

ThinkSystem PM1743 Read Intensive NVMe PCIe 5.0 SSDs

Product Guide

The ThinkSystem PM1743 Read Intensive NVMe PCIe 5.0 SSDs, available in capacities up to 15.36TB, are general-purpose yet high-performance NVMe PCIe Gen 5 SSDs. They are engineered for greater performance and endurance in a cost-effective design, and to support a broader set of workloads. Now with SED encryption as standard, these drives help ensure data security, even when the drive is removed from the server.

The PM1743 SSDs are available in both 2.5-inch and E3.S EDSFF form factors.

SED support: All drives listed in this product guide include SED drive encryption. Our naming convention for new drives doesn't include SED in the name.



Figure 1. ThinkSystem PM1743 Read Intensive NVMe PCIe 5.0 SSDs in E3.S 1T EDSFF form factor

Did you know?

The PM1743 SSDs are part of the new family of PCIe 5.0 SSDs that match the performance of the ThinkSystem V3 family of servers. By having a Gen 5 host interface, sequential performance is doubled compared to Gen 4 SSDs. The NVMe host interface also maximizes flash storage performance and minimizes latency.

Lenovo Read Intensive SSDs like the PM1743 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. Ordering information

Part number	Feature	Description	Vendor part number
2.5-inch hot-swap drives			
4XB7A82366	BTPZ	ThinkSystem 2.5" U.3 PM1743 1.92TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	MZWLO1T9HCJR-00A07
4XB7A82367	BTQ0	ThinkSystem 2.5" U.3 PM1743 3.84TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	MZWLO3T8HCLS-00A07
4XB7A82368	BTQ1	ThinkSystem 2.5" U.3 PM1743 7.68TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	MZWLO7T6HBLA-00A07
4XB7A82369	BTQ2	ThinkSystem 2.5" U.3 PM1743 15.36TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	MZWLO15THBLA-00A07
2.5-inch trayless drives			
4XB7A82609	BW8Q	ThinkSystem 2.5" 15mm U.3 PM1743 1.92TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	MZWLO1T9HCJR-00A07
4XB7A82411	BW8R	ThinkSystem 2.5" 15mm U.3 PM1743 3.84TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	MZWLO3T8HCLS-00A07
4XB7A88392	BW8S	ThinkSystem 2.5" 15mm U.3 PM1743 7.68TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	MZWLO7T6HBLA-00A07
4XB7A88393	BW8T	ThinkSystem 2.5" 15mm U.3 PM1743 15.36TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	MZWLO15THBLA-00A07
E3.S EDSFF hot-swap drives			
4XB7A84129	BVTD	ThinkSystem E3.S PM1743 1.92TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	MZ3LO1T9HCJR-00A07
4XB7A84130	BVEJ	ThinkSystem E3.S PM1743 3.84TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	MZ3LO3T8HCJR-00A07
4XB7A84131	BVEK	ThinkSystem E3.S PM1743 7.68TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	MZ3LO7T6HBLT-00A07
4XB7A84132	BVEL	ThinkSystem E3.S PM1743 15.36TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	MZ3LO15THBLA-00A07
E3.S EDSFF trayless drives			
4XB7A88775	BWS1	ThinkSystem E3.S PM1743 1.92TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	MZ3LO1T9HCJR-00A07
4XB7A88776	BWS2	ThinkSystem E3.S PM1743 3.84TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	MZ3LO3T8HCJR-00A07
4XB7A88777	BWS3	ThinkSystem E3.S PM1743 7.68TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	MZ3LO7T6HBLT-00A07
4XB7A88778	BWS4	ThinkSystem E3.S PM1743 15.36TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	MZ3LO15THBLA-00A07

The part numbers include the following items:

- One solid-state drive
- Attached hot-swap tray (for hot-swap drives)
- Documentation flyer



Figure 2. ThinkSystem PM1743 Read Intensive NVMe PCIe 5.0 SSDs in 2.5-inch form factor

Features

Non-Volatile Memory Express (NVMe) is PCIe 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 of the PM1743 SSDs have direct PCIe 5.0 x4 connection, which provides at significantly greater bandwidth and lower 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 ThinkSystem PM1743 Read Intensive NVMe PCIe 5.0 SSDs have the following features:

- Available in two form factors:
 - 2.5-inch drive in a hot-swap tray
 - E3.S 1T EDSFF drive in a hot-swap tray
- Direct PCIe 5.0 x4 connection for each NVMe drive, resulting in up to 14 GBps overall throughput, compared to 7.5 GBps for a PCIe 4.0 connection.
- Also supports PCIe 4.0 and 3.0 host connection for servers with 3rd, 2nd or 1st Gen Intel Xeon Scalable processors or with PCIe 3.0/4.0 NVMe switch adapters
- Read-intensive SSD from Samsung using TLC flash technology
- Advanced ECC Engine and End-to-End Data Protection
- Samsung's SSD virtualization technology allows a single SSD to be subdivided into smaller SSDs, up to 64, providing independent virtual workspaces. It also enables SSDs to take on certain tasks typically carried out by the server CPUs, such as Single-Root I/O Virtualization (SR-IOV), requiring fewer server CPUs and SSDs.
- V-NAND Machine Learning enables the SSD to accurately predict and verify cell characteristics, as well as detect any variations in circuit patterns.
- Fail-In-Place technology ensures the SSD operates normally even when errors occur at the chip level. It allows the SSD to identify failing NAND cells, and actually recover then relocate the data without interrupting normal operations or impacting performance.
- 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).

- Supports the following specifications:
 - PCI Express Base Specification Rev. 5.0
 - NVM Express Specification Rev. 1.3
 - NVM Express Management Interface Specification Rev. 1.0a

Read Intensive SSDs and Write Intensive SSDs have similar read IOPS performance, but the key difference between them is their endurance -- how long they can reliably perform write operations. Read Intensive SSDs have a better cost/IOPS ratio but lower endurance compared to Write Intensive 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 Read Intensive 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 PM1743 3.84TB drive has an endurance of 7,008 TB of total bytes written (TBW). This means that for full operation over five years, write workload must be limited to no more than 3,840 GB of writes per day, which is equivalent to 1.0 full drive writes per day (DWPD). For the device to last three years, the drive write workload must be limited to no more than 6,400 GB of writes per day, which is equivalent to 1.7 full drive writes per day.

The benefits of drive encryption

All ThinkSystem PM1743 Read Intensive NVMe PCIe 5.0 SSDs support drive encryption.

Self-encrypting drives (SEDs) provide benefits in three main ways:

- By encrypting data on-the-fly at the drive level with no performance impact
- By providing instant secure erasure (cryptographic erasure, thereby making the data no longer readable)
- By enabling auto-locking to secure active data if a drive is misplaced or stolen from a system while in use

The following sections describe the benefits in more details.

Automatic encryption

It is vital that a company keep its data secure. With the threat of data loss due to physical theft or improper inventory practices, it is important that the data be encrypted. However, challenges with performance, scalability, and complexity have led IT departments to push back against security policies that require the use of encryption. In addition, encryption has been viewed as risky by those unfamiliar with key management, a process for ensuring a company can always decrypt its own data. Self-encrypting drives comprehensively resolve these issues, making encryption both easy and affordable.

When the self-encrypting drive is in normal use, its owner need not maintain authentication keys (otherwise known as credentials or passwords) in order to access the data on the drive. The self-encrypting drive will encrypt data being written to the drive and decrypt data being read from it, all without requiring an authentication key from the owner.

Drive retirement and disposal

When hard drives are retired and moved outside the physically protected data center into the hands of others, the data on those drives is put at significant risk. IT departments retire drives for a variety of reasons, including:

- Returning drives for warranty, repair, or expired lease agreements
- Removal and disposal of drives
- Repurposing drives for other storage duties

Nearly all drives eventually leave the data center and their owner's control. Corporate data resides on such drives, and when most leave the data center, the data they contain is still readable. Even data that has been striped across many drives in a RAID array is vulnerable to data theft because just a typical single stripe in today's high-capacity arrays is large enough to expose for example, hundreds of names and bank account numbers.

In an effort to avoid data breaches and the ensuing customer notifications required by data privacy laws, companies use different methods to erase the data on retired drives before they leave the premises and potentially fall into the wrong hands. Current retirement practices that are designed to make data unreadable rely on significant human involvement in the process, and are thus subject to both technical and human failure.

The drawbacks of today's drive retirement practices include the following:

- Overwriting drive data is expensive, tying up valuable system resources for days. No notification of completion is generated by the drive, and overwriting won't cover reallocated sectors, leaving that data exposed.
- Methods that include degaussing or physically shredding a drive are expensive. It is difficult to ensure the degauss strength is optimized for the drive type, potentially leaving readable data on the drive. Physically shredding the drive is environmentally hazardous, and neither practice allows the drive to be returned for warranty or expired lease.
- Some companies have concluded the only way to securely retire drives is to keep them in their control, storing them indefinitely in warehouses. But this is not truly secure because a large volume of drives coupled with human involvement inevitably leads to some drives being lost or stolen.
- Professional disposal services is an expensive option and includes the cost of reconciling the services as well as internal reports and auditing. Transporting of the drives also has the potential of putting the data at risk.

Self-encrypting drives eliminate the need to overwrite, destroy, or store retired drives. When the drive is to be retired, it can be cryptographically erased, a process that is nearly instantaneous regardless of the capacity of the drive.

