Lenovo PM963 NVMe Enterprise Value PCIe SSDs
Product Guide (withdrawn product)

The Lenovo PM963 NVMe Enterprise Value PCIe solid-state drives (SSDs) are general-purpose yet high-performance SSDs for Lenovo servers. They are engineered for greater performance and endurance in a cost-effective design, and to support a broader set of workloads.

Figure 1. Lenovo PM963 NVMe 2.5" Enterprise Value PCIe SSD

Did you know?

NVMe (Non-Volatile Memory Express) is a technology that overcomes SAS/SATA SSD performance limitations by optimizing hardware and software to take full advantage of flash technology. The use of NVMe drives means data is transferred more efficiently from the processor to the drives compared to the legacy Advance Host Controller Interface (AHCI) stack, thereby reducing latency and overhead. These SSDs connect directly to the processor via the PCIe bus, further reducing latency and TCO.

Lenovo Enterprise Value SSDs are suitable for read-intensive and general-purpose data center workloads, however their NVMe PCIe interface means the drives also offer high performance. Overall, these SSDs provide outstanding IOPS/watt and cost/IOPS for enterprise solutions.

Part number information

The following table lists the part numbers and feature codes for ThinkSystem servers.

Table 1. Part numbers and feature codes for ThinkSystem

Part number	Feature code	Description
2.5-inch drives for ThinkSystem		
7N47A00984	AUV0	ThinkSystem U.2 PM963 1.92TB Entry 2.5" NVMe PCIe 3.0 Hot Swap SSD
7N47A00985	AUUU	ThinkSystem U.2 PM963 3.84TB Entry 2.5" NVMe PCIe 3.0 Hot Swap SSD
3.5-inch drives for ThinkSystem		
7N47A00987	AUUX	ThinkSystem 3.5" PM963 1.92TB Entry NVMe PCIe 3.0 Hot Swap SSD
7N47A00988	AUVZ	ThinkSystem 3.5" PM963 3.84TB Entry NVMe PCIe 3.0 Hot Swap SSD

The following table lists the part numbers and feature codes for System x servers.

Table 2. Part numbers and feature codes for System x

Part number	Feature code	Description
2.5-inch drives		
01GR660	AVPN	PM963 1.92TB NVMe 2.5" Enterprise Value PCIe SSD
01GT715	AVPP	PM963 3.84TB NVMe 2.5" Enterprise Value PCIe SSD

The following table lists the part numbers for ThinkServer systems.

Table 3. Part numbers for ThinkServer

Part number	Description
2.5-inch drives	
4XB0K12390	ThinkServer PM963 3.84TB NVMe 2.5" Enterprise Entry Easy Swap SSD
4XB0K12389	ThinkServer PM963 1.92TB NVMe 2.5" Enterprise Entry Easy Swap SSD

The part numbers include the following items:

- One 2.5-inch solid-state drive
- Support Flyer for SSDs
- Warranty Flyer
- Important Notices Flyer

Features

Non-Volatile Memory Express (NVMe) is new PCIe 3.0 high performance SSD technology that provides high I/O throughput and low latency. NVMe interfaces remove SAS/SATA bottlenecks and unleash all of the capabilities of contemporary NAND flash memory. Each NVMe PCI SSD has direct PCIe 3.0 x4 connection, which provides at least 2x more bandwidth and 2x less latency than SATA/SAS-based SSD solutions. NVMe drives are also optimized for heavy multi-threaded workloads by using internal parallelism and many other improvements, such as enlarged I/O queues.

The PM963 NVMe Enterprise Value PCIe SSD have the following features:

- Available in 2.5-inch (U.2) and 3.5-inch form factors
- Low cost, read-intensive SSD from Samsung
- Direct PCIe 3.0 x4 connection for each NVMe drive, resulting in up to 4 GBps overall throughput.
- Advanced ECC Engine and End-to-End Data Protection
- Samsung 32 layer V-NAND stacks the vertical NAND layers in three dimensions, solving the cell-to-cell interference that causes data corruption in planar NAND.
- Protect data integrity from unexpected power loss with Samsung's advanced power-loss protection architecture
- Supports Self-Monitoring, Analysis and Reporting Technology (S.M.A.R.T).

