

ThinkSystem RAID 540 PCIe Gen4 12Gb Adapters

Product Guide

The ThinkSystem RAID 540 PCIe Gen4 12Gb Adapters are an entry-level 12 Gb SAS/SATA family of internal RAID adapters that offer a cost-effective RAID solution for small to medium business customers. These cacheless adapters support RAID levels 0, 1 and 10, and include an extensive list of RAS and management features.

The ThinkSystem RAID 540-8i PCIe Gen4 12Gb Adapter is shown in the following figure.

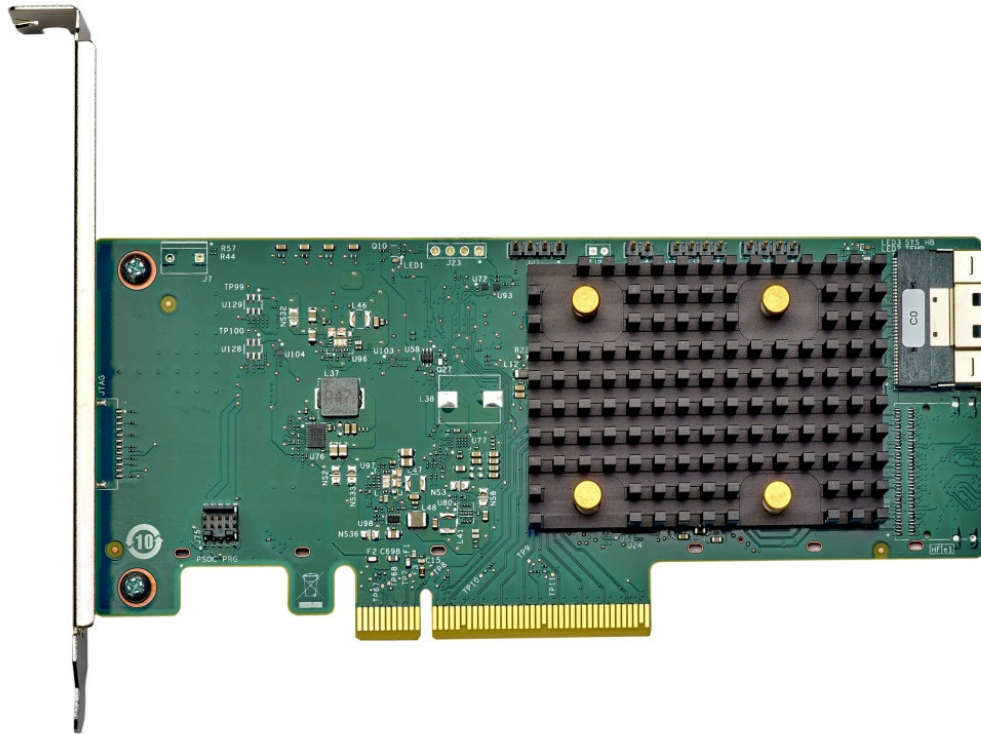


Figure 1. ThinkSystem RAID 540-8i PCIe Gen4 12Gb Adapter

Did you know?

Along with an extensive list of enterprise RAID capabilities, the RAID 540 adapters offer advanced drive diagnostic technologies. In the event of a physical drive failure, the drive is placed in a shielded state and the controller starts drive diagnostics to determine if the drive is indeed failed or can be restored. This saves time, money and server downtime associated with transient drive failures and unnecessary drive replacement.

Part number information

The following table provides the ordering information for the adapters.

Table 1. Part numbers and feature codes

Part number	Feature code	Description
4Y37A78834	BMFT	ThinkSystem RAID 540-8i PCIe Gen4 12Gb Adapter
4Y37A78835	BNM5, BNAX	ThinkSystem RAID 540-16i PCIe Gen4 12Gb Adapter

Technical specifications

The ThinkSystem RAID 540 PCIe Gen4 12Gb Adapters has the following specifications:

- PCIe 4.0 x8 host interface
- 12 Gbps SAS/SATA RAID controllers, based on the Broadcom MegaRAID 9540 adapter family
- Cacheless (not upgradeable)
- Connectivity for up to 16 internal SAS or SATA drives, depending on the adapters:
 - RAID 540-8i: 8 internal drives
 - RAID 540-16i: 16 internal drives
- Support for intermixing SAS and SATA HDDs and SSDs. Mixing SAS and SATA drives in the same array is not supported. Mixing of HDDs and SSDs in the same array is not supported.
- Support for intermixing of 12 Gbps and 6 Gbps drives.
- RAID level support: RAID 0, 1, 10
- Support for JBOD (non-RAID) drive state
- Support for up to 63 physical drives with SAS expander (where supported)
- Support for up to 32 virtual drives
- Support for logical drive sizes greater than 2 TB
- Fixed 64 KB stripe size
- Supports 512e, 512n and 4K sector formatted drives
- Supports UNMAP command for SAS SSDs (JBOD and RAID volumes)
- Supports TRIM command for SATA SSDs (JBOD)
- Compliant with Disk Data Format (DDF) configuration on disk (CoD).
- S.M.A.R.T. support.
- Configuration through
 - XClarity Provisioning Manager UEFI interface
 - XClarity Controller web interface
 - XClarity Administrator Configuration Patterns
 - StorCLI command-line interface
 - LSI Storage Authority (LSA) GUI interface
 - UEFI Human Interface Infrastructure (HII)

Note: CacheCade is not supported by these adapters

The following table compares the specifications of the adapters.

Table 2. Specifications

Feature	RAID 540-8i	RAID 540-16i
Part number	4Y37A78834	4Y37A78835
Form factor	PCIe low profile	PCIe low profile
Controller chip	SAS3808	SAS3816
Host interface	PCIe 4.0 x8	PCIe 4.0 x8
Port interface	12 Gb SAS	12 Gb SAS
Number of ports	8	16
Port connectors	One x8 SFF-8654	Two x8 SFF-8654
Drive interface	SAS, SATA	SAS, SATA
Drive type	HDD, SED, SSD	HDD, SED, SSD
Hot-swap drives	Yes	Yes
Max devices	8	16
RAID levels	0, 1, 10	0, 1, 10
JBOD mode	Yes	Yes
Cache	None	None
CacheVault cache protection	No	No
Performance Accelerator (FastPath)	Yes	Yes
SED support (SafeStore)	Yes	Yes

To compare these adapters to others in the ThinkSystem portfolio, see the ThinkSystem RAID Adapter and HBA Reference:

<https://lenovopress.com/lp1288-thinksystem-raid-adapter-and-hba-reference>

Features

The ThinkSystem RAID 540 PCIe Gen4 12Gb Adapters have the following standard features:

- MegaRAID FastPath SSD performance acceleration

MegaRAID FastPath software provides high-performance I/O acceleration for SSD-based virtual drives by using a low latency I/O path to increase the maximum I/O per second (IOPS) capability of the controller. This feature boosts the performance of applications with a highly random data storage access pattern, such as transactional databases.

- Auto-resume on array rebuild or array reconstruction after the loss of system power

Auto-resume uses non-volatile RAM (NVRAM) to save the rebuild progress during a host reboot or power failure to automatically resume from the last checkpoint. Auto-resume ensures that data integrity is maintained throughout the process. The card supports a number of features that can be implemented without rebooting the server. Applications, such as email and web server, benefit from avoiding downtime during the transition.

- Online Capacity Expansion

Online Capacity Expansion (OCE) allows the capacity of a virtual disk to be expanded by adding new physical disks or making use of unused space on existing disks, without requiring a reboot.

- Online RAID Level Migration

Online RAID Level Migration (RLM), which is also known as logical drive migration, can migrate a virtual disk from any RAID level to any other RAID level without requiring a reboot. System availability and application functionality remain unaffected.

- Fast initialization for quick array setup

Fast initialization quickly writes zeros to the first and last sectors of the virtual drive. This feature allows you to immediately start writing data to the virtual drive while the initialization is running in the background.

- Consistency check for background data integrity

Consistency check verifies that all stripes in a virtual disk with a redundant RAID level are consistent. The consistency check mirrors data when an inconsistent stripe is detected for RAID 1 and re-creates the parity from the peer disks for RAID 5 or RAID 6. Consistency checks can be scheduled to take place periodically.

- Extensive online configuration options and advanced monitoring and event notification

Management tools provide convenience for the configuration of logical volumes and alerting when errors have occurred or are about to occur.

