" 3TB 7.2K Enterprise SATA 6Gbps Hot Swap HDD	4XB0F28714	4

Description	Part number	Maximum supported
ThinkServer Gen 5 3.5" 4TB 7.2K Enterprise SATA 6Gbps Hot Swap HDD	4XB0G45715	4
ThinkServer Gen 5 3.5" 5TB 7.2K Enterprise SATA 6Gbps Hot Swap HDD	4XB0G88712	4
ThinkServer Gen 5 3.5" 6TB 7.2K Enterprise SATA 6Gbps Hot Swap HDD	4XB0G88713	4
ThinkServer Gen 5 3.5" 8TB 7.2K Enterprise SATA 6Gbps Hot Swap HDD	4XB0K12255	4
3.5-inch hot-swap SSDs - Enterprise Performance 12 Gbps SAS		
ThinkServer Gen 5 3.5" 200GB Enterprise Performance SAS 12Gbps Hot Swap SSD	4XB0G45733	4
ThinkServer Gen 5 3.5" 400GB Enterprise Performance SAS 12Gbps Hot Swap SSD	4XB0G45734	4
ThinkServer Gen 5 3.5" 800GB Enterprise Performance SAS 12Gbps Hot Swap SSD	4XB0G45735	4
3.5-inch hot-swap SSDs - Enterprise Mainstream 12 Gbps SAS		
ThinkServer 3.5" 400GB PM1635 Enterprise Mainstream 12Gb SAS HS SSD	4XB0K12261	4
ThinkServer 3.5" 800GB PM1635 Enterprise Mainstream 12Gb SAS HS SSD	4XB0K12262	4
ThinkServer 3.5" 1.6TB PM1635 Enterprise Mainstream 12Gb SAS HS SSD	4XB0K12263	4
3.5-inch hot-swap SSDs - Mainstream 6 Gbps SATA		
ThinkServer Gen 5 3.5" 480GB Mainstream SATA 6Gbps Hot Swap SSD	4XB0G88767	4
ThinkServer Gen 5 3.5" 800GB Mainstream SATA 6Gbps Hot Swap SSD	4XB0G88769	4
ThinkServer Gen 5 3.5" 1.2TB Mainstream SATA 6Gbps Hot Swap SSD	4XB0G88771	4
ThinkServer Gen 5 3.5" 1.6TB Mainstream SATA 6Gbps Hot Swap SSD	4XB0G88773	4
3.5-inch hot-swap SSDs - Entry 6 Gbps SATA		
ThinkServer Gen 5 3.5" 120GB Entry SATA 6Gbps Hot Swap SSD	4XB0G88777	4
ThinkServer Gen 5 3.5" 240GB Entry SATA 6Gbps Hot Swap SSD	4XB0G88779	4
ThinkServer Gen 5 3.5" 480GB Entry SATA 6Gbps Hot Swap SSD	4XB0G88781	4
ThinkServer Gen 5 3.5" 800GB Entry SATA 6Gbps Hot Swap SSD	4XB0G88783	4
ThinkServer 3.5" 960GB PM863 Enterprise Entry SATA 6Gbps Hot Swap SSD	4XB0K12256	4
3.5-inch hot-swap SSDs - Value 6 Gbps SATA		
ThinkServer Gen 5 3.5" 120GB Value Read-Optimized SATA 6Gbps Hot Swap SSD	4XB0G45742	4
ThinkServer Gen 5 3.5" 240GB Value Read-Optimized SATA 6Gbps Hot Swap SSD	4XB0G45743	4
ThinkServer Gen 5 3.5" 300GB Value Read-Optimized SATA 6Gbps Hot Swap SSD	4XB0G45744	4
ThinkServer Gen 5 3.5" 480GB Value Read-Optimized SATA 6Gbps Hot Swap SSD	4XB0G45745	4
ThinkServer Gen 5 3.5" 600GB Value Read-Optimized SATA 6Gbps Hot Swap SSD	4XB0G45746	4
ThinkServer Gen 5 3.5" 800GB Value Read-Optimized SATA 6Gbps Hot Swap SSD	4XB0G45747	4

Table 12. Internal drive options: 2.5-inch drives

Description	Part number	Maximum supported
2.5-inch hot-swap HDDs - 12 Gbps SAS		
ThinkServer Gen 5 2.5" 300GB 10K Enterprise SAS 12Gbps Hot Swap HDD	4XB0G88732	12
ThinkServer Gen 5 2.5" 300GB 15K Enterprise SAS 12Gbps Hot Swap HDD	4XB0G88739	12
ThinkServer Gen 5 2.5" 450GB 15K Enterprise SAS 12Gbps Hot Swap HDD	4XB0G88743	12
ThinkServer Gen 5 2.5" 600GB 10K Enterprise SAS 12Gbps Hot Swap HDD	4XB0G88734	12
ThinkServer Gen 5 2.5" 600GB 15K Enterprise SAS 12Gbps Hot Swap HDD	4XB0G88765	12
ThinkServer Gen 5 2.5" 900GB 10K Enterprise SAS 12Gbps Hot Swap HDD	4XB0G88735	12
ThinkServer Gen 5 2.5" 1.2TB 10K Enterprise SAS 12Gbps Hot Swap HDD	4XB0G88736	12
ThinkServer Gen 5 2.5" 1.8TB 10K Enterprise SAS 12Gbps Hot Swap HDD	4XB0G88737	12
2.5-inch hot-swap HDDs - 6 Gbps SAS		
ThinkServer Gen 5 2.5" 300GB 10K Enterprise SAS 6Gbps Hot Swap HDD	4XB0G45722	12
ThinkServer Gen 5 2.5" 300GB 15K Enterprise SAS 6Gbps Hot Swap HDD	4XB0G45727	12
ThinkServer Gen 5 2.5" 450GB 15K Enterprise SAS 6Gbps Hot Swap HDD	4XB0G45728	12
ThinkServer Gen 5 2.5" 600GB 10K Enterprise SAS 6Gbps Hot Swap HDD	4XB0G45723	12
ThinkServer Gen 5 2.5" 600GB 15K Enterprise SAS 6Gbps Hot Swap HDD	4XB0G45729	12
ThinkServer Gen 5 2.5" 900GB 10K Enterprise SAS 6Gbps Hot Swap HDD	4XB0G45724	12
ThinkServer Gen 5 2.5" 1.2TB 10K Enterprise SAS 6Gbps Hot Swap HDD	4XB0G45725	12
2.5-inch hot-swap HDDs - 6 Gbps NL SATA		
ThinkServer Gen 5 2.5" 500GB 7.2K Enterprise SATA 6Gbps Hot Swap HDD	4XB0G45720	12
ThinkServer Gen 5 2.5" 1TB 7.2K Enterprise SATA 6Gbps Hot Swap HDD	4XB0G45721	12
ThinkServer Gen 5 2.5" 2TB 7.2K Enterprise SATA 6Gbps Hot Swap HDD	4XB0G88774	12
2.5-inch hot-swap SSDs - Enterprise Performance 12 Gbps SAS		
ThinkServer Gen 5 2.5" 200GB Enterprise Performance SAS 12Gbps Hot Swap SSD	4XB0G45730	12
ThinkServer Gen 5 2.5" 400GB Enterprise Performance SAS 12Gbps Hot Swap SSD	4XB0G45731	12
ThinkServer Gen 5 2.5" 800GB Enterprise Performance SAS 12Gbps Hot Swap SSD	4XB0G45732	12
2.5-inch hot-swap SSDs - Enterprise Mainstream 12 Gbps SAS		
ThinkServer 2.5" 400GB PM1635 Enterprise Mainstream 12Gb SAS HS SSD	4XB0K12258	12
ThinkServer 2.5" 800GB PM1635 Enterprise Mainstream 12Gb SAS HS SSD	4XB0K12259	12
ThinkServer 2.5" 1.6TB PM1635 Enterprise Mainstream 12Gb SAS HS SSD	4XB0K12260	12
2.5-inch hot-swap SSDs - Mainstream 6 Gbps SATA		
ThinkServer Gen 5 2.5" 480GB Mainstream SATA 6Gbps Hot Swap SSD	4XB0G88766	12
ThinkServer Gen 5 2.5" 800GB Mainstream SATA 6Gbps Hot Swap SSD	4XB0G88768	12
ThinkServer Gen 5 2.5" 1.2TB Mainstream SATA 6Gbps Hot Swap SSD	4XB0G88770	12
ThinkServer Gen 5 2.5" 1.6TB Mainstream SATA 6Gbps Hot Swap SSD	4XB0G88772	12
2.5-inch hot-swap SSDs - Enterprise Entry 6 Gbps SATA		
ThinkServer 2.5" 120GB PM863 Enterprise Entry SATA 6Gbps HS SSD	4XB0K12264	12
ThinkServer 2.5" 240GB PM863 Enterprise Entry SATA 6Gbps HS SSD	4XB0K12265	12
ThinkServer 2.5" 480GB PM863 Enterprise Entry SATA 6Gbps HS SSD	4XB0K12266	12
ThinkServer 2.5" 960GB PM863 Enterprise Entry SATA 6Gbps HS SSD	4XB0K12257	12