Enterprise Value SSDs and Enterprise Performance SSDs have similar read IOPS performance, but the key difference between them is their endurance -- how long they can reliably perform write operations. Enterprise Entry SSDs have a better cost/IOPS ratio but lower endurance compared to Enterprise Performance SSDs. SSD write endurance is typically measured by the number of program/erase (P/E) write cycles that the drive incurs over its lifetime, listed as the total bytes of written data (TBW) in the device specification.

The TBW value assigned to a solid-state device is the total bytes of written data (based on the number of P/E cycles) that a drive can be guaranteed to complete (% of remaining P/E cycles = % of remaining TBW). Reaching this limit does not cause the drive to immediately fail. It simply denotes the maximum number of writes that can be guaranteed. A solid-state device will not fail upon reaching the specified TBW. At some point based on manufacturing variance margin, after surpassing the TBW value, the drive will reach the end-of-life point, at which the drive will go into a read-only mode.

Because of such behavior by Enterprise Entry solid-state drives, careful planning must be done to use them only in read-intensive or mixed up to 70% read/30% write environments to ensure that the TBW of the drive will not be exceeded before the required life expectancy.

For example, the PM963 3.84 TB drive has an endurance of 5466 TB of total bytes written (TBW). This means that for full operation over five years, write workload must be limited to no more than 2995 GB of writes per day, which is equivalent to 0.8 full drive writes per day (DWPD). For the device to last three years, the drive write workload must be limited to no more than 4992 GB of writes per day, which is equivalent to 1.3 full drive writes per day.

Technical specifications

The following tables present technical specifications for the PM963 NVMe 2.5" Enterprise Value PCIe SSD.

Table 4. Technical specifications

Feature	1.92 TB drive	3.84 TB drive
Interface	PCIe 3.0 x4	PCIe 3.0 x4
Capacity	1.92 TB	3.84 TB
Endurance (total bytes written)	2733 TB	5466 TB
Endurance (drive writes per day for 5 years)	0.8 DWPD	0.8 DWPD
Data reliability (UBER)	< 1 in 10^{17} bits read	< 1 in 10^{17} bits read
MTBF	2,000,000 hours	2,000,000 hours
IOPS reads (4 KB blocks)	430,000	430,000
IOPS writes (4 KB blocks)	40,000	40,000
Sequential read rate (128 KB blocks)	2000 MBps	2000 MBps
Sequential write rate (128 KB blocks)	1200 MBps	1200 MBps
Latency (random R/W)	85 µs / 50 µs	85 µs / 50 µs
Latency (sequential R/W)	15 µs / 35 µs	15 µs / 35 µs
Typical power (R/W)	7.2 W / 6.4 W	7.6 W / 7.0 W

Server support - ThinkSystem

The following table lists the ThinkSystem servers that are compatible.

Table 5. ThinkSystem server support

Description and part number	E SE350 (7Z46/7D1X)	1S Intel ST50 (7Y48/7Y50)	ST250 (7Y45/7Y46)	SR150 (7Y54)	SR250 (7Y51/7Y52)	2S Intel ST550 (7X09/7X10)	SR530 (7X07/7X08)	SR550 (7X03/7X04)	SR570 (7Y02/7Y03)	SR590 (7X98/7X99)	SR630 (7X01/7X02)	SR650 (7X05/7X06)	SR670 (7Y36/37/38)	AMD SR635 (7Y98/7Y99)	SR655 (7Y00/7Z01)	4S Intel SR850 (7X18/7X19)	SR850P (7D2F/2D2G)	SR860 (7X69/7X70)	SR950 (7X11/12/13)	Dense/Blade SD530 (7X21)	SD650 (7X58)	SN550 (7X16)	SN850 (7X15)
2.5-inch drives for ThinkSystem																							
U.2 PM963 1.92TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD, 7N47A00984	N	N	N	N	N	Y	N	N	Y	Y	Y	Y	N	N	N	Y	N	Y	Y	N	N	Y	Y
U.2 PM963 3.84TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD, 7N47A00985	N	N	N	N	N	Y	N	N	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	N	N	Y	Y
3.5-inch drives for ThinkSystem																							
3.5" PM963 1.92TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD, 7N47A00987	N	N	N	N	N	N	N	N	N	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N
3.5" PM963 3.84TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD, 7N47A00988	N	N	N	N	N	N	N	N	N	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N

Server support - System x

The following tables list the System x servers that are compatible.