- Patrol read for media scanning and repairing

Patrol read is a background sentry service that pro-actively discovers and corrects media defects (bad sectors) that arise normally as a disk drive ages. The service issues a series of verify commands, and if a bad block is discovered, the card's firmware uses RAID algorithms to re-create the missing data and remap the sector to a good sector. The task is interruptible based on controller activity and host operations. The firmware also provides an interface where the patrol read task can be initiated, set up for continuous operation, and terminated from a management application. Patrol read can be activated by a manual command or automatically.

- Global and dedicated hot spare with revertible hot spare support

A hot spare rebuilds data from all virtual disks within the disk group in which it is configured. You can define a physical disk as a hot spare to replace a failed drive. Hot spares can be configured as either global or dedicated. A global hot spare allows any physical drive to be designated as a hot spare. A dedicated hot spare allows the user to assign a hot spare drive to a particular array of the same drive type.

- Drive roaming

Drive roaming occurs when the physical disks are changed to different ports on the same controller. When the drives are placed on different channels, the controller detects the RAID configuration from the configuration data on the drives.

- MegaRAID SafeStore support for self-encrypting drive (SED) services

MegaRAID SafeStore encryption services offer instant secure erase and local key management for self-encrypting drives. This technology represents a step forward in securing data on a disk drive from any unauthorized access or modification resulting from theft, loss, or repurposing of drives. Instant secure erase permanently removes data when repurposing or decommissioning SEDs. SafeStore local key management provides the necessary management and protection of SEDs by using a simple pass phrase, security key identifier, and security key file that can be set and applied to all SEDs that are assigned to a RAID adapter. This feature removes the complexity of managing each SED's unique encryption key, and it essentially relieves the administrator of most of the daily tasks of securing data.

- XClarity Provisioning Manager for pre-boot array configuration and management

Provisioning Manager is the ThinkSystem UEFI-based application that includes a RAID setup wizard to help you configure drive groups and virtual disks before installing or booting the operating system.

- XClarity Controller web interface for remote storage management

XClarity Controller (XCC) is the systems management processor integrated in all ThinkSystem servers. The XCC web interface allows you to perform storage inventory, create and edit virtual disks, view events, import a new controller configuration, and perform firmware updates on the adapter.

- Hardware Secure Boot

The onboard controller incorporates advanced security by only permitting authenticated firmware to execute on the adapter. The controller's internal Boot ROM establishes an initial Root of Trust (RoT) and then authenticates and builds a Chain of Trust (CoT) with succeeding firmware images using the RoT, meaning only authorized firmware is executed on the adapter. Lenovo provides the firmware signed by Broadcom, making the use of hardware secure boot transparent to customers, while providing confidence in the security of the solution.

Note: MegaRAID CacheCade and MegaRAID Storage Manager are not supported.

The ThinkSystem RAID 540-16i PCIe Gen4 12Gb Adapter is shown in the following figure.