Description	Part number	Maximum supported
2.5-inch hot-swap SSDs - Entry 6 Gbps SATA		
ThinkServer Gen 5 2.5" 120GB Entry SATA 6Gbps Hot Swap SSD	4XB0G88776	12
ThinkServer Gen 5 2.5" 240GB Entry SATA 6Gbps Hot Swap SSD	4XB0G88778	12
ThinkServer Gen 5 2.5" 480GB Entry SATA 6Gbps Hot Swap SSD	4XB0G88780	12
ThinkServer Gen 5 2.5" 800GB Entry SATA 6Gbps Hot Swap SSD	4XB0G88782	12
2.5-inch hot-swap SSDs - Value 6 Gbps SATA		
ThinkServer Gen 5 2.5" 120GB Value Read-Optimized SATA 6Gbps Hot Swap SSD	4XB0G45736	12
ThinkServer Gen 5 2.5" 240GB Value Read-Optimized SATA 6Gbps Hot Swap SSD	4XB0G45737	12
ThinkServer Gen 5 2.5" 300GB Value Read-Optimized SATA 6Gbps Hot Swap SSD	4XB0G45738	12
ThinkServer Gen 5 2.5" 480GB Value Read-Optimized SATA 6Gbps Hot Swap SSD	4XB0G45739	12
ThinkServer Gen 5 2.5" 600GB Value Read-Optimized SATA 6Gbps Hot Swap SSD	4XB0G45740	12
ThinkServer Gen 5 2.5" 800GB Value Read-Optimized SATA 6Gbps Hot Swap SSD	4XB0G45741	12
2.5-inch EasySwap SSDs for AnyBay - Enterprise Performance PCIe 3.0		
ThinkServer G5 2.5" 400GB Enterprise Perf. PCIe 3.0 Easy Swap SSD for AnyBay	4XB0G45748	2
ThinkServer G5 2.5" 800GB Enterprise Perf. PCIe 3.0 Easy Swap SSD for AnyBay	4XB0G45749	2
ThinkServer G5 2.5" 1.6TB Enterprise Perf. PCIe 3.0 Easy Swap SSD for AnyBay	4XB0G45750	2

Table 13. Internal drive options: M.2 SSDs and SD cards

Description	Part number	Maximum supported
M.2 SSDs		
ThinkServer M.2 80GB Value Read-Optimized SATA 6Gbps SSD	4XB0G88741	2
ThinkServer M.2 120GB Value Read-Optimized SATA 6Gbps SSD	4XB0F28656	2
SD cards		
ThinkServer 8GB SD Card	4X70F28592	2
ThinkServer 32GB SD Card	4X70F28593	2

Optical drives

The RD550 server models with 3.5-inch drives support the optical drive options listed in the following table. Server models with 2.5-inch drive bays do not support an internal optical drive; a supported external optical drive listed in the following table can be used instead.

Table 14. Optical drive options

Description	Part number	Maximum supported
Internal optical drives		
Lenovo ThinkServer Slim SATA DVD-RW Optical Disk Drive	4XA0F28607	1
Lenovo ThinkServer Slim SATA DVD-ROM Optical Disk Drive	4XA0F28608	1
External USB optical drives		
ThinkPad UltraSlim USB DVD Burner	4XA0E97775	1

The Slim SATA DVD-RW Optical Disk Drive and the USB DVD Burner support the following types of media: CD-R, CD-ROM, CD-RW, DVD-R, DVD-R (dual-layer recording), DVD-RAM, DVD-RW, DVD+R, DVD+R (dual-layer recording), and DVD+RW.

The Slim SATA DVD-ROM Optical Disk Drive supports the following types of media: CD-R, CD-ROM, DVD-R, DVD-R (dual-layer recording), DVD+R, DVD+R (dual-layer recording).

I/O expansion

The RD550 supports up to two AnyFabric slots and up to three PCIe slots with riser cards that are installed into two riser sockets on the system planar (one riser socket supports installation of one riser card). The slot form factors are as follows:

- Up to five slots for 2.5-inch drive bay models:
  - AnyFabric slot 1 (PCIe 3.0 x8) (system planar)
  - AnyFabric slot 2 (PCIe 3.0 x8) (system planar)
  - PCIe slot 1: PCIe 3.0 x8; low profile (Riser card 1)
  - PCIe slot 2: PCIe 3.0 x8; low profile (Riser card 1)
  - PCIe slot 3: PCIe 3.0 x16; low profile (Riser card 2; requires the second CPU to be installed)
- Up to three slots 3.5-inch drive bays models:
  - AnyFabric slot (PCIe 3.0 x8) (system planar)
  - PCIe slot 1: PCIe 3.0 x16; low profile (Riser card 1)
  - PCIe slot 2: PCIe 3.0 x16; low profile (Riser card 2; requires the second CPU to be installed)

The locations of the expansion slots are shown in the following figure.

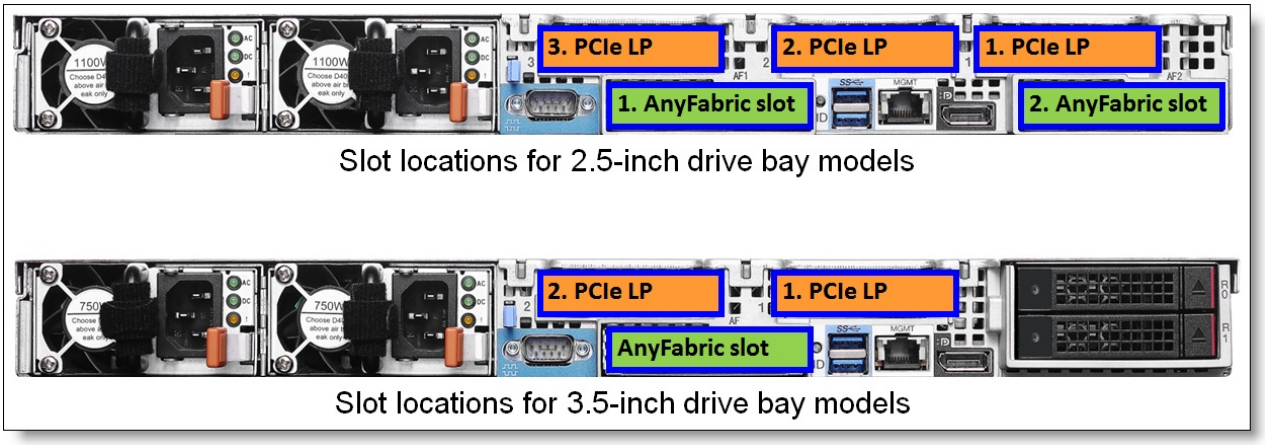

Figure 9. Slot locations

The following table lists the available PCIe riser card options.

Table 15. PCIe riser card options

Description	Part number	Maximum supported
Riser card slot 1		
Lenovo ThinkServer 1U x8/x8 PCIe Riser Kit (for 2.5-inch drive bay models)	4XF0G45880	1
Lenovo ThinkServer 1U x16 PCIe Riser 2 Kit (for 3.5-inch drive bay models)	4XF0G45878	1
Riser card slot 2 (Requires the second CPU to be installed)		
Lenovo ThinkServer 1U x16 PCIe Riser 1 Kit	4XF0G45879	1

Network adapters

The RD550 server supports AnyFabric slots for integrated NIC solution. The integrated NIC solution supports AnyFabric adapters with two or four 10 GbE ports or four Gigabit Ethernet ports and supports direct connectivity to the TSM service processor for out-of-band systems management.