Support for System x and dense servers with Xeon E5/E7 v4 and E3 v5 processors

Table 6. Support for System x and dense servers with Xeon E5/E7 v4 and E3 v5 processors

Part number	Description	x3250 M6 (3943)	x3250 M6 (3633)	x3550 M5 (8869)	x3650 M5 (8871)	x3850 X6/x3950 X6 (6241, E7 v4)	nx360 M5 (5465, E5-2600 v4)	sd350 (5493)
01GR660	PM963 1.92TB NVMe 2.5" Enterprise Value PCIe SSD	N	N	Y	Y	Y	N	N
01GT715	PM963 3.84TB NVMe 2.5" Enterprise Value PCIe SSD	N	N	Y	Y	Y	N	N

Support for System x and dense servers with Intel Xeon v3 processors

Table 7. Support for servers with Intel Xeon v3 processors

Part number	Description	x3100 M5 (5457)	x3250 M5 (5458)	x3500 M5 (5464)	x3550 M5 (5463)	x3650 M5 (5462)	x3850 X6/x3950 X6 (6241, E7 v3)	nx360 M5 (5465)
01GR660	PM963 1.92TB NVMe 2.5" Enterprise Value PCIe SSD	N	N	N	N	N	N	N
01GT715	PM963 3.84TB NVMe 2.5" Enterprise Value PCIe SSD	N	N	N	N	N	N	N

Server support - ThinkServer

The following tables list the ThinkServer systems that are compatible.

Support for sd350: The drives supported with the sd350 are listed in Table 4.

The following tables list the ThinkServer systems that are compatible.

Support for ThinkServer Gen 5 servers with E5 v4 or E3 v5 processors

Table 8. Support for ThinkServer Generation 5 servers with E5 v4 or E3 v5 processors

Part number	Description	TS150 (E3 v5)	TS450 (E3 v5)	RS160 (E3 v5)	TD350 (E5 v4)	RD350 (E5 v4)	RD450 (E5 v4)	RD550 (E5 v4)	RD650 (E5 v4)
4XB0K12389	ThinkServer PM963 1.92TB NVMe 2.5" Enterprise Entry Easy Swap SSD	N	N	N	N	N	N	Y	Y
4XB0K12390	ThinkServer PM963 3.84TB NVMe 2.5" Enterprise Entry Easy Swap SSD	N	N	N	N	N	N	Y	Y

Support for ThinkServer Gen 5 servers with E5 v3 processors

Table 9. Support for ThinkServer Generation 5 servers with E5 v3 processors

Part number	Description	TS140	TS440	RS140	TD350 (E5 v3)	RD350 (E5 v3)	RD450 (E5 v3)	RD550 (E5 v3)	RD650 (E5 v3)	RQ750 (E5 v3)
4XB0K12389	ThinkServer PM963 1.92TB NVMe 2.5" Enterprise Entry Easy Swap SSD	N	N	N	N	N	N	N	N	N
4XB0K12390	ThinkServer PM963 3.84TB NVMe 2.5" Enterprise Entry Easy Swap SSD	N	N	N	N	N	N	N	N	N

Server support - Flex System

The following table lists the compatibility information for Flex System servers.

Table 10. Support for Flex System servers

Part number	Description	x240 (8737, E5-2600 v2)	x240 (7162)	x240 M5 (9532, E5 v3)	x240 M5 (9532, E5 v4)	x440 (7167)	x880/x480/x280 X6 (7903)	x280/x480/x880 X6 (7196)	Storage Expansion Node
01GR660	PM963 1.92TB NVMe 2.5" Enterprise Value PCIe SSD	N	N	N	N	N	N	N	N
01GT715	PM963 3.84TB NVMe 2.5" Enterprise Value PCIe SSD	N	N	N	N	N	N	N	N

Storage controller support

NVMe PCIe SSDs require a NVMe drive backplane and some form of PCIe connection to processors. PCIe connections can take the form of either an adapter (PCIe Interposer or PCIe extender) or simply a cable that connects to an onboard NVMe connector.