Instant secure erase

The self-encrypting drive provides instant data encryption key destruction via cryptographic erasure. When it is time to retire or repurpose the drive, the owner sends a command to the drive to perform a cryptographic erasure. Cryptographic erasure simply replaces the encryption key inside the encrypted drive, making it impossible to ever decrypt the data encrypted with the deleted key.

Self-encrypting drives reduce IT operating expenses by reducing asset control challenges and disposal costs. Data security with self-encrypting drives helps ensure compliance with privacy regulations without hindering IT efficiency. So called "Safe Harbor" clauses in government regulations allow companies to not have to notify customers of occurrences of data theft if that data was encrypted and therefore unreadable.

Furthermore, self-encrypting drives simplify decommissioning and preserve hardware value for returns and repurposing by:

- Eliminating the need to overwrite or destroy the drive
- Securing warranty returns and expired lease returns
- Enabling drives to be repurposed securely

Auto-locking

Insider theft or misplacement is a growing concern for businesses of all sizes; in addition, managers of branch offices and small businesses without strong physical security face greater vulnerability to external theft. Self-encrypting drives include a feature called auto-lock mode to help secure active data against theft.

Using a self-encrypting drive when auto-lock mode is enabled simply requires securing the drive with an authentication key. When secured in this manner, the drive's data encryption key is locked whenever the drive is powered down. In other words, the moment the self-encrypting drive is switched off or unplugged, it automatically locks down the drive's data.

When the self-encrypting drive is then powered back on, it requires authentication before being able to unlock its encryption key and read any data on the drive, thus protecting against misplacement and theft.

While using self-encrypting drives just for the instant secure erase is an extremely efficient and effective means to help securely retire a drive, using self-encrypting drives in auto-lock mode provides even more advantages. From the moment the drive or system is removed from the data center (with or without authorization), the drive is locked. No advance thought or action is required from the data center administrator to protect the data. This helps prevent a breach should the drive be mishandled and helps secure the data against the threat of insider or outside theft.

Technical specifications

The following tables present the technical specifications for the PM1743 SSDs. Note that the performance data and power consumption is based on a PCIe 5.0 host interface.

Tip: 2.5-inch and E3.S 1T drives have the same performance data

Table 2. Technical specifications

Feature	1.92 TB drive	3.84 TB drive	7.68 TB drive	15.36 TB drive
Interface	PCIe 5.0 x4	PCIe 5.0 x4	PCIe 5.0 x4	PCIe 5.0 x4
Form factors	2.5-inch E3.S 1T	2.5-inch E3.S 1T	2.5-inch E3.S 1T	2.5-inch E3.S 1T
Capacity	1.92 TB	3.84 TB	7.68 TB	15.36 TB
SED encryption	TCG Opal 2.0	TCG Opal 2.0	TCG Opal 2.0	TCG Opal 2.0
Endurance (total bytes written)	3504 TB	7008 TB	14,016 TB	28,032 TB
Endurance (drive writes per day for 5 years)	1 DWPD	1 DWPD	1 DWPD	1 DWPD
Data reliability (UBER)	< 1 in 10 ¹⁷ bits read	< 1 in 10 ¹⁷ bits read	< 1 in 10 ¹⁷ bits read	< 1 in 10 ¹⁷ bits read
MTBF	2,500,000 hours	2,500,000 hours	2,500,000 hours	2,500,000 hours
Performance & Power - PCIe 5.0 host interface				
IOPS reads (4 KB blocks)	2,000,000	2,500,000	2,500,000	2,500,000
IOPS writes (4 KB blocks)	150,000	280,000	300,000	360,000
Sequential read rate (128 KB blocks)	14,000 MBps	14,000 MBps	14,000 MBps	14,000 MBps
Sequential write rate (128 KB blocks)	3000 MBps	6000 MBps	6000 MBps	7100 MBps
Latency (random R/W)	60 µs / 20 µs	60 µs / 20 µs	60 µs / 20 µs	90 µs / 20 µs
Latency (sequential R/W)	70 µs / 130 µs	70 µs / 80 µs	80 µs / 80 µs	80 µs / 60 µs
Typical power (R/W)	19.9 W / 15.5 W	20.9 W / 21.2 W	23 W / 21.1 W	24.6 W / 25 W
Performance & Power - PCIe 4.0 host interface				
IOPS reads (4 KB blocks)	1,700,000	1,700,000	1,700,000	1,700,000
IOPS writes (4 KB blocks)	150,000	280,000	300,000	360,000
Sequential read rate (128 KB blocks)	7500 MBps	7500 MBps	7500 MBps	7500 MBps
Sequential write rate (128 KB blocks)	3000 MBps	6000 MBps	6000 MBps	7000 MBps
Latency (random R/W)	60 µs / 20 µs	60 µs / 20 µs	60 µs / 20 µs	90 µs / 20 µs
Latency (sequential R/W)	70 µs / 130 µs	70 µs / 80 µs	80 µs / 80 µs	80 µs / 60 µs
Typical power (R/W)	-	-	-	-

Server support

The following tables list the ThinkSystem servers that are compatible.