The following table lists the supported network adapters. The maximum quantity listed is for 2.5-inch drive bay configurations with two processors. For more information about the maximum adapter quantity supported for other configurations, see the I/O expansion section.

Table 16. Network adapter options

Description	Part number	Maximum supported
AnyFabric - 10 Gb Ethernet		
ThinkServer X520-DA2 AnyFabric 10Gb 2 Port SFP+ Ethernet Adapter by Intel	4XC0F28742	2*
ThinkServer X540-T2 AnyFabric 10Gb 2 Port Base-T Ethernet Adapter by Intel	4XC0F28741	2
Lenovo ThinkServer X710-DA2 AnyFabric 10Gb 2 port Ethernet Adapter by Intel	4XC0G88847	2*
Lenovo ThinkServer X710-DA4 AnyFabric 10Gb 4 port Ethernet Adapter by Intel	4XC0G88848	2*
ThinkServer OCm14102-NX-L AnyFabric 10Gb 2 port SFP+ Ethernet Adapter by Emulex	4XC0G88830	2*
ThinkServer OCm14102-UX-L AnyFabric 10Gb 2 Port SFP+ CNA by Emulex	4XC0F28743	2*
ThinkServer OCm14104-UX-L AnyFabric 10Gb 4 Port SFP+ CNA by Emulex	4XC0F28744	2*
AnyFabric - 1 Gb Ethernet		
ThinkServer I350-T4 AnyFabric 1Gb 4 Port Base-T Ethernet Adapter by Intel	4XC0F28740	2
PCIe - 40 Gb Ethernet		
ThinkServer OCe14401-UX-L PCIe 40Gb 1 Port QSFP+ CNA by Emulex	4XC0F28738	3*
PCIe - 10 Gb Ethernet		
ThinkServer X520-SR2 PCIe 10Gb 2 Port SFP+ Ethernet Adapter by Intel	4XC0F28733	3**
ThinkServer X520-DA2 PCIe 10Gb 2 Port SFP+ Ethernet Adapter by Intel	4XC0F28734	3*
ThinkServer X540-T2 PCIe 10Gb 2 Port Base-T Ethernet Adapter by Intel	4XC0F28732	3
ThinkServer X550-T1 PCIe 10Gb 1 Port Base-T Ethernet Adapter by Intel	4XC0G88855	3
ThinkServer X550-T2 PCIe 10Gb 2 Port Base-T Ethernet Adapter by Intel	4XC0G88856	3
ThinkServer X710-DA2 PCIe 10Gb 2 Port SFP+ Ethernet Adapter by Intel	4XC0G88852	3*
ThinkServer OCe14102-NX 10Gbps Dual Port SFP+ Ethernet Adapter by Emulex	4XC0F28724	3*
ThinkServer OCe14102-UX-L PCIe 10Gb 2 Port SFP+ CNA by Emulex	4XC0F28736	3*
PCIe - 1 Gb Ethernet		
ThinkServer I350-T2 PCIe 1Gb 2 Port Base-T Ethernet Adapter by Intel	4XC0F28730	3
ThinkServer I350-T4 PCIe 1Gb 4 Port Base-T Ethernet Adapter by Intel	4XC0F28731	3
Optical modules		
ThinkServer 40Gb Optical Module by Emulex (for 40 Gb QSFP+ adapters by Emulex)	4XC0F28739	Port qty***
ThinkServer 10Gb Optical Module by Emulex (for 10 Gb SFP+ adapters by Emulex)	4XC0F28737	Port qty***
ThinkServer 10Gb Optical Module by Intel (for 10 Gb SFP+ adapters by Intel)	4XC0F28735	Port qty***

* Requires a supported Direct Attach Copper (DAC) cable or optical transceiver (see Optical modules in Table 12).
** Includes two 10Gb SR SFP+ transceivers.
*** The maximum number of optical modules that are supported per adapter equals the quantity of the adapter ports.

SAS adapters for external storage

The following table lists SAS RAID controllers and HBAs for external storage attachments that are supported by the RD550 server.

Table 17. RAID adapters and HBAs for external storage expansion

Description	Part number	Maximum supported
External RAID adapters		
Lenovo ThinkServer 9286CV-8e PCIe 6Gb 8 Port External SAS RAID Adapter by LSI	4XB0F28699	1
Lenovo ThinkServer RAID CacheCade Pro 2.0 Key (for 9286CV-8e)	4XB0F28702	1
External SAS HBAs		
Lenovo ThinkServer 9300-8e PCIe 12Gb 8 Port External SAS Adapter by LSI	4XB0F28703	3
Lenovo ThinkServer 8885e PCIe 12Gb 8 port external SAS Adapter by PMC	4XB0G88727	1

The following table summarizes features of supported external drive controllers.

Table 18. External drive controller features and specifications summary

Feature	9286CV-8e	9300-8e	8885e*
Part number	4XB0F28699	4XB0F28703	4XB0G88727
Form factor	Low profile	Low profile	Low profile
Controller chip	LSI SAS2208	LSI SAS3008	PMC PM8063
Host interface	PCIe 3.0 x8	PCIe 3.0 x8	PCIe 3.0 x8
Port interface	6 Gbps SAS	12 Gbps SAS	12 Gbps SAS
Number of external SAS ports	8	8	8
External port connectors	2x Mini-SAS (SFF-8088)	2x Mini-SAS HD (SFF-8644)	2x Mini-SAS HD (SFF-8644)
Drive interface	SAS, SATA	SAS, SATA	SAS, SATA
Drive type	HDD, SSD	HDD, SSD	HDD, SSD
Maximum number of devices	240	1024	256
Maximum number of expansion units	8	8	8
RAID levels	0/1/10/5/50/6/60	None	None
JBOD mode	No	Yes	Yes
Cache	1 GB	None	1 GB
Cache protection	CacheVault flash backup (included)	None	None
CacheCade Pro	Optional (4XB0F28702)	None	None

* In addition to eight external ports, the ThinkServer 8885e adapter has eight internal ports.

Fibre Channel host bus adapters

The following table lists Fibre Channel host bus adapters (HBAs) supported by the RD550 server. The maximum quantity listed is for 2.5-inch drive bay configurations with two processors. For more information about the maximum adapter quantity supported for other configurations, see I/O expansion.

Table 19. Storage host bus adapter options

Description	Part number	Maximum supported
AnyFabric - 16 Gb FC		
ThinkServer LPm16002-M6-L AnyFabric 16Gb 2 Port Fibre Channel HBA by Emulex	4XB0F28706	2
AnyFabric - 8 Gb FC		
ThinkServer LPm15004-M8-L AnyFabric 8Gb 4 Port Fibre Channel HBA by Emulex	4XB0F28707	2
PCIe - 16 Gb FC		
ThinkServer LPe16000B Single Port 16Gb Fibre Channel HBA by Emulex	4XB0F28653	3
ThinkServer LPe16002B-M6-L PCIe 16Gb 2 Port Fibre Channel HBA by Emulex	4XB0F28705	3
ThinkServer QLE2670 Single Port 16Gb Fibre Channel HBA by QLogic	4XB0F28654	3
ThinkServer QLE2672 PCIe 16Gb 2 Port Fibre Channel HBA by QLogic	4XC0F28745	3
PCIe - 8 Gb FC		
ThinkServer LPe1250 Single Port 8Gb Fibre Channel HBA by Emulex	0C19476	3
ThinkServer LPe12002 Dual Port 8Gb Fibre Channel HBA by Emulex	0C19478	3
ThinkServer LPe16000B Single Port 8Gb Fibre Channel HBA by Emulex	4XB0F28652	3
ThinkServer LPe16002B-M8-L PCIe 8Gb 2 Port Fibre Channel HBA by Emulex	4XB0F28704	3
ThinkServer QLE2562 Dual Port 8Gb Fibre Channel HBA by QLogic	0C19482	3
ThinkServer QLE2560 Single Port 8Gb Fibre Channel HBA by QLogic	4XB0F28649	3

Flash storage adapters

The RD550 server supports the Flash storage adapters listed in the following table. The maximum quantity listed is for 2.5-inch drive bay configurations with two processors. For more information about the maximum adapter quantity supported for other configurations, see the I/O expansion section.