Consult the relevant server product guide for details about required components for NVMe drive support.

Operating system support

The following table lists the supported operating systems:

Tip: This table is automatically generated based on data from Lenovo ServerProven.

Table 11. Operating system support for ThinkSystem U.2 PM963 3.84TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD, 7N47A00985 (Part 1 of 2)

Operating systems	SN550 (Xeon Gen 2)	SN850 (Xeon Gen 2)	SR570 (Xeon Gen 2)	SR590 (Xeon Gen 2)	SR630 (Xeon Gen 2)	SR650 (Xeon Gen 2)	SR850 (Xeon Gen 2)	SR850P (Xeon Gen 2)	SR860 (Xeon Gen 2)	SR950 (Xeon Gen 2)	ST550 (Xeon Gen 2)
Microsoft Windows Server 2012 R2	N	N	N	N	N	N	N	N	N	N	N
Microsoft Windows Server 2016	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2019	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2022	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server version 1709	N	N	N	N	N	N	N	N	N	N	N
Microsoft Windows Server version 1803	N	N	N	N	N	N	N	N	N	N	N
Red Hat Enterprise Linux 6.10	N	N	N	N	N	N	N	N	N	N	N
Red Hat Enterprise Linux 6.9	N	N	N	N	N	N	N	N	N	N	N
Red Hat Enterprise Linux 7.3	N	N	N	N	N	N	N	N	N	N	N
Red Hat Enterprise Linux 7.4	N	N	N	N	N	N	N	N	N	N	N
Red Hat Enterprise Linux 7.5	N	N	N	N	N	N	N	N	N	N	N
Red Hat Enterprise Linux 7.6	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.7	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.8	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.9	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.0	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.0	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 11 SP4	N	N	N	N	N	N	N	N	N	N	N

Operating systems	SN550 (Xeon Gen 2)	SN850 (Xeon Gen 2)	SR570 (Xeon Gen 2)	SR590 (Xeon Gen 2)	SR630 (Xeon Gen 2)	SR650 (Xeon Gen 2)	SR850 (Xeon Gen 2)	SR850P (Xeon Gen 2)	SR860 (Xeon Gen 2)	SR950 (Xeon Gen 2)	ST550 (Xeon Gen 2)
SUSE Linux Enterprise Server 12 SP2	N	N	N	N	N	N	N	N	N	N	N
SUSE Linux Enterprise Server 12 SP2 with Xen	N	N	N	N	N	N	N	N	N	N	N
SUSE Linux Enterprise Server 12 SP3	N	N	N	N	N	N	N	Y	N	N	N
SUSE Linux Enterprise Server 12 SP3 with Xen	N	N	N	N	N	N	N	Y	N	N	N
SUSE Linux Enterprise Server 12 SP4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP4 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP5 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP1 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP2 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP3 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP4 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Ubuntu 22.04 LTS	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.0 U3	N	N	N	N	N	N	N	N	N	N	N
VMware vSphere Hypervisor (ESXi) 6.5	N	N	N	N	N	N	N	N	N	N	N
VMware vSphere Hypervisor (ESXi) 6.5 U1	N	N	N	N	N	N	N	N	N	N	N
VMware vSphere Hypervisor (ESXi) 6.5 U2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7	N	N	N	N	N	N	N	N	N	N	N
VMware vSphere Hypervisor (ESXi) 6.7 U1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7 U2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7 U3	N	N	N	N	N	N	N	Y	N	N	N
VMware vSphere Hypervisor (ESXi) 7.0	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 8.0	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Table 12. Operating system support for ThinkSystem U.2 PM963 3.84TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD, 7N47A00985 (Part 2 of 2)