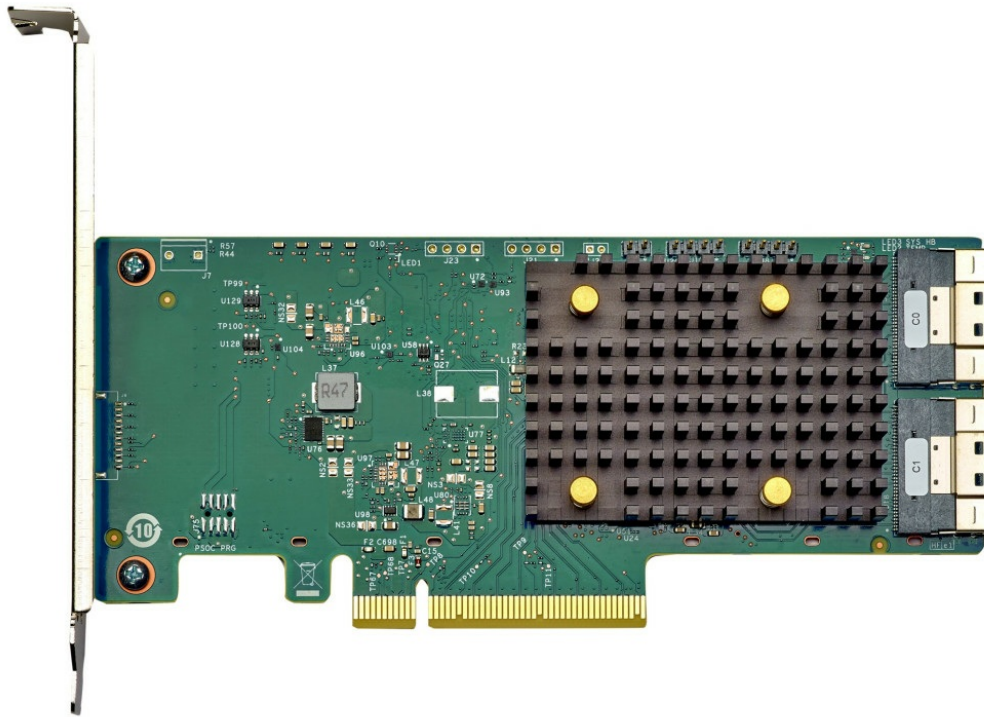


Figure 2. ThinkSystem RAID 540-16i PCIe Gen4 12Gb Adapter

Server support

The following tables list the ThinkSystem servers that are compatible.

Table 3. Server support (Part 1 of 2)

Part Number	Description	Edge		1S Intel V2		2S Intel V2				AMD			Dense V2			4S V2	8S				
		SE350 (7Z46 / 7D1X)	SE450 (7D8T)	ST50 V2 (7D8K / 7D8J)	ST250 V2 (7D8G / 7D8F)	SR250 V2 (7D7R / 7D7Q)	ST650 V2 (7Z75 / 7Z74)	SR630 V2 (7Z70 / 7Z71)	SR650 V2 (7Z72 / 7Z73)	SR670 V2 (7Z22 / 7Z23)	SR635 (7Y98 / 7Y99)	SR655 (7Y00 / 7Z01)	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)
4Y37A78834	ThinkSystem RAID 540-8i PCIe Gen4 12Gb Adapter	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	Y	Y	Y	Y
4Y37A78835	ThinkSystem RAID 540-16i PCIe Gen4 12Gb Adapter	N	N	N	N	N	Y	Y	Y	N	N	N	Y	Y	N	N	N	Y	Y	N	N

Table 4. Server support (Part 2 of 2)

Part Number	Description	1S Intel V1				2S Intel V1						Dense V1			4S V1					
		ST150 (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)	SR850 (7X18 / 7X19)	SR850P (7D2F / 2D2G)	SR860 (7X69 / 7X70)
4Y37A78834	ThinkSystem RAID 540-8i PCIe Gen4 12Gb Adapter	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	Y	Y	Y	Y
4Y37A78835	ThinkSystem RAID 540-16i PCIe Gen4 12Gb Adapter	N	N	N	N	N	N	N	Y	Y	Y	Y	N	N	N	N	N	N	N	N

Operating system support

The RAID 540 adapters support the following operating systems:

- [ThinkSystem RAID 540-8i PCIe Gen4 12Gb Adapter, 4Y37A78834](#)
- [ThinkSystem RAID 540-16i PCIe Gen4 12Gb Adapter, 4Y37A78835](#)

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

Table 5. Operating system support for ThinkSystem RAID 540-8i PCIe Gen4 12Gb Adapter, 4Y37A78834 (Part 1 of 3)