Table 3. Server support (Part 1 of 3)

Part Number	Description	Edge				1S Intel V2			AMD V3				Intel V3							
		SE350 (7Z46 / 7D1X)	SE350 V2 (7DA9)	SE360 V2 (7DAM)	SE450 (7D8T)	ST50 V2 (7D8K / 7D8J)	ST250 V2 (7D8G / 7D8F)	SR250 V2 (7D7R / 7D7Q)	SR635 V3 (7D9H / 7D9G)	SR655 V3 (7D9F / 7D9E)	SR645 V3 (7D9D / 7D9C)	SR665 V3 (7D9B / 7D9A)	SR675 V3 (7D9Q / 7D9R)	ST650 V3 (7D7B / 7D7A)	SR630 V3 (7D72 / 7D73)	SR650 V3 (7D75 / 7D76)	SR850 V3 (7D97 / 7D96)	SR860 V3 (7D94 / 7D93)	SR950 V3 (7DC5 / 7DC4)	
2.5-inch hot-swap drives																				
4XB7A82366	ThinkSystem 2.5" U.3 PM1743 1.92TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y	Y	Y	Y	N
4XB7A82367	ThinkSystem 2.5" U.3 PM1743 3.84TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y	Y	Y	Y	N
4XB7A82368	ThinkSystem 2.5" U.3 PM1743 7.68TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y	Y	Y	Y	N
4XB7A82369	ThinkSystem 2.5" U.3 PM1743 15.36TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y	Y	Y	Y	N
2.5-inch trayless drives																				
4XB7A82609	ThinkSystem 2.5" 15mm U.3 PM1743 1.92TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7A82411	ThinkSystem 2.5" 15mm U.3 PM1743 3.84TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7A88392	ThinkSystem 2.5" 15mm U.3 PM1743 7.68TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7A88393	ThinkSystem 2.5" 15mm U.3 PM1743 15.36TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
E3.S EDSFF hot-swap drives																				
4XB7A84129	ThinkSystem E3.S PM1743 1.92TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
4XB7A84130	ThinkSystem E3.S PM1743 3.84TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	Y

Part Number	Description	Edge				1S Intel V2			AMD V3				Intel V3						
		SE350 (7Z46 / 7D1X)	SE350 V2 (7DA9)	SE360 V2 (7DAM)	SE450 (7D8T)	ST50 V2 (7D8K / 7D8J)	ST250 V2 (7D8G / 7D8F)	SR250 V2 (7D7R / 7D7Q)	SR635 V3 (7D9H / 7D9G)	SR655 V3 (7D9F / 7D9E)	SR645 V3 (7D9D / 7D9C)	SR665 V3 (7D9B / 7D9A)	SR675 V3 (7D9Q / 7D9R)	ST650 V3 (7D7B / 7D7A)	SR630 V3 (7D72 / 7D73)	SR650 V3 (7D75 / 7D76)	SR850 V3 (7D97 / 7D96)	SR860 V3 (7D94 / 7D93)	SR950 V3 (7DC5 / 7DC4)
4XB7A84131	ThinkSystem E3.S PM1743 7.68TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	Y
4XB7A84132	ThinkSystem E3.S PM1743 15.36TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	Y
E3.S EDSFF trayless drives																			
4XB7A88775	ThinkSystem E3.S PM1743 1.92TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7A88776	ThinkSystem E3.S PM1743 3.84TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7A88777	ThinkSystem E3.S PM1743 7.68TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7A88778	ThinkSystem E3.S PM1743 15.36TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Table 4. Server support (Part 2 of 3)

Part Number	Description	Dense V3				2S Intel V2				AMD V1				Dense V2		4S V2	8S				
		SD665 V3 (7D9P)	SD665-N V3 (7DAZ)	SD650 V3 (7D7M)	SD650-V3 (7D7L)	ST650 V2 (7Z75 / 7Z74)	SR630 V2 (7Z70 / 7Z71)	SR650 V2 (7Z72 / 7Z73)	SR670 V2 (7Z22 / 7Z23)	SR635 (7Y98 / 7Y99)	SR655 (7Y00 / 7Z01)	SR655 Client OS	SR645 (7D2Y / 7D2X)	SR665 (7D2W / 7D2V)	SD630 V2 (7D1K)	SD650 V2 (7D1M)	SD650-N V2 (7D1N)	SN550 V2 (7Z69)	SR850 V2 (7D31 / 7D32)	SR860 V2 (7Z59 / 7Z60)	SR950 (7X11 / 7X12)
2.5-inch hot-swap drives																					
4XB7A82366	ThinkSystem 2.5" U.3 PM1743 1.92TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	