Table 20. Flash storage adapter options

Description	Part number	Maximum supported
ThinkServer 1.6TB ioMemory SX350 Performance PCIe 2.0 SSD by SanDisk	4XB0G88747	3
ThinkServer 3.2TB ioMemory SX350 Performance PCIe 2.0 SSD by SanDisk	4XB0G88748	3

Power supplies and cables

The RD550 server supports up to two redundant power supplies. The following table lists the power supplies.

Table 21. Power supply options

Description	Part number	Maximum supported
ThinkServer Gen 5 550W Platinum Hot Swap Power Supply (100 - 240 V AC)	4X20F28579	2
ThinkServer Gen 5 750W Platinum Hot Swap Power Supply (100 - 240 V AC)	4X20F28575	2
ThinkServer Gen 5 750W Titanium Hot Swap Power Supply (200 - 240 V AC)	4X20F28576	2
ThinkServer Gen 5 1100W Platinum Hot Swap Power Supply (100 - 240 V AC)	4X20F28577	2

The following power supply rules apply:

- A minimum of one power supply and a maximum of two power supplies are needed per system.
- If two power supplies are installed, the power supplies must be identical.

Important: It is highly recommended to validate system configuration for specific power requirements by using the latest version of the ThinkServer Power Planner, which is available at this website: http://support.lenovo.com/us/en/downloads/ds101155

Completing this validation ensures that the correct power supply is chosen for optimal performance.

The RD550 models come with one or two country-specific line cords or one or two rack power cables. Other country-specific line cords and rack power cables that are listed in the following table can be ordered if needed.

Table 22. Power cable options

Description	Part number	Maximum supported
Rack power cords		
ThinkServer C13-C14 WW 250V 10A 1.8m Jumper Cord	4X90F92964	2
Country-specific line cords		
ThinkServer C13-NEMA_5-15P US 125V 10A 1.8m Power Cord	4X90F92965	2
ThinkServer C13-BS_1363A UK 250V 10A 1.8m Power Cord	4X90F92970	2
ThinkServer C13-DK_2.5A Denmark 250V 10A 1.8m Power Cord	4X90F92971	2
ThinkServer C13-CEE_7.7 Europe 250V 10A 1.8m Power Cord	4X90F92974	2
ThinkServer C13-CE123_50 Italy 250V 10A 1.8m Power Cord	4X90F92975	2
ThinkServer C13-NRB_14136 Brazil 250V 10A 1.8m Power Cord	4X90F92976	2
ThinkServer C13-IRAM_2073 LA 250V 10A 1.8m Power Cord	4X90F92977	2
ThinkServer C13-GB1002 PRC 250V 10A 1.8m Power Cord	4X90F92981	2
ThinkServer C13-SI_32 Israel 250V 10A 1.8m Power Cord	4X90F92973	2
ThinkServer C13-SABS_164 South Africa 250V 6A 1.8m Power Cord	4X90F92978	2

Systems management

The RD550 server contains ThinkServer System Manager (TSM), which provides advanced service-processor control, monitoring, and an alerting function. If an environmental condition exceeds a threshold or if a system component fails, the TSM lights LEDs to help you diagnose the problem, records the error in the event log, and alerts you to the problem. Optionally, the TSM also provides a virtual presence capability for remote storage server management capabilities.

The TSM provides remote storage server management through the following industry-standard interfaces:

- Intelligent Platform Management Interface (IPMI) Version 2.0
- Simple Network Management Protocol (SNMP) Version 3
- Data Center Management Interface (DCMI) Version 1.0
- Web browser

The optional TSM Premium is required for enabling remote presence and energy monitoring and management. The TSM Premium feature provides the following functions:

- Remotely viewing video with graphics resolutions up to 1920x1200 at 60 Hz with up to 24 bits per pixel colors
- Remotely accessing the system by using the keyboard and mouse from a remote client
- Mapping the CD or DVD drive, diskette drive, and USB flash drive on a remote client, and mapping ISO and diskette image files as virtual drives that are available for use by the system
- Enabling support for Lenovo XClarity Energy Manager for power monitoring and management

The following table lists the Premium management option.

Table 23. Premium management option

Description	Part number	Maximum supported
Lenovo ThinkServer System Manager Premium	4XF0G45867	1

Lenovo offers the following software tools that can help you set up, use, and maintain the server at no additional cost:

- ThinkServer Deployment Manager
  The ThinkServer Deployment Manager tool, a part of the server firmware, simplifies the process of updating firmware, configuring system settings, configuring RAID, and installing supported Microsoft Windows or Linux operating systems or VMware hypervisors and associated device drivers on a ThinkServer system.
- ThinkServer Operating System-based Platform Update Tool
  The ThinkServer Operating System-based Platform Update Tool firmware update tool runs in the server operating system and enables customers to maintain server firmware up-to-date to help avoid unnecessary server outages.
- ThinkServer Diagnostics
  The ThinkServer Diagnostics software speeds up troubleshooting tasks to reduce service time by diagnosing server problems, performing diagnostic tests, and collecting system information and logs. The diagnostics software resides in the server firmware (Embedded edition), on a bootable USB drive (Standalone edition), or in the operating system (Windows or Linux editions).
- ThinkServer Partner Pack for vSphere vCenter Server
  The ThinkServer Partner Pack for vSphere vCenter Server software provides detailed system information about the ThinkServer systems in the VMware virtualized environment and enables users to receive and view alerts, deploy server firmware updates, and perform tasks such as launching a remote console and accessing web-based ThinkServer System Manager.

- ThinkServer PartnerPacks for Microsoft System Center
  The ThinkServer PartnerPack for Microsoft System Center Operations Manager (SCOM) software discovers ThinkServer systems and provides detailed system information about the managed servers. The software also enables users to perform management tasks, such as restarting the server or turning the server on or off, accessing the Remote Desktop Console through Remote Desktop Protocol (RDP), accessing web-based ThinkServer System Manager and capture the latest crash screen if the remote presence feature is enabled. The ThinkServer Partner Pack for Microsoft System Center Configuration Manager (SCCM) provides centralized firmware management of ThinkServer components.

Security

The RD550 server offers an optional hardware security module - Trusted Platform Module (TPM), and an optional chassis intrusion. These components are listed in the following table.

Table 24. Security options

Description	Part number	Maximum supported
Lenovo ThinkServer Gen 5 Trusted Platform Module v1.2 (Worldwide except China)	4XF0G45868	1
Lenovo ThinkServer Gen 5 Trusted Cryptographic Module (China only)	4XF0G45869	1
Chassis Intrusion Cable for 1U	None*	1

* Comes with select relationship and TopSeller models; configurable for custom models (SBB0E69082).

Rack installation

Select models of the RD550 server ship without a rail kit and a cable management arm. The following table lists rack installation options that are available for the RD550 server.

Table 25. Rack installation options

Description	Part number	Maximum supported
Lenovo ThinkServer Gen 5 DisplayPort to VGA Dongle	4X90F92980	1
Lenovo ThinkServer Gen 5 1U 4-Post Slide Rail Kit	4XF0G45871	1
Lenovo ThinkServer Gen 5 4-Post Static Rail Kit	4XF0G45873	1
Lenovo ThinkServer Gen 5 1U Cable Management Arm	4XF0G45874	1
Lenovo ThinkServer Gen 5 Cable Management Bar	4XF0G45876	1

Operating systems

The RD550 supports the following operating systems:

- Microsoft
  - Windows Server 2008 R2 x64 SP1 Foundation, Standard, Enterprise, Datacenter, Hyper-V
  - Windows Small Business Server 2011 Essentials, Standard, Premium Add-on
  - Windows Server 2012 Foundation, Essentials, Standard, Datacenter, Hyper-V
  - Windows Storage Server 2012 Standard
  - Windows Server 2012 R2 Foundation, Essentials, Standard, Datacenter, Hyper-V
  - Windows Storage Server 2012 R2 Standard
- SUSE
  - SUSE Linux Enterprise Server 11 for x86 SP3
  - SUSE Linux Enterprise Server 11 for AMD64/EM64T SP3
  - SUSE Linux Enterprise Server 11 for x86 SP4
  - SUSE Linux Enterprise Server 11 for AMD64/EM64T SP4
  - SUSE Linux Enterprise Server 12
  - SUSE Linux Enterprise Server 12 SP1
- Red Hat
  - Red Hat Enterprise Linux Server 6.5 (x86 and x64)
  - Red Hat Enterprise Linux Server 6.6 (x86 and x64)
  - Red Hat Enterprise Linux Server 6.7 (x86 and x64)
  - Red Hat Enterprise Linux Server 7
  - Red Hat Enterprise Linux Server 7.1
  - Red Hat Enterprise Linux Server 7.2
- VMware
  - VMware ESXi 5.1
  - VMware ESXi 5.5 Update 2
  - VMware ESXi 5.5 Update 3
  - VMware ESXi 6.0
  - VMware ESXi 6.0 Update 1

Important:

- SD cards support installation and booting of the VMware ESXi hypervisor only; other operating systems and hypervisors cannot be installed on an SD card.
- VMware ESXi and other hypervisor support requires a RAID 510i/720i/720ix adapter. The onboard RAID 110i controller is not supported by VMware ESXi and other hypervisors.