Operating systems	SR150	SR250	ST250	ST50	SR630 V2	SR650 V2	SR670 V2	SR850 V2	SR860 V2	ST650 V2	SR635	SR645	SR655	SR665
Microsoft Windows 10	N	N	N	N	N	N	N	N	N	N	N	N	Y ¹⁴	N
Microsoft Windows 11	N	N	N	N	N	N	N	N	N	N	N	N	Y ¹⁴	N
Microsoft Windows Server 2016	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2019	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2022	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.7	Y	Y	Y	Y	N	N	N	N	N	N	Y ¹	Y ¹⁰	Y ¹⁰	Y ¹⁰
Red Hat Enterprise Linux 7.8	Y	Y	Y	Y	N	N	N	N	N	N	Y ²	Y ²	Y ²	Y ²
Red Hat Enterprise Linux 7.9	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y ³	Y ¹¹	Y ¹¹	Y ¹¹
Red Hat Enterprise Linux 8.3	Y	Y	Y	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	Y	Y	Y
Red Hat Enterprise Linux 8.5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.6	Y	Y	Y	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	Y	Y	Y
SUSE Linux Enterprise Server 12 SP3	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N
SUSE Linux Enterprise Server 12 SP3 with Xen	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N
SUSE Linux Enterprise Server 12 SP4	N	N	N	N	N	N	N	N	N	N	Y ⁴	N	Y ⁴	N
SUSE Linux Enterprise Server 12 SP4 with Xen	N	N	N	N	N	N	N	N	N	N	Y ⁵	N	Y ⁵	N
SUSE Linux Enterprise Server 12 SP5	Y	Y	Y	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	Y	Y	Y
SUSE Linux Enterprise Server 15 SP1	Y	Y	Y	Y	N	N	N	N	N	N	Y ⁶	Y ⁶	Y ⁶	Y ⁶
SUSE Linux Enterprise Server 15 SP1 with Xen	Y	Y	Y	Y	N	N	N	N	N	N	Y ⁷	Y ¹²	Y ¹²	Y ¹²
SUSE Linux Enterprise Server 15 SP2	Y	Y	Y	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	Y	Y	Y
SUSE Linux Enterprise Server 15 SP3	Y	Y	Y	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	Y	Y	Y
SUSE Linux Enterprise Server 15 SP4	Y	Y	Y	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	Y	Y	Y
Ubuntu 22.04 LTS	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7 U3	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0	Y	Y	Y	Y	N	N	N	N	N	N	Y ⁸	Y ¹³	Y ¹³	Y ¹³
VMware vSphere Hypervisor (ESXi) 7.0 U1	Y	Y	Y	Y	N	N	N	Y	Y	N	Y ⁹	Y	Y ¹⁵	Y
VMware vSphere Hypervisor (ESXi) 7.0 U2	Y	Y	Y	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	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 8.0	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

¹ RHEL7.7 Not support with EPYC 7003 processors.

² RHEL7.8 Not support with EPYC 7003 processors

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- ³ RHEL7.9 Not support with EPYC 7003 processors.
- ⁴ SLES12 SP4 Not support with EPYC 7003 processors
- ⁵ SLES12 SP4 Xen Not support with EPYC 7003 processors
- ⁶ SLES15 SP1 Not support with EPYC 7003 processors
- ⁷ SLES15 SP1 Xen Not support with EPYC 7003 processors.
- ⁸ VMware 7.0 Not support with EPYC 7003 processors.
- ⁹ VMware 7.0 U1 Not support with EPYC 7003 processors.
- ¹⁰ RHEL7.7 Not support with EPYC 7003 processors
- ¹¹ RHEL7.9 Not support with EPYC 7003 processors
- ¹² SLES15 SP1 Xen Not support with EPYC 7003 processors
- ¹³ VMware 7.0 Not support with EPYC 7003 processors
- ¹⁴ ISG will not sell/preload this OS, but compatibility and cert only.
- ¹⁵ VMware 7.0 U1 Not support with EPYC 7003 processors

Table 6. Operating system support for ThinkSystem RAID 540-8i PCIe Gen4 12Gb Adapter, 4Y37A78834
(Part 2 of 3)

Operating systems	SR530 (Gen 2)	SR550 (Gen 2)	SR570 (Gen 2)	SR590 (Gen 2)	SR630 (Gen 2)	SR650 (Gen 2)	SR850 (Gen 2)	SR850P	SR860 (Gen 2)	SR950 (Gen 2)	ST550 (Gen 2)
Microsoft Windows 10	N	N	N	N	N	N	N	N	N	N	N
Microsoft Windows 11	N	N	N	N	N	N	N	N	N	N	N
Microsoft Windows Server 2016	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2019	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2022	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 8.3	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 8.6	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 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 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
Ubuntu 22.04 LTS	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7 U3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
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 7. Operating system support for ThinkSystem RAID 540-8i PCIe Gen4 12Gb Adapter, 4Y37A78834
(Part 3 of 3)