Part Number	Description	Dense V3				2S Intel V2				AMD V1				Dense V2				4S V2	8S		
		SD665 V3 (7D9P)	SD665-N V3 (7DAZ)	SD650 V3 (7D7M)	SD650-I V3 (7D7L)	ST650 V2 (7Z75 / 7Z74)	SR630 V2 (7Z70 / 7Z71)	SR650 V2 (7Z72 / 7Z73)	SR670 V2 (7Z22 / 7Z23)	SR635 (7Y98 / 7Y99)	SR655 (7Y00 / 7Z01)	SR655 Client OS	SR645 (7D2Y / 7D2X)	SR665 (7D2W / 7D2V)	SD630 V2 (7D1K)	SD650 V2 (7D1M)	SD650-N V2 (7D1N)	SN550 V2 (7Z69)	SR850 V2 (7D31 / 7D32)	SR860 V2 (7Z59 / 7Z60)	SR950 (7X11 / 7X12)
4XB7A82367	ThinkSystem 2.5" U.3 PM1743 3.84TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7A82368	ThinkSystem 2.5" U.3 PM1743 7.68TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7A82369	ThinkSystem 2.5" U.3 PM1743 15.36TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
2.5-inch trayless drives																					
4XB7A82609	ThinkSystem 2.5" 15mm U.3 PM1743 1.92TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7A82411	ThinkSystem 2.5" 15mm U.3 PM1743 3.84TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7A88392	ThinkSystem 2.5" 15mm U.3 PM1743 7.68TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7A88393	ThinkSystem 2.5" 15mm U.3 PM1743 15.36TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
E3.S EDSFF hot-swap drives																					
4XB7A84129	ThinkSystem E3.S PM1743 1.92TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7A84130	ThinkSystem E3.S PM1743 3.84TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7A84131	ThinkSystem E3.S PM1743 7.68TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Part Number	Description	Dense V3				2S Intel V2			AMD V1				Dense V2			4S V2	8S				
		SD665 V3 (7D9P)	SD665-N V3 (7DAZ)	SD650 V3 (7D7M)	SD650-I V3 (7D7L)	ST650 V2 (7Z75 / 7Z74)	SR630 V2 (7Z70 / 7Z71)	SR650 V2 (7Z72 / 7Z73)	SR670 V2 (7Z22 / 7Z23)	SR635 (7Y98 / 7Y99)	SR655 (7Y00 / 7Z01)	SR655 Client OS	SR645 (7D2Y / 7D2X)	SR665 (7D2W / 7D2V)	SD630 V2 (7D1K)	SD650 V2 (7D1M)	SD650-N V2 (7D1N)	SN550 V2 (7Z69)	SR850 V2 (7D31 / 7D32)	SR860 V2 (7Z59 / 7Z60)	SR950 (7X11 / 7X12)
4XB7A84132	ThinkSystem E3.S PM1743 15.36TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
E3.S EDSFF trayless drives																					
4XB7A88775	ThinkSystem E3.S PM1743 1.92TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7A88776	ThinkSystem E3.S PM1743 3.84TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7A88777	ThinkSystem E3.S PM1743 7.68TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7A88778	ThinkSystem E3.S PM1743 15.36TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Table 5. Server support (Part 3 of 3)