For the latest information about the specific versions and service levels that are supported and any other prerequisites, see the Operating System Interoperability Guide: http://lenovopress.com/redposig.

Physical specifications

The RD550 server has the following dimensions and weight (approximate):

- Width
  - Without rack handles: 447 mm (17.6 inches)
  - With rack handles: 482 mm (19.0 inches)
- Depth
  - Without rack handles and power supply handles: 780 mm (30.7 inches)
  - With rack handles and power supply handles: 803 mm (31.6 inches)
- Height: 43 mm (1.7 inches)
- Weight
  - Without package: 13.5 kg (29.8 lb) to 21 kg (46.3 lb)
  - With package: 19.8 kg (43.7 lb) to 27.3 kg (60.2 lb)

Operating environment

The RD550 server complies with ASHRAE Class A2 specifications. Depending on the hardware configuration, some server models comply with ASHRAE Class A3 and Class A4 specifications. To comply with ASHRAE Class A3 and Class A4 specifications, the RD550 server models need to meet the following hardware configuration requirements:

- Lenovo-qualified CPU except the following types:
  - 135-watt CPU (4-core, 6-core, or 8-core)
  - 145-watt CPU (14-core or 18-core)
- Two power supplies (except the 1100-watt power supplies) installed for redundancy

The RD550 server is supported in the following environment:

- Air temperature:
  - Operating:
    - ASHRAE Class A4: 5 °C - 45 °C (41 °F - 113 °F); for altitudes above 900 m (2,953 ft), decrease the maximum ambient temperature by 1 °C for every 125-m (410-ft) increase in altitude
    - ASHRAE Class A3: 5 °C - 40 °C (41 °F - 104 °F); for altitudes above 900 m (2,953 ft), decrease the maximum ambient temperature by 1 °C for every 175-m (574-ft) increase in altitude
    - ASHRAE Class A2: 10 °C - 35 °C (50 °F - 95 °F); for altitudes above 900 m (2,953 ft), decrease the maximum ambient temperature by 1 °C for every 300-m (984-ft) increase in altitude
  - Storage: -40 °C - +60 °C (-40 °F - 140 °F)
- Maximum altitude: 3,048 m (10,000 ft)
- Storage: -40 °C - +60 °C (-40 °F - 140 °F)
- Humidity:
  - Operating:
    - ASHRAE Class A4: 8% - 90% (non-condensing)
    - ASHRAE Class A3: 8% - 85% (non-condensing)
    - ASHRAE Class A2: 8% - 80% (non-condensing)
  - Storage: 8% - 90% (non-condensing)
- Electrical:
  - 100 - 127 (nominal) V AC; 50 Hz - 60 Hz
  - 200 - 240 (nominal) V AC; 50 Hz - 60 Hz
- Noise level:
  - 5.7 bels (operating)
  - 5.6 bels (idle)

Warranty

The RD550 server has a three-year or one-year warranty (model dependent) with 24x7 standard call center support and 9x5 next business day onsite coverage. Lenovo offers warranty maintenance upgrades and post-warranty maintenance agreements with a well-defined scope of services, including service hours, response time, and length of service coverage.

The Lenovo QuickPick tool helps locate compatible accessories and services and warranty information. Services offered may vary by geographic location. Access the tool via the following URL: http://lenovoquickpick.com

The following table explains warranty service definitions in more detail.

Table 26. Warranty service definitions

Term	Description
On-site service	A service technician will go to the client's location for equipment service.
24x7x4 hour	A service technician is scheduled to arrive at the client’s location within four hours after remote problem determination is completed. Lenovo provides service around the clock, every day, including Lenovo holidays.
24x7x8 hour	A service technician is scheduled to arrive at the client’s location within eight hours after remote problem determination is completed. Lenovo provides service around the clock, every day, including Lenovo holidays.
9x5x4 hour	A service technician is scheduled to arrive at the client’s location within four business hours after remote problem determination is completed. Lenovo provides service 8:00 am - 5:00 pm in the client's local time zone, Monday-Friday, excluding Lenovo holidays. For example, if a customer reports an incident at 3:00 pm on Friday, the technician will arrive by 10:00 am the following Monday.
9x5 next business day	A service technician is scheduled to arrive at the client’s location on the business day after remote problem determination is completed. Lenovo provides service 8:00 am - 5:00 pm in the client's local time zone, Monday - Friday, excluding Lenovo holidays. Calls received after 4:00 pm local time require an extra business day for service dispatch.

The following Lenovo warranty service upgrades are available:

- Warranty and maintenance service upgrades:
  - Three, four, or five years of 9x5 or 24x7 service coverage
  - Onsite response time from next business day to 4 hour same-day
  - Warranty extension of up to 5 years
  - Post warranty extensions offered in 1-year increments
- Priority Technical Support

  Lenovo’s Priority Support Offering enhances our award-winning call center support to provide top priority queue assignment to specialized Lenovo technicians. Priority support accelerates call center troubleshooting to get your problems resolved quickly, and includes other value-added support for Lenovo provided software tools. Priority support can be purchased stand alone to match the base warranty of your system or in convenient bundles with our same-day response services.
- Keep Your Drive Multi-Drive

  Lenovo’s Keep Your Drive Multi-Drive service is a multi-drive hard drive retention offering that ensures your data is always under your control, regardless of the number of hard drives that are installed in your Lenovo server. In the unlikely event of a hard drive failure, you retain possession of your hard drive while Lenovo replaces the failed drive part. Your data stays safely on your premises, in your hands. Keep Your Drive Multi-Drive covers multiple drives and multiple failures with one service offering at one value price. This service can be purchased stand-alone to match the base warranty of your system or in convenient bundles with our same-day response services.

Regulatory compliance

The RD550 conforms to the following regulations:

- RoHS
- Energy Star V2.0
- FCC class A: USA FCC 47 CFR Part 15-Subpart B; ANSI C63.4
- ICES class A: Canada ICES-003 Issue 5
- CB
- UL/cTUVus
- Germany GS
- Russia EAC
- Argentina AR-S
- Mexico NOM
- EU CE: EN55022; EN55024; EN61000-3-2;EN61000-3-3
- International: CISPR22; CISPR 24
- Brazil (voluntary)
- China CCC: GB 9254
- CECP
- CELP
- Green Guard

External drive enclosures

The following table lists the external drive enclosures that are offered by Lenovo that can be used in RD550 solutions.

Table 27. External drive enclosures

Description	Part number
Lenovo Storage E1012 LFF Disk Expansion Single SAS IO Module, Rail Kit, 9x5 NBD	64111B1
Lenovo Storage E1012 LFF Disk Expansion Dual SAS IO Module, Rail Kit, 9x5 NBD	64111B2
Lenovo Storage E1024 SFF Disk Expansion Single SAS IO Module, Rail Kit, 9x5 NBD	64111B3
Lenovo Storage E1024 SFF Disk Expansion Dual SAS IO Module, Rail Kit, 9x5 NBD	64111B4

For details about supported drives and cables for the Lenovo Storage E1012 and E1024, see the Lenovo Press Product Guide:
http://lenovopress.com/lp0043

External storage systems

The following table lists the external storage systems that are offered by Lenovo that can be used in RD550 solutions.

