Lenovo ThinkSystem Memory Summary
Reference Information

ThinkSystem TruDDR4 Memory delivers trusted, tested, quality, performance, and reliability throughout the ThinkSystem portfolio. We use the highest quality industry-standard memory components sourced from Tier 1 DRAM suppliers. Only memory that meets these strict requirements are selected for TruDDR4 Memory. It is then compatibility tested and tuned on every ThinkSystem server to maximize reliability.

In addition, TruDDR4 Memory DIMMs have a unique signature programmed into them so your system can verify that TruDDR4 Memory is installed in your system. Since the memory will be authenticated, memory stretch goals are enabled only when TruDDR4 Memory DIMMs are detected. Together with lower power consumption, these new DIMMs can provide the lowest TCO for data centers.

Figure 1. Lenovo TruDDR4 Memory DIMM

High Performance Memory

Lenovo offers high-performance and high-capacity memory options in ThinkSystem servers.

Persistent Memory

Lenovo ThinkSystem servers configured with Intel Optane DC Persistent Memory transforms the memory/storage hierarchy enabling faster insights from data. This breakthrough technology delivers large capacity, high speed, affordable memory with data persistence and advanced encryption capabilities. These DDR4 compatible modules significantly increase the capacity of available system memory, keeping more hot data closer to the CPU, and enabling greater operational efficiency by processing larger data sets with more user instances.

3DS RDIMMs

To meet the ever increasing demand for higher density server memory modules, Lenovo offers 3DS (3 Dimensional Stacked) DDR4 RDIMMs which apply TSV (Through Silicon Via) technology from our partnership with a leading Tier 1 DRAM supplier. The new TSV 3DS stack technology enables higher density DRAM stack packages with higher operational frequency and reduced power consumption. The RDIMM configuration along with 3DS TSV DRAM packages exhibits performance benefits and lower power consumption over alternative high density solutions to ultimately provide the lowest TCO for data centers.

Performance+ Memory

Memory intensive workloads needing a competitive advantage will benefit from Lenovo's Performance+ memory. Lenovo engineers worked in partnership with leading memory suppliers to develop and tune ThinkSystem servers enabling them to exceed the latest industry standard for memory performance. Lenovo's Performance+ memory delivers increased bandwidth and lower latency at 2933 MHz with memory all channels fully populated.

Figure 2. Intel Optane DC Persistent Memory

Part Number Information

The following tables list the ordering information.

Table 1. 3200 MHz TruDDR4 DIMM ordering information

Part number	Feature code	Description
3200 MHz memory for SR635 and SR655		
4ZC7A15121	B5XD	ThinkSystem 16GB TruDDR4 3200MHz (2Rx8 1.2V) RDIMM-A
4ZC7A15122	B5XE	ThinkSystem 32GB TruDDR4 3200MHz (2Rx4 1.2V) RDIMM-A
4ZC7A15124	B5XC	ThinkSystem 64GB TruDDR4 3200MHz (2Rx4 1.2V) RDIMM-A