Operating systems	SR530 (Gen 1)	SR550 (Gen 1)	SR570 (Gen 1)	SR590 (Gen 1)	SR630 (Gen 1)	SR650 (Gen 1)	SR850 (Gen 1)	SR860 (Gen 1)	SR950 (Gen 1)	ST550 (Gen 1)
Microsoft Windows 10	N	N	N	N	N	N	N	N	N	N
Microsoft Windows 11	N	N	N	N	N	N	N	N	N	N
Microsoft Windows Server 2016	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2019	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2022	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 8.3	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 8.6	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
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 SP1	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
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
Ubuntu 22.04 LTS	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7 U3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
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

Table 8. Operating system support for ThinkSystem RAID 540-16i PCIe Gen4 12Gb Adapter, 4Y37A78835

Operating systems	SR630 V2	SR650 V2	SR850 V2	SR860 V2	ST650 V2	SR645	SR665	SR570 (Gen 2)	SR590 (Gen 2)	SR630 (Gen 2)	SR650 (Gen 2)	SR570 (Gen 1)	SR590 (Gen 1)	SR630 (Gen 1)	SR650 (Gen 1)
Microsoft Windows Server 2016	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2019	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2022	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.7	N	N	N	N	N	Y ¹	Y ¹	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.8	N	N	N	N	N	Y ²	Y ²	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.9	Y	Y	Y	Y	Y	Y ³	Y ³	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	Y	Y	Y	Y
Red Hat Enterprise Linux 8.4	Y	Y	Y	Y	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	Y	Y	Y	Y
Red Hat Enterprise Linux 8.6	Y	Y	Y	Y	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	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP3	N	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP3 with Xen	N	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP4	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP4 with Xen	N	N	N	N	N	N	N	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	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP5 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP1	N	N	N	N	N	Y ⁴	Y ⁴	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP1 with Xen	N	N	N	N	N	Y ⁵	Y ⁵	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	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP2 with Xen	Y	Y	Y	Y	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	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP3 with Xen	Y	Y	Y	Y	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	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP4 with Xen	Y	Y	Y	Y	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	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7 U3	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0	N	N	N	N	N	Y ⁶	Y ⁶	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U1	N	N	Y	Y	N	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	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U3	Y	Y	Y	Y	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	Y	Y	Y	Y

¹ RHEL7.7 Not support with EPYC 7003 processors

² RHEL7.8 Not support with EPYC 7003 processors

³ RHEL7.9 Not support with EPYC 7003 processors

⁴ SLES15 SP1 Not support with EPYC 7003 processors

⁵ SLES15 SP1 Xen Not support with EPYC 7003 processors

⁶ VMware 7.0 Not support with EPYC 7003 processors

Warranty

The ThinkSystem RAID 540 PCIe Gen4 12Gb Adapters carry a 1-year limited warranty. When installed in a supported ThinkSystem server, the adapter assumes the server's base warranty and any warranty upgrades.

Operating environment

The ThinkSystem RAID 540 PCIe Gen4 12Gb Adapters are supported in the following environment:

- Operating:
 - Temperature: 10°C to 55°C (50°F to 131°F)
 - Relative humidity: 20% to 90% (non-condensing)
- Storage
 - Temperature with package: -40°C to 70°C (-40°F to 158°F)
 - Relative humidity: 5% to 95% (non-condensing)

Agency approvals

The ThinkSystem RAID 540 PCIe Gen4 12Gb Adapters have the following agency approvals:

- USA (FCC 47 CFR part 15 Subpart B, class B)
- Canada (ICES -003, Class B)
- Taiwan (CNS 13438)
- Japan (VCCI V-3)
- Australia/New Zealand (AS/NZS CISPR 22)
- Korea (RRA no 2013-24 & 25)
- Europe (EN55022/EN55024)
- Safety: EN/IEC/ UL 60950; RoHS; WEEE

Related publications and links

For more information, see the following documents:

- Lenovo ThinkSystem product publications:
<http://thinksystem.lenovofiles.com/help/index.jsp>
- ServerProven hardware compatibility:
<http://www.lenovo.com/us/en/serverproven>
- Lenovo RAID Management Tools and Resources:
<https://lenovopress.com/lp0579-lenovo-raid-management-tools-and-resources>
- Lenovo RAID Introduction
<https://lenovopress.com/lp0578-lenovo-raid-introduction>

Related product families

Product families related to this document are the following:

- [RAID Adapters](#)

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