Table 28. External storage systems

Description	Part number
Lenovo Storage N Series (NAS storage)	
Lenovo Storage N3310	70FX / 70FY*
Lenovo Storage N4610	70G0 / 70G1*
Lenovo Storage S Series (SAS, iSCSI, or FC host connectivity)	
Lenovo Storage S2200 LFF Chassis SAS Single Controller, Rack Kit, 9x5NBD	64112B1
Lenovo Storage S2200 LFF Chassis SAS Dual Controller, Rack Kit, 9x5NBD	64112B2
Lenovo Storage S2200 LFF Chassis FC/iSCSI Single Controller, Rack Kit, 9x5NBD	64114B1
Lenovo Storage S2200 LFF Chassis FC/iSCSI Dual Controller, Rack Kit, 9x5NBD	64114B2
Lenovo Storage S2200 SFF Chassis SAS Single Controller, Rack Kit, 9x5NBD	64112B3
Lenovo Storage S2200 SFF Chassis SAS Dual Controller, Rack Kit, 9x5NBD	64112B4
Lenovo Storage S2200 SFF Chassis FC/iSCSI Single Controller, Rack Kit, 9x5NBD	64114B3
Lenovo Storage S2200 SFF Chassis FC/iSCSI Dual Controller, Rack Kit, 9x5NBD	64114B4
Lenovo Storage S3200 LFF Chassis SAS Single Controller, Rack Kit, 9x5NBD	64113B1
Lenovo Storage S3200 LFF Chassis SAS Dual Controller, Rack Kit, 9x5NBD	64113B2
Lenovo Storage S3200 LFF Chassis FC/iSCSI Single Controller, Rack Kit, 9x5NBD	64116B1
Lenovo Storage S3200 LFF Chassis FC/iSCSI Dual Controller, Rack Kit, 9x5NBD	64116B2
Lenovo Storage S3200 SFF Chassis SAS Single Controller, Rack Kit, 9x5NBD	64113B3
Lenovo Storage S3200 SFF Chassis SAS Dual Controller, Rack Kit, 9x5NBD	64113B4
Lenovo Storage S3200 SFF Chassis FC/iSCSI Single Controller, Rack Kit, 9x5NBD	64116B3
Lenovo Storage S3200 SFF Chassis FC/iSCSI Dual Controller, Rack Kit, 9x5NBD	64116B4
Lenovo Storage V Series (SAS, iSCSI, FC, or FCoE host connectivity)	
Lenovo Storage V3700 V2 LFF Control Enclosure	6535C1D
Lenovo Storage V3700 V2 LFF Control Enclosure (Top Seller)	6535EC1
Lenovo Storage V3700 V2 SFF Control Enclosure	6535C2D
Lenovo Storage V3700 V2 SFF Control Enclosure (Top Seller)	6535EC2
Lenovo Storage V3700 V2 XP LFF Control Enclosure	6535C3D
Lenovo Storage V3700 V2 XP LFF Control Enclosure (Top Seller)	6535EC3
Lenovo Storage V3700 V2 XP SFF Control Enclosure	6535C4D
Lenovo Storage V3700 V2 XP SFF Control Enclosure (Top Seller)	6535EC4
Lenovo Storage V5030 LFF Control Enclosure 3Yr S&S	6536C12
Lenovo Storage V5030 LFF Control Enclosure 5Yr S&S	6536C32
Lenovo Storage V5030 SFF Control Enclosure 3Yr S&S	6536C22
Lenovo Storage V5030 SFF Control Enclosure 5Yr S&S	6536C42
IBM Storwize for Lenovo (SAS [except V7000], iSCSI, FC, or FCoE host connectivity)	
IBM Storwize V3500 3.5-inch Dual Control Storage Controller Unit	6096CU2**
IBM Storwize V3500 2.5-inch Dual Control Storage Controller Unit	6096CU3**
IBM Storwize V3700 3.5-inch Storage Controller Unit	6099L2C

Description	Part number
IBM Storwize V3700 2.5-inch Storage Controller Unit	6099S2C
IBM Storwize V3700 2.5-inch DC Storage Controller Unit	6099T2C
IBM Storwize V5000 LFF Control Enclosure, w/3 Yr S&S	6194L2C†
IBM Storwize V5000 LFF Control Enclosure, w/3 Yr S&S (LA)	6194L2L‡
IBM Storwize V5000 LFF Control Enclosure, w/5 Yr S&S	61941A1†
IBM Storwize V5000 LFF Control Enclosure, w/5 Yr S&S (LA)	61941AL‡
IBM Storwize V5000 SFF Control Enclosure, w/3 Yr S&S	6194S2C†
IBM Storwize V5000 SFF Control Enclosure, w/3 Yr S&S (LA)	6194S2L‡
IBM Storwize V5000 SFF Control Enclosure, w/5 Yr S&S	61941C1†
IBM Storwize V5000 SFF Control Enclosure, w/5 Yr S&S (LA)	61941CL‡
IBM Storwize V7000 2.5-inch Storage Controller Unit, w/3 Yr S&S	6195SC5†
IBM Storwize V7000 2.5-inch Storage Controller Unit, w/3 Yr S&S (LA)	6195SCL‡
IBM Storwize V7000 2.5-inch Storage Controller Unit, w/5 Yr S&S	61951F1†
IBM Storwize V7000 2.5-inch Storage Controller Unit, w/5 Yr S&S (LA)	61951FL‡

* Machine Type; see the respective Product Guide in the NAS Storage category (http://lenovopress.com/storage/nas) for models.
** Available only in China.
† Available worldwide except Latin America.
‡ Available only in Latin America.

For more information, see the list of Product Guides in the following categories:

- Lenovo N Series storage: http://lenovopress.com/storage/nas
- Lenovo S Series and V Series storage: http://lenovopress.com/storage/san/lenovo
- IBM Storwize storage: http://lenovopress.com/storage/san/ibm

External backup units

The following table lists the external backup options that are offered by Lenovo that can be used in RD550 solutions.

Table 29. External backup options

Description	Part number
External RDX unit	
ThinkServer External RDX Tape Drive	4XF0G88929
RDX cartridges	
ThinkServer 1TB 3Gbps RDX Cartridge	4XB0F28660
ThinkServer 1.5TB 3Gbps RDX Cartridge	4XB0F28659
ThinkServer 2TB SATA 3Gbps RDX Cartridge	4XB0G88711
External SAS tape backup drives	
IBM TS2250 Tape Drive Model H5S	6160S5E
IBM TS2260 Tape Drive Model H6S	6160S6E
IBM TS2270 Tape Drive Model H7S	6160S7E
External SAS tape backup autoloaders	
IBM TS2900 Tape Autoloader w/LTO5 HH SAS	6171S5R
IBM TS2900 Tape Autoloader w/LTO6 HH SAS	6171S6R

Description	Part number
IBM TS2900 Tape Autoloader w/LTO7 HH SAS	6171S7R
External tape backup libraries	
IBM TS3100 Tape Library Model L2U	61732UL
IBM TS3200 Tape Library Model L4U	61734UL
Fibre Channel tape backup drives for TS3100 and TS3200 Tape Libraries	
6173 LTO Ultrium 5 Fibre Channel Drive	00NA107
6173 LTO Ultrium 5 Half High Fibre Drive Sled	00NA113
6173 LTO Ultrium 6 Fibre Channel Drive	00NA115
6173 LTO Ultrium 6 Half High Fibre Drive Sled	00NA119
6173 LTO Ultrium 7 Fibre Channel Drive	00WF765
6173 LTO Ultrium 7 Half High Fibre Drive Sled	00WF769
SAS tape backup drives for TS3100 and TS3200 Tape Libraries	
6173 LTO Ultrium 5 SAS Drive Sled	00NA109
6173 LTO Ultrium 5 Half High SAS Drive Sled	00NA111
6173 LTO Ultrium 6 Half High SAS Drive Sled	00NA117
6173 LTO Ultrium 7 Half High SAS Drive Sled	00WF767

For more information, see the list of Product Guides in the Backup Units category:
http://lenovopress.com/servers/options/backup

Top-of-rack Ethernet switches

The following table lists the top-of-rack Ethernet switches that are offered by Lenovo that can be used in RD550 solutions.