Table 2. 2933 MHz TruDDR4 DIMM ordering information

Part number	Feature code	Description
2933 MHz RDIMMs		
4ZC7A08706	B4H1	ThinkSystem 8GB TruDDR4 2933MHz (1Rx8 1.2V) RDIMM
4ZC7A08707	B4LY	ThinkSystem 16GB TruDDR4 2933 MHz (1Rx4 1.2V) RDIMM
4ZC7A08708	B4H2	ThinkSystem 16GB TruDDR4 2933MHz (2Rx8 1.2V) RDIMM
4ZC7A08709	B4H3	ThinkSystem 32GB TruDDR4 2933MHz (2Rx4 1.2V) RDIMM
4ZC7A08710	B4H4	ThinkSystem 64GB TruDDR4 2933MHz (2Rx4 1.2V) RDIMM
2933 MHz RDIMMs for SR635 and SR655		
4ZC7A08739	B7MS	ThinkSystem 8GB TruDDR4 2933MHz (1Rx8 1.2V) RDIMM-A
4ZC7A08740	B7MT	ThinkSystem 16GB TruDDR4 2933MHz (1Rx4 1.2V) RDIMM-A
4ZC7A08741	B7MU	ThinkSystem 16GB TruDDR4 2933MHz (2Rx8 1.2V) RDIMM-A
4ZC7A08742	B7MV	ThinkSystem 32GB TruDDR4 2933MHz (2Rx4 1.2V) RDIMM-A
4ZC7A08744	B7MW	ThinkSystem 64GB TruDDR4 2933MHz (2Rx4 1.2V) RDIMM-A
2933 MHz 3DS RDIMMs		
4ZC7A15113	B587	ThinkSystem 128GB TruDDR4 2933MHz (4Rx4 1.2V) 3DS RDIMM
4ZC7A08727	B4Y3	ThinkSystem 256GB TruDDR4 2933MHz (8Rx4 1.2V) 3DS RDIMM
2933 MHz Performance+ RDIMMs		
CTO only*	B5N6	ThinkSystem 16GB TruDDR4 Performance+ 2933MHz (2Rx8 1.2V) RDIMM
CTO only*	B5N7	ThinkSystem 32GB TruDDR4 Performance+ 2933MHz (2Rx4 1.2V) RDIMM
CTO only*	B5N8	ThinkSystem 64GB TruDDR4 Performance+ 2933MHz (2Rx4 1.2V) RDIMM
2933 MHz Performance+ RDIMMs		
CTO only*	B5N9	ThinkSystem 128GB TruDDR4 Performance+ 2933MHz (4Rx4 1.2V) 3DS RDIMM
CTO only*	B5NA	ThinkSystem 256GB TruDDR4 Performance+ 2933MHz (8Rx4 1.2V) 3DS RDIMM

* Configure-to-order only; not available as a field upgrade

Table 3. 2666 MHz TruDDR4 DIMM ordering information

Part number	Feature code	Description
2666 MHz RDIMMs		
CTO only	B21T	ThinkSystem 8GB TruDDR4 2666 MHz (2Rx8 1.2V) RDIMM
7X77A01301	AUU1	ThinkSystem 8GB TruDDR4 2666 MHz (1Rx8 1.2V) RDIMM
7X77A01302	AUNB	ThinkSystem 16GB TruDDR4 2666 MHz (1Rx4 1.2V) RDIMM
7X77A01303	AUNC	ThinkSystem 16GB TruDDR4 2666 MHz (2Rx8 1.2V) RDIMM
7X77A01304	AUND	ThinkSystem 32GB TruDDR4 2666 MHz (2Rx4 1.2V) RDIMM
2666 MHz LRDIMMs		
7X77A01305	AUNE	ThinkSystem 64GB TruDDR4 2666 MHz (4Rx4 1.2V) LRDIMM
2666 MHz 3DS RDIMMs		
4ZC7A08716	AUW5	ThinkSystem 64GB TruDDR4 2666MHz (4Rx4, 1.2V) 3DS RDIMM
7X77A01307	AUNF	ThinkSystem 128GB TruDDR4 2666 MHz (8Rx4 1.2V) 3DS RDIMM
2666 MHz UDIMMs		
4ZC7A08696	B35J	ThinkSystem 8GB TruDDR4 2666MHz (1Rx8, 1.2V) UDIMM
4ZC7A08699	B35K	ThinkSystem 16GB TruDDR4 2666MHz (2Rx8, 1.2V) UDIMM
4ZC7A08700	B35L	ThinkSystem 4GB TruDDR4 2666MHz (1Rx16, 1.2V) Non-ECC UDIMM
4ZC7A08701	B35M	ThinkSystem 8GB TruDDR4 2666MHz (1Rx8, 1.2V) Non-ECC UDIMM
4ZC7A08702	B35N	ThinkSystem 16GB TruDDR4 2666MHz (2Rx8, 1.2V) Non-ECC UDIMM