Part Number	Description	4S V1			1S Intel V1			2S Intel V1						Dense V1							
		SR850 (7X18 / 7X19)	SR850P (7D2F / 2D2G)	SR860 (7X69 / 7X70)	ST50 (7Y48 / 7Y50)	ST250 (7Y45 / 7Y46)	SR150 (7Y54)	SR250 (7Y52 / 7Y51)	ST550 (7X09 / 7X10)	SR530 (7X07 / 7X08)	SR550 (7X03 / 7X04)	SR570 (7Y02 / 7Y03)	SR590 (7X98 / 7X99)	SR630 (7X01 / 7X02)	SR650 (7X05 / 7X06)	SR670 (7Y36 / 7Y37)	SD530 (7X21)	SD650 (7X58)	SN550 (7X16)	SN850 (7X15)	
2.5-inch hot-swap drives																					
4XB7A82366	ThinkSystem 2.5" U.3 PM1743 1.92TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7A82367	ThinkSystem 2.5" U.3 PM1743 3.84TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7A82368	ThinkSystem 2.5" U.3 PM1743 7.68TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Part Number	Description	4S V1		1S Intel V1				2S Intel V1						Dense V1						
		SR850 (7X18 / 7X19)	SR850P (7D2F / 2D2G)	SR860 (7X69 / 7X70)	ST50 (7Y48 / 7Y50)	ST250 (7Y45 / 7Y46)	SR150 (7Y54)	SR250 (7Y52 / 7Y51)	ST550 (7X09 / 7X10)	SR530 (7X07 / 7X08)	SR550 (7X03 / 7X04)	SR570 (7Y02 / 7Y03)	SR590 (7X98 / 7X99)	SR630 (7X01 / 7X02)	SR650 (7X05 / 7X06)	SR670 (7Y36 / 7Y37)	SD530 (7X21)	SD650 (7X58)	SN550 (7X16)	SN850 (7X15)
4XB7A82369	ThinkSystem 2.5" U.3 PM1743 15.36TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
2.5-inch trayless drives																				
4XB7A82609	ThinkSystem 2.5" 15mm U.3 PM1743 1.92TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7A82411	ThinkSystem 2.5" 15mm U.3 PM1743 3.84TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7A88392	ThinkSystem 2.5" 15mm U.3 PM1743 7.68TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7A88393	ThinkSystem 2.5" 15mm U.3 PM1743 15.36TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
E3.S EDSFF hot-swap drives																				
4XB7A84129	ThinkSystem E3.S PM1743 1.92TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7A84130	ThinkSystem E3.S PM1743 3.84TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7A84131	ThinkSystem E3.S PM1743 7.68TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7A84132	ThinkSystem E3.S PM1743 15.36TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
E3.S EDSFF trayless drives																				
4XB7A88775	ThinkSystem E3.S PM1743 1.92TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7A88776	ThinkSystem E3.S PM1743 3.84TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7A88777	ThinkSystem E3.S PM1743 7.68TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Part Number	Description	4S V1		1S Intel V1		2S Intel V1						Dense V1								
		SR850 (7X18 / 7X19)	SR850P (7D2F / 2D2G)	SR860 (7X69 / 7X70)	ST50 (7Y48 / 7Y50)	ST250 (7Y45 / 7Y46)	SR150 (7Y54)	SR250 (7Y52 / 7Y51)	ST550 (7X09 / 7X10)	SR530 (7X07 / 7X08)	SR550 (7X03 / 7X04)	SR570 (7Y02 / 7Y03)	SR590 (7X98 / 7X99)	SR630 (7X01 / 7X02)	SR650 (7X05 / 7X06)	SR670 (7Y36 / 7Y37)	SD530 (7X21)	SD650 (7X58)	SN550 (7X16)	SN850 (7X15)
4XB7A88778	ThinkSystem E3.S PM1743 15.36TB Read Intensive NVMe PCIe 5.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	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/switch adapter) or simply a cable that connects to an onboard NVMe connector.

PCIe 4.0 & 3.0 support: The PM1743 SSDs offer a PCIe 5.0 host interface, however they are backward compatible with a PCIe 4.0 or PCIe 3.0 host interface. Note however that servers or NVMe retimer/switch adapters with a PCIe 4.0 or 3.0 host interface will not see the same performance levels (especially sequential read and write rates).

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

Operating system support

The following tables list the supported operating systems.

Tip: These tables are automatically generated based on data from [Lenovo ServerProven](#).

Table 6. Operating system support for ThinkSystem 2.5" U.3 PM1743 3.84TB Read Intensive NVMe PCIe 5.0 x4 HS SSD, 4XB7A82367

Operating systems	SR630 V3	SR635 V3	SR650 V3	SR655 V3	SR675 V3
Microsoft Windows 10	N	N	Y ¹	N	N
Microsoft Windows 11	N	N	Y ¹	N	N
Microsoft Windows Server 2019	Y ¹	N	Y ¹	N	Y
Microsoft Windows Server 2022	Y ¹	N	Y ¹	N	Y
Red Hat Enterprise Linux 8.6	Y ¹	N	Y ¹	N	Y
Red Hat Enterprise Linux 8.7	Y ¹	N	Y ¹	N	N
Red Hat Enterprise Linux 9.0	Y ¹	N	Y ¹	N	Y
Red Hat Enterprise Linux 9.1	Y ¹	N	Y ¹	N	N
SUSE Linux Enterprise Server 15 SP4	Y ¹	N	Y ¹	N	Y
SUSE Linux Enterprise Server 15 SP4 with Xen	Y ¹	N	Y ¹	N	Y
Ubuntu 20.04.5 LTS	N	N	N	N	Y
Ubuntu 22.04 LTS	Y ¹	N	Y ¹	N	Y
VMware vSphere Hypervisor (ESXi) 7.0 U3	Y ²	N	Y ⁵	N	Y
VMware vSphere Hypervisor (ESXi) 8.0	Y ³	N	Y ⁶	N	N
VMware vSphere Hypervisor (ESXi) 8.0 U1	Y ⁴	Y	Y ⁷	Y	Y