Table 30. Top-of-rack switches

Description	Part number
1 Gb Ethernet top-of-rack switches	
Lenovo RackSwitch G7028 (Rear to Front)	7159BAX
Lenovo RackSwitch G7052 (Rear to Front)	7159CAX
Lenovo RackSwitch G8052 (Rear to Front)	7159G52
10 Gb Ethernet top-of-rack switches	
Lenovo RackSwitch G8124E (Rear to Front)	7159BR6
Lenovo RackSwitch G8264 (Rear to Front)	7159G64
Lenovo RackSwitch G8264CS (Rear to Front)	7159DRX
Lenovo RackSwitch G8272 (Rear to Front)	7159CRW
Lenovo RackSwitch G8296 (Rear to Front)	7159GR6
40 Gb Ethernet top-of-rack switches	
Lenovo RackSwitch G8332 (Rear to Front)	7159BRX

For more information, see the list of Product Guides in the Top-of-rack switches category:
http://lenovopress.com/servers/options/switches

Fibre Channel SAN switches

The following table lists the Fibre Channel SAN switches that are offered by Lenovo that can be used in RD550 solutions.

Table 31. Fibre Channel SAN switches

Description	Part number
8 Gb Fibre Channel	
Lenovo B300, 8 ports activated w/ 8Gb SWL SFPs, 1 PS, Rail Kit	3873AR3
Lenovo B6505, 12 ports activated w/ 8Gb SWL SFPs, 1 PS, Rail Kit	3873AR4
Lenovo B6510, 24 ports activated w/ 8Gb SWL SFPs, 2 PS, Rail Kit	3873BR2
16 Gb Fibre Channel	
Lenovo B6505, 12 ports activated w/ 16Gb SWL SFPs, 1 PS, Rail Kit	3873AR5
Lenovo B6510, 24 ports activated w/ 16Gb SWL SFPs, 2 PS, Rail Kit	3873BR3

For more information, see the list of Product Guides in the Rack SAN Switches category:
http://lenovopress.com/storage/switches/rack

Rack cabinets

The following table lists the rack cabinets that are offered by Lenovo that can be used in RD550 solutions.

Table 32. Rack cabinets

Description	Part number
11U Rack Office Enablement Kit	201886X
25U S2 Standard Rack	93072RX
25U Static S2 Standard Rack	93072PX
42U S2 Standard Rack	93074RX
42U 1100mm Enterprise V2 Dynamic Rack	93634PX
42U 1100mm Enterprise V2 Dynamic Expansion Rack	93634EX
42U 1200mm Deep Dynamic Rack	93604PX
42U 1200mm Deep Static Rack	93614PX
42U Enterprise Rack	93084PX
42U Enterprise Expansion Rack	93084EX

For more information, see the list of Product Guides in the Rack cabinets category:
http://lenovopress.com/servers/options/racks

KVM switches and consoles

The following table lists the KVM switches and consoles that are offered by Lenovo that can be used in RD550 solutions.

Table 33. KVM switch and console options

Description	Part number
Consoles	
1U 18.5" Standard Console (without keyboard)	17238BX
Console keyboards	
Keyboard w/ Int. Pointing Device USB - US Eng 103P RoHS v2	46W6712
Keyboard w/ Int. Pointing Device USB - Arabic 253 RoHS v2	46W6713
Keyboard w/ Int. Pointing Device USB - Belg/UK 120 RoHS v2	46W6714
Keyboard w/ Int. Pointing Device USB - Chinese/US 467 RoHS v2	46W6715
Keyboard w/ Int. Pointing Device USB - Czech 489 RoHS v2	46W6716
Keyboard w/ Int. Pointing Device USB - Danish 159 RoHS v2	46W6717
Keyboard w/ Int. Pointing Device USB - Dutch 143 RoHS v2	46W6718
Keyboard w/ Int. Pointing Device USB - French 189 RoHS v2	46W6719
Keyboard w/ Int. Pointing Device USB - Fr/Canada 445 RoHS v2	46W6720
Keyboard w/ Int. Pointing Device USB - German 129 RoHS v2	46W6721
Keyboard w/ Int. Pointing Device USB - Greek 219 RoHS v2	46W6722
Keyboard w/ Int. Pointing Device USB - Hebrew 212 RoHS v2	46W6723
Keyboard w/ Int. Pointing Device USB - Hungarian 208 RoHS v2	46W6724
Keyboard w/ Int. Pointing Device USB - Italian 141 RoHS v2	46W6725
Keyboard w/ Int. Pointing Device USB - Japanese 194 RoHS v2	46W6726
Keyboard w/ Int. Pointing Device USB - Korean 413 RoHS v2	46W6727
Keyboard w/ Int. Pointing Device USB - LA Span 171 RoHS v2	46W6728
Keyboard w/ Int. Pointing Device USB - Norwegian 155 RoHS v2	46W6729
Keyboard w/ Int. Pointing Device USB - Polish 214 RoHS v2	46W6730
Keyboard w/ Int. Pointing Device USB - Portugese 163 RoHS v2	46W6731
Keyboard w/ Int. Pointing Device USB - Russian 441 RoHS v2	46W6732
Keyboard w/ Int. Pointing Device USB - Slovak 245 RoHS v2	46W6733
Keyboard w/ Int. Pointing Device USB - Spanish 172 RoHS v2	46W6734
Keyboard w/ Int. Pointing Device USB - Swed/Finn 153 RoHS v2	46W6735
Keyboard w/ Int. Pointing Device USB - Swiss F/G 150 RoHS v2	46W6736
Keyboard w/ Int. Pointing Device USB - Thai 191 RoHS v2	46W6737
Keyboard w/ Int. Pointing Device USB - Turkish 179 RoHS v2	46W6738
Keyboard w/ Int. Pointing Device USB - UK Eng 166 RoHS v2	46W6739
Keyboard w/ Int. Pointing Device USB - US Euro 103P RoHS v2	46W6740
Keyboard w/ Int. Pointing Device USB - Slovenian 234 RoHS v2	46W6741
Console switches	
Global 4x2x32 Console Manager (GCM32)	1754D2X
Global 2x2x16 Console Manager (GCM16)	1754D1X
Local 2x16 Console Manager (LCM16)	1754A2X

Description	Part number
Local 1x8 Console Manager (LCM8)	1754A1X
Console cables	
Single Cable USB Conversion Option (UCO)	43V6147
USB Conversion Option (4 Pack UCO)	39M2895
Virtual Media Conversion Option Gen2 (VCO2)	46M5383
Serial Conversion Option (SCO)	46M5382

For more information, see the list of Product Guides in the KVM Switches and Consoles category: http://lenovopress.com/servers/options/kvm

Uninterruptible power supply units

The following table lists the uninterruptible power supply (UPS) units that are offered by Lenovo that can be used in RD550 solutions.

Table 34. Uninterruptible power supply units

Description	Part number
RT1.5kVA 2U Rack or Tower UPS (100-125VAC)	55941AX
RT1.5kVA 2U Rack or Tower UPS (200-240VAC)	55941KX
RT2.2kVA 2U Rack or Tower UPS (100-125VAC)	55942AX
RT2.2kVA 2U Rack or Tower UPS (200-240VAC)	55942KX
RT3kVA 2U Rack or Tower UPS (100-125VAC)	55943AX
RT3kVA 2U Rack or Tower UPS (200-240VAC)	55943KX
RT5kVA 3U Rack or Tower UPS (200-240VAC)	55945KX
RT6kVA 3U Rack or Tower UPS (200-240VAC)	55946KX
RT8kVA 6U Rack or Tower UPS (200-240VAC)	55948KX
RT11kVA 6U Rack or Tower UPS (200-240VAC)	55949KX
RT8kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC)	55948PX
RT11kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC)	55949PX

For more information, see the list of Product Guides in the Uninterruptible Power Supply Units category: http://lenovopress.com/servers/options/ups

Power distribution units

The following table lists the power distribution units (PDUs) that are offered by Lenovo that can be used in RD550 solutions.