Operating systems	SN550 (Xeon Gen 1)	SN850 (Xeon Gen 1)	SR570 (Xeon Gen 1)	SR590 (Xeon Gen 1)	SR630 (Xeon Gen 1)	SR650 (Xeon Gen 1)	SR850 (Xeon Gen 1)	SR860 (Xeon Gen 1)	SR950 (Xeon Gen 1)	ST550 (Xeon Gen 1)
Microsoft Windows Server 2012 R2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2016	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2019	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2022	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server version 1709	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server version 1803	Y	N	N	N	Y	Y	Y	Y	Y	N
Red Hat Enterprise Linux 6.10	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 6.9	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.3	Y	Y	N	N	Y	Y	Y	N	Y	Y
Red Hat Enterprise Linux 7.4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.6	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.7	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.8	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.9	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.0	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.0	N	N	N	N	N	N	N	N	N	N
SUSE Linux Enterprise Server 11 SP4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP2	Y	Y	N	N	Y	Y	Y	N	Y	Y
SUSE Linux Enterprise Server 12 SP2 with Xen	N	Y	N	N	Y	Y	Y	N	Y	Y
SUSE Linux Enterprise Server 12 SP3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP3 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP4 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP5 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Operating systems	SN550 (Xeon Gen 1)	SN850 (Xeon Gen 1)	SR570 (Xeon Gen 1)	SR590 (Xeon Gen 1)	SR630 (Xeon Gen 1)	SR650 (Xeon Gen 1)	SR850 (Xeon Gen 1)	SR860 (Xeon Gen 1)	SR950 (Xeon Gen 1)	ST550 (Xeon Gen 1)
SUSE Linux Enterprise Server 15 SP1 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP2 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP3 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP4 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Ubuntu 22.04 LTS	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.0 U3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.5	Y	Y	N	N	Y	Y	Y	N	Y	Y
VMware vSphere Hypervisor (ESXi) 6.5 U1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.5 U2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7 U1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7 U2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7 U3	N	N	N	N	N	N	N	N	N	N
VMware vSphere Hypervisor (ESXi) 7.0	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 8.0	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Warranty

The PM963 NVMe Enterprise Value PCIe SSDs carry a one-year, customer-replaceable unit (CRU) limited warranty. When the SSDs are installed in a supported server, these drives assume the system's base warranty and any warranty upgrades.

Solid State Memory cells have an intrinsic, finite number of program/erase cycles that each cell can incur. As a result, each solid state device has a maximum amount of program/erase cycles to which it can be subjected. The warranty for Lenovo solid state drives (SSDs) is limited to drives that have not reached the maximum guaranteed number of program/erase cycles, as documented in the Official Published Specifications for the SSD product. A drive that reaches this limit may fail to operate according to its Specifications.

Physical specifications

The PM963 NVMe Enterprise Value PCIe SSDs have the following physical specifications:

Dimensions and weight (approximate, without the drive tray):

- Height: 7 mm (0.3 in.)
- Width: 70 mm (2.8 in.)
- Depth: 100 mm (4.0 in.)
- Weight: 70 g (2.5 oz)

Shipping dimensions and weight for the 2.5-inch drives (approximate):

- Height: 63 mm (2.5 in.)
- Width: 133 mm (5.2 in.)
- Depth: 174 mm (6.9 in.)
- Weight (with drive tray): 433 g (1.0 lb)

Operating environment

The PM963 NVMe Enterprise Value PCIe SSDs are supported in the following environment:

- Temperature: 0 to 70 °C (32 to 158 °F)
- Relative humidity: 5 to 95% (noncondensing)
- Maximum altitude: 3,050 m (10,000 ft)
- Shock, operating: 1,500 G (Max) at 0.5 ms
- Vibration: 2.17 G_{RMS} (7-800 Hz)

Agency approvals

The PM963 NVMe Enterprise Value PCIe SSDs conform to the following regulations:

- UL
- TUV
- FCC
- CE Mark
- C-Tick Mark
- BSMI (Taiwan)
- KCC (Korea EMI)

Related publications and links

For more information, see the following documents:

- Lenovo ThinkSystem storage options product web page
  https://lenovopress.com/lp0761-storage-options-for-thinksystem-servers

- Lenovo System x storage options product web page
  https://www3.lenovo.com/us/en/data-center/servers/server-options/system-x-options/server-storage/c/system-x-storage

- Samsung product page for Enterprise SSDs
  http://www.samsung.com/semiconductor/products/flash-storage/enterprise-ssd/

- ThinkServer Option Compatibility Matrix (OCM)
  http://www.lenovo.com/accessoriesguide

Related product families

Product families related to this document are the following:

- Drives

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