¹ For limitation, please refer [Support Tip TT1184](#)

² For limitation, please refer [Support Tip 104278](#), [Support Tip TT1196](#)

³ For limitation, please refer [Support Tip 104278](#), [Support Tip TT1197](#)

⁴ For limitation, please refer [Support Tip 104278](#), [Support Tip TT1198](#)

⁵ For limitation, please refer [Support Tip 104278](#), [Support Tip TT1187](#)

⁶ For limitation, please refer [Support Tip 104278](#), [Support Tip TT1188](#)

⁷ For limitation, please refer [Support Tip 104278](#), [Support Tip TT1189](#)

IBM SKLM Key Management support

To effectively manage a large deployment of SEDs in Lenovo servers, IBM Security Key Lifecycle Manager (SKLM) offers a centralized key management solution. Certain Lenovo servers support Features on Demand (FoD) license upgrades that enable SKLM support.

The following table lists the part numbers and feature codes to enable SKLM support in the management processor of the server.

Table 7. FoD upgrades for SKLM support

Part number	Feature code	Description
Security Key Lifecycle Manager - FoD (United States, Canada, Asia Pacific, and Japan)		
00D9998	A5U1	SKLM for System x/ThinkSystem w/SEDs - FoD per Install w/1Yr S&S
00D9999	AS6C	SKLM for System x/ThinkSystem w/SEDs - FoD per Install w/3Yr S&S
Security Key Lifecycle Manager - FoD (Latin America, Europe, Middle East, and Africa)		
00FP648	A5U1	SKLM for System x/ThinkSystem w/SEDs - FoD per Install w/1Yr S&S
00FP649	AS6C	SKLM for System x/ThinkSystem w/SEDs - FoD per Install w/3Yr S&S

The IBM Security Key Lifecycle Manager software is available from Lenovo using the ordering information listed in the following table.

Table 8. IBM Security Key Lifecycle Manager licenses

Part number	Description
7S0A007FWW	IBM Security Key Lifecycle Manager Basic Edition Install License + SW Subscription & Support 12 Months
7S0A007HWW	IBM Security Key Lifecycle Manager For Raw Decimal Terabyte Storage Resource Value Unit License + SW Subscription & Support 12 Months
7S0A007KWW	IBM Security Key Lifecycle Manager For Raw Decimal Petabyte Storage Resource Value Unit License + SW Subscription & Support 12 Months
7S0A007MWW	IBM Security Key Lifecycle Manager For Usable Decimal Terabyte Storage Resource Value Unit License + SW Subscription & Support 12 Months
7S0A007PWW	IBM Security Key Lifecycle Manager For Usable Decimal Petabyte Storage Resource Value Unit License + SW Subscription & Support 12 Months

The following tables list the ThinkSystem servers that support the FoD license upgrade.

Table 9. IBM SKLM Key Management license upgrade support (Part 1 of 3)

Part Number	Description	Edge				1S Intel V2		AMD V3				Intel V3						
		SE350 (7Z46 / 7D1X)	SE350 V2 (7DA9)	SE360 V2 (7DAM)	SE450 (7D8T)	ST50 V2 (7D8K / 7D8J)	ST250 V2 (7D8G / 7D8F)	SR250 V2 (7D7R / 7D7Q)	SR635 V3 (7D9H / 7D9G)	SR655 V3 (7D9F / 7D9E)	SR645 V3 (7D9D / 7D9C)	SR665 V3 (7D9B / 7D9A)	SR675 V3 (7D9Q / 7D9R)	ST650 V3 (7D7B / 7D7A)	SR630 V3 (7D72 / 7D73)	SR650 V3 (7D75 / 7D76)	SR850 V3 (7D97 / 7D96)	SR860 V3 (7D94 / 7D93)
A5U1	SKLM for System x w/SEDs - FoD per Install w/1Yr S&S	N	N	N	N	N	Y	Y	N	N	N	N	Y	Y	Y	N	N	N
AS6C	SKLM for System x w/SEDs - FoD per Install w/3Yr S&S	N	N	N	N	N	Y	Y	N	N	N	N	Y	Y	Y	N	N	N

Table 10. IBM SKLM Key Management license upgrade support (Part 2 of 3)