Table 35. Power distribution units

Description	Part number
0U Basic PDUs	
0U 36 C13/6 C19 24A/200-240V 1 Phase PDU with NEMA L6-30P line cord	00YJ776
0U 36 C13/6 C19 32A/200-240V 1 Phase PDU with IEC60309 332P6 line cord	00YJ777
0U 21 C13/12 C19 32A/200-240V/346-415V 3 Phase PDU with IEC60309 532P6 line cord	00YJ778
0U 21 C13/12 C19 48A/200-240V 3 Phase PDU with IEC60309 460P9 line cord	00YJ779
Switched and Monitored PDUs	
0U 20 C13/4 C19 Switched and Monitored 24A/200-240V/1Ph PDU w/ NEMA L6-30P line cord	00YJ781
0U 20 C13/4 C19 Switched and Monitored 32A/200-240V/1Ph PDU w/ IEC60309 332P6 line cord	00YJ780
0U 18 C13/6 C19 Switched / Monitored 32A/200-240V/346-415V/3Ph PDU w/ IEC60309 532P6 cord	00YJ782
0U 12 C13/12 C19 Switched and Monitored 48A/200-240V/3Ph PDU w/ IEC60309 460P9 line cord	00YJ783
1U 9 C19/3 C13 Switched and Monitored DPI PDU (without line cord)	46M4002
1U 9 C19/3 C13 Switched and Monitored 60A 3Ph PDU with IEC 309 3P+Gnd cord	46M4003
1U 12 C13 Switched and Monitored DPI PDU (without line cord)	46M4004
1U 12 C13 Switched and Monitored 60A 3 Phase PDU with IEC 309 3P+Gnd line cord	46M4005
Ultra Density Enterprise PDUs (9x IEC 320 C13 + 3x IEC 320 C19 outlets)	
Ultra Density Enterprise C19/C13 PDU Module (without line cord)	71762NX
Ultra Density Enterprise C19/C13 PDU 60A/208V/3ph with IEC 309 3P+Gnd line cord	71763NU
C13 Enterprise PDUs (12x IEC 320 C13 outlets)	
DPI C13 Enterprise PDU+ (without line cord)	39M2816
DPI Single Phase C13 Enterprise PDU (without line cord)	39Y8941
C19 Enterprise PDUs (6x IEC 320 C19 outlets)	
DPI Single Phase C19 Enterprise PDU (without line cord)	39Y8948
DPI 60A 3 Phase C19 Enterprise PDU with IEC 309 3P+G (208 V) fixed line cord	39Y8923
Front-end PDUs (3x IEC 320 C19 outlets)	
DPI 30amp/125V Front-end PDU with NEMA L5-30P line cord	39Y8938
DPI 30amp/250V Front-end PDU with NEMA L6-30P line cord	39Y8939
DPI 32amp/250V Front-end PDU with IEC 309 2P+Gnd line cord	39Y8934
DPI 60amp/250V Front-end PDU with IEC 309 2P+Gnd line cord	39Y8940
DPI 63amp/250V Front-end PDU with IEC 309 2P+Gnd line cord	39Y8935
Universal PDUs (7x IEC 320 C13 outlets)	
DPI Universal 7 C13 PDU (with 2 m IEC 320-C19 to C20 rack power cord)	00YE443
NEMA PDUs (6x NEMA 5-15R outlets)	
DPI 100-127V PDU with fixed NEMA L5-15P line cord	39Y8905
Line cords for PDUs that ship without a line cord	
DPI 30a Line Cord (NEMA L6-30P)	40K9614
DPI 32a Line Cord (IEC 309 P+N+G)	40K9612

Description	Part number
DPI 32a Line Cord (IEC 309 3P+N+G)	40K9611
DPI 60a Cord (IEC 309 2P+G)	40K9615
DPI 63a Cord (IEC 309 P+N+G)	40K9613
DPI Australian/NZ 3112 Line Cord	40K9617

For more information, see the list of Product Guides in the Power Distribution Units category: http://lenovopress.com/servers/options/pdu

Lenovo Financial Services

Lenovo Financial Services reinforces Lenovo's commitment to deliver pioneering products and services that are recognized for their quality, excellence, and trustworthiness. Lenovo Financial Services offers financing solutions and services that complement your technology solution anywhere in the world.

We are dedicated to delivering a positive finance experience for customers like you who want to maximize your purchase power by obtaining the technology you need today, protect against technology obsolescence, and preserve your capital for other uses.

We work with businesses, non-profit organizations, governments and educational institutions to finance their entire technology solution. We focus on making it easy to do business with us. Our highly experienced team of finance professionals operates in a work culture that emphasizes the importance of providing outstanding customer service. Our systems, processes and flexible policies support our goal of providing customers with a positive experience.

We finance your entire solution. Unlike others, we allow you to bundle everything you need from hardware and software to service contracts, installation costs, training fees, and sales tax. If you decide weeks or months later to add to your solution, we can consolidate everything into a single invoice.

Our Premier Client services provide large accounts with special handling services to ensure these complex transactions are serviced properly. As a premier client, you have a dedicated finance specialist who manages your account through its life, from first invoice through asset return or purchase. This specialist develops an in-depth understanding of your invoice and payment requirements. For you, this dedication provides a high-quality, easy, and positive financing experience.

For your region specific offers please ask your Lenovo sales representative or your technology provider about the use of Lenovo Financial Services. For more information, see the following Lenovo website: http://www.lenovofs.com

Related publications and links

For more information, see these resources:

- ThinkServer RD550 product page
  http://shop.lenovo.com/us/en/systems/servers/racks/thinkserver/rd550
- ThinkServer RD550 User Guide and Hardware Maintenance Manual
  http://download.lenovo.com/pccbbs/thinkservers/rd550ughmm_en.pdf
- Lenovo Presale Advisor Tool (PSAT) for ThinkServer RD550
  http://lenovo.presalesadvisor.com/Family/Family.aspx?id1=33
- Lenovo Quick Pick for ThinkServer RD550
  http://www.lenovoquickpick.com/usa/system/thinkserver/rd-series/rd550
- Lenovo Support for ThinkServer RD550
  http://support.lenovo.com/us/en/products/servers/thinkserver-rack-servers/thinkserver-rd550
- ThinkServer Power Planner
  http://support.lenovo.com/us/en/downloads/ds101155
- Lenovo Press Product Guides for servers and options
  http://lenovopress.com/?rt=product-guide
- Lenovo PSREF for ThinkServer RD550
  http://psref.lenovo.com/Product/24

Related product families

Product families related to this document are the following:

- 2-Socket Rack Servers

Notices

Lenovo may not offer the products, services, or features discussed in this document in all countries. Consult your local Lenovo representative for information on the products and services currently available in your area. Any reference to a Lenovo product, program, or service is not intended to state or imply that only that Lenovo product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any Lenovo intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any other product, program, or service. Lenovo may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

Lenovo (United States), Inc.
1009 Think Place - Building One
Morrisville, NC 27560
U.S.A.
Attention: Lenovo Director of Licensing

LENOVO PROVIDES THIS PUBLICATION ”AS IS” WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some jurisdictions do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. Lenovo may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

The products described in this document are not intended for use in implantation or other life support applications where malfunction may result in injury or death to persons. The information contained in this document does not affect or change Lenovo product specifications or warranties. Nothing in this document shall operate as an express or implied license or indemnity under the intellectual property rights of Lenovo or third parties. All information contained in this document was obtained in specific environments and is presented as an illustration. The result obtained in other operating environments may vary. Lenovo may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Any references in this publication to non-Lenovo Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this Lenovo product, and use of those Web sites is at your own risk. Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

This document, TIPS1248, was created or updated on August 12, 2016.

Send us your comments in one of the following ways:

- Use the online Contact us review form found at:
  http://lenovopress.com/TIPS1248
- Send your comments in an e-mail to:
  comments@lenovopress.com

This document is available online at http://lenovopress.com/TIPS1248.

Trademarks

Lenovo, the Lenovo logo, and For Those Who Do are trademarks or registered trademarks of Lenovo in the United States, other countries, or both. A current list of Lenovo trademarks is available on the Web at http://www.lenovo.com/legal/copytrade.html.

The following terms are trademarks of Lenovo in the United States, other countries, or both:
Lenovo®
Lenovo Services™
Lenovo XClarity™
ThinkPad®
ThinkServer®
TopSeller™
RackSwitch™

The following terms are trademarks of other companies:

Intel® and Intel Xeon® are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

Linux® is a trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft® and Windows® are trademarks of Microsoft Corporation in the United States, other countries, or both.

Other company, product, or service names may be trademarks or service marks of others.