Table 4. 2666 MHz Persistent Memory

Part number	Feature code	Description
4ZC7A15110	B4LV	ThinkSystem 128GB TruDDR4 2666MHz (1.2V) Intel Optane DC Persistent Memory
4ZC7A15111	B4LW	ThinkSystem 256GB TruDDR4 2666MHz (1.2V) Intel Optane DC Persistent Memory
4ZC7A15112	B4LX	ThinkSystem 512GB TruDDR4 2666MHz (1.2V) Intel Optane DC Persistent Memory
CTO only*	B691	ThinkSystem 128GB TruDDR4 2666MHz (1.2V) Intel Optane DC Persistent Memory for SD650
CTO only*	B692	ThinkSystem 256GB TruDDR4 2666MHz (1.2V) Intel Optane DC Persistent Memory for SD650
CTO only*	B693	ThinkSystem 512GB TruDDR4 2666MHz (1.2V) Intel Optane DC Persistent Memory for SD650

* Configure-to-order only, not available as a field upgrade.

Server Support

The following tables list the ThinkSystem servers that are compatible:

- 3200 MHz memory options (AMD Epyc 7002 processors only)
- 2933 MHz memory options (Intel Xeon SP Gen 2 processors only)
- 2666 MHz memory options (Intel Xeon E, Intel Xeon SP Gen 1 & Gen 2 processors only except where noted)
- Persistent Memory options (Intel Xeon SP Gen 2 processors only)

Configurations notes:

- ThinkSystem servers with first-generation Intel Xeon Scalable processors support 2666 MHz TruDDR4 DIMMs only. They do not support 2933 MHz DIMMs or Persistent Memory Modules.

- ThinkSystem servers with second-generation Intel Xeon Scalable processors support 2933 MHz DIMMs and Persistent Memory modules, and support 2666 MHz DIMMs except where noted. If these are installed together, they operate at the lowest speed (2666 MHz).

The following table lists the ThinkSystem servers that are compatible.

Table 5. Server support - 3200 MHz memory

Description and part number	1S Intel				2S Intel								AMD		4S Intel			Dense/ Blade			
	ST50 (7Y48/7Y50)	ST250 (7Y45/7Y46)	SR150 (7Y54)	SR250 (7Y51/7Y52)	ST550 (7X09/7X10)	SR530 (7X07/7X08)	SR550 (7X03/7X04)	SR570 (7X02/7X03)	SR590 (7X98/7X99)	SR630 (7X01/7X02)	SR650 (7X05/7X06)	SR670 (7Y36/7Y37/7Y38)	SR635 (7Y98 / 7Y99)	SR655 (7Y00 / 7Z01)	SR850 (7X18/7X19)	SR860 (7X69/7X70)	SR950 (7X11/12/13)	SD530 (7X21)	SD650 (7X58)	SN550 (7X16)	SN850 (7X15)
ThinkSystem 16GB TruDDR4 3200MHz (2Rx8 1.2V) RDIMM-A, 4ZC7A15121	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N
ThinkSystem 32GB TruDDR4 3200MHz (2Rx4 1.2V) RDIMM-A, 4ZC7A15122	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N
ThinkSystem 64GB TruDDR4 3200MHz (2Rx4 1.2V) RDIMM-A, 4ZC7A15124	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N

The following table lists the ThinkSystem servers that are compatible.

Table 6. ThinkSystem server support

Description and part number	1S Intel				2S Intel								AMD		4S Intel			Dense/Blade			
	ST50 (7Y48/7Y50)	ST250 (7Y45/7Y46)	SR150 (7Y54)	SR250 (7Y51/7Y52)	ST550 (7X09/7X10)	SR530 (7X07/7X08)	SR550 (7X03/7X04)	SR570 (7Y02/7Y03)	SR590 (7X98/7X99)	SR630 (7X01/7X02)	SR650 (7X05/7X06)	SR670 (7Y36/7Y37/7Y38)	SR635 (7Y98 / 7Y99)	SR655 (7Y00 / 7Z01)	SR850 (7X18/7X19)	SR860 (7X69/7X70)	SR950 (7X11/12/13)	SD530 (7X21)	SD650 (7X58)	SN550 (7X16)	SN850 (7X15)
ThinkSystem 8GB TruDDR4 2933MHz (1Rx8 1.2V) RDIMM, 4ZC7A08706	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	N	Y	Y	N	N
ThinkSystem 16GB TruDDR4 2933 MHz (1Rx4 1.2V) RDIMM, 4ZC7A08707	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	N	Y	Y
ThinkSystem 16GB TruDDR4 2933MHz (2Rx8 1.2V) RDIMM, 4ZC7A08708	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y
ThinkSystem 32GB TruDDR4 2933MHz (2Rx4 1.2V) RDIMM, 4ZC7A08709	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y
ThinkSystem 64GB TruDDR4 2933MHz (2Rx4 1.2V) RDIMM, 4ZC7A08710	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y
ThinkSystem 128GB TruDDR4 2933MHz (4Rx4 1.2V) 3DS RDIMM, 4ZC7A15113	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	Y	Y	Y	N	Y	N	N
ThinkSystem 256GB TruDDR4 2933MHz (8Rx4 1.2V) 3DS RDIMM, 4ZC7A08727	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N
ThinkSystem 16GB TruDDR4 Performance+ 2933MHz (2Rx8 1.2V) RDIMM, Feature B5N6	N	N	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	Y	Y	N	N	N	N
ThinkSystem 32GB TruDDR4 Performance+ 2933MHz (2Rx4 1.2V) RDIMM, Feature B5N7	N	N	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	Y	Y	N	N	N	N
ThinkSystem 64GB TruDDR4 Performance+ 2933MHz (2Rx4 1.2V) RDIMM, Feature B5N8	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	Y	Y	Y	N	N	N	N
ThinkSystem 128GB TruDDR4 Performance+ 2933MHz (4Rx4 1.2V) 3DS RDIMM, Feature B5N9	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N	Y	N	N	N	N
ThinkSystem 256GB TruDDR4 Performance+ 2933MHz (8Rx4 1.2V) 3DS RDIMM, Feature B5NA	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N
ThinkSystem 8GB TruDDR4 2933MHz (1Rx8 1.2V) RDIMM-A, 4ZC7A08739	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N
ThinkSystem 16GB TruDDR4 2933MHz (1Rx4 1.2V) RDIMM-A, 4ZC7A08740	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N
ThinkSystem 16GB TruDDR4 2933MHz (2Rx8 1.2V) RDIMM-A, 4ZC7A08741	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N

Description and part number	1S Intel				2S Intel								AMD		4S Intel			Dense/ Blade			
	ST50 (7Y48/7Y50)	ST250 (7Y45/7Y46)	SR150 (7Y54)	SR250 (7Y51/7Y52)	ST550 (7X09/7X10)	SR530 (7X07/7X08)	SR550 (7X03/7X04)	SR570 (7Y02/7Y03)	SR590 (7X98/7X99)	SR630 (7X01/7X02)	SR650 (7X05/7X06)	SR670 (7Y36/7Y37/7Y38)	SR635 (7Y98 / 7Y99)	SR655 (7Y00 / 7Z01)	SR850 (7X18/7X19)	SR860 (7X69/7X70)	SR950 (7X11/12/13)	SD530 (7X21)	SD650 (7X58)	SN550 (7X16)	SN850 (7X15)
ThinkSystem 32GB TruDDR4 2933MHz (2Rx4 1.2V) RDIMM-A, 4ZC7A08742	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N
ThinkSystem 64GB TruDDR4 2933MHz (2Rx4 1.2V) RDIMM-A, 4ZC7A08744	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N

Table 7. Server support - 2666 MHz memory options (Xeon E and Xeon SP processors, except where noted)

Part number	Description	1S Rack & Tower				2S Rack & Tower								4S Rack			Dense/Blade			
		ST50 (7Y48/7Y50)	ST250 (7Y45/7Y46)	SR150 (7Y54)	SR250 (7Y51/7Y52)	ST550 (7X09/7X10)	SR530 (7X07/7X08)	SR550 (7X03/7X04)	SR570 (7Y02/7Y03)	SR590 (7X98/7X99)	SR630 (7X01/7X02)	SR650 (7X05/7X06)	SR670 (7Y36/7Y37/7Y38)	SR850 (7X18/7X19)	SR860 (7X69/7X70)	SR950 (7X11/12/13)	SD530 (7X21)	SD650 (7X58)	SN550 (7X16)	SN850 (