Part Number	Description	Dense V3				2S Intel V2				AMD V1				Dense V2			4S V2	8S		
		SD665 V3 (7D9P)	SD665-N V3 (7DAZ)	SD650 V3 (7D7M)	SD650-I V3 (7D7L)	ST650 V2 (7Z75 / 7Z74)	SR630 V2 (7Z70 / 7Z71)	SR650 V2 (7Z72 / 7Z73)	SR670 V2 (7Z22 / 7Z23)	SR635 (7Y98 / 7Y99)	SR655 (7Y00 / 7Z01)	SR655 Client OS	SR645 (7D2Y / 7D2X)	SR665 (7D2W / 7D2V)	SD630 V2 (7D1K)	SD650 V2 (7D1M)	SD650-N V2 (7D1N)	SN550 V2 (7Z69)	SR850 V2 (7D31 / 7D32)	SR860 V2 (7Z59 / 7Z60)
A5U1	SKLM for System x w/SEDs - FoD per Install w/1Yr S&S	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N	N	Y	Y	Y	Y
AS6C	SKLM for System x w/SEDs - FoD per Install w/3Yr S&S	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N	N	Y	Y	Y	Y

Table 11. IBM SKLM Key Management license upgrade support (Part 3 of 3)

Part Number	Description	4S V1		1S Intel V1				2S Intel V1						Dense V1					
		SR850 (7X18 / 7X19)	SR850P (7D2F / 2D2G)	SR860 (7X69 / 7X70)	ST50 (7Y48 / 7Y50)	ST250 (7Y45 / 7Y46)	SR150 (7Y54)	SR250 (7Y52 / 7Y51)	ST550 (7X09 / 7X10)	SR530 (7X07 / 7X08)	SR550 (7X03 / 7X04)	SR570 (7Y02 / 7Y03)	SR590 (7X98 / 7X99)	SR630 (7X01 / 7X02)	SR650 (7X05 / 7X06)	SR670 (7Y36 / 7Y37)	SD530 (7X21)	SD650 (7X58)	SN550 (7X16)
A5U1	SKLM for System x w/SEDs - FoD per Install w/1Yr S&S	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N
AS6C	SKLM for System x w/SEDs - FoD per Install w/3Yr S&S	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N

Warranty

The PM1743 SSDs carry a one-year, customer-replaceable unit (CRU) limited warranty. When the SSDs are installed in a supported server, these drives assume the server'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 PM1743 SSDs have the following physical specifications:

Dimensions and weight of the 2.5-inch drives (approximate, without the drive tray):

- Height: 15 mm (0.6 in.)
- Width: 70 mm (2.8 in.)
- Depth: 100 mm (4.0 in.)
- Weight: 190 g (6.7 oz)

Dimensions and weight of the E3.S 1T drives (approximate, without the drive tray):

- Height: 7.5 mm (0.3 in.)
- Width: 76 mm (3 in.)
- Depth: 113 mm (4.4 in.)
- Weight: 120 g (4.2 oz)

Operating environment

The PM1743 SSDs are supported in the following environment:

- Temperature (operating): 0 to 70 °C (32 to 158 °F)
- Temperature (non-operating): -40 to 85 °C (-40 to 185 °F)
- Relative humidity (non-operating): 5 to 95% (noncondensing)
- Maximum altitude: 3,050 m (10,000 ft)
- Shock, non-operating: 1,500 G (Max) at 0.5 ms
- Vibration, non-operating: 20 G_{PEAK} (10-2000 Hz) at 4 min/cycle, 4 cycle/axis on 3 axis.

Agency approvals

The PM1743 SSDs conform to the following regulations:

- Safety
 - cUL
 - CE
 - TUV-GS
 - CB
- EMC
 - CE (EU)
 - BSMI (Taiwan)
 - KC (South Korea)
 - VCCI (Japan)
 - RCM (Australia)
 - FCC (USA) / IC (Canada)

Related publications and links

For more information, see the following documents:

- Lenovo ThinkSystem SSD Portfolio Comparison
<https://lenovopress.com/lp1261-lenovo-thinksystem-ssd-portfolio>
- Lenovo ThinkSystem storage options product web page
<https://lenovopress.com/lp0761-storage-options-for-thinksystem-servers>
- Samsung product page for PM1743 SSDs:
<https://semiconductor.samsung.com/ssd/enterprise-ssd/pm1743/>

Related product families

Product families related to this document are the following:

- [Drives](#)

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.
8001 Development Drive
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.

© Copyright Lenovo 2023. All rights reserved.

This document, LP1712, was created or updated on July 18, 2023.

Send us your comments in one of the following ways:

- Use the online Contact us review form found at:
<https://lenovopress.lenovo.com/LP1712>
- Send your comments in an e-mail to:
comments@lenovopress.com

This document is available online at <https://lenovopress.lenovo.com/LP1712>.

Trademarks

Lenovo and the Lenovo logo 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 <https://www.lenovo.com/us/en/legal/copytrade/>.

The following terms are trademarks of Lenovo in the United States, other countries, or both:

Lenovo®

ServerProven®

System x®

ThinkSystem®

The following terms are trademarks of other companies:

Intel® and Xeon® are trademarks of Intel Corporation or its subsidiaries.

Linux® is the trademark of Linus Torvalds in the U.S. and other countries.

Microsoft®, Windows Server®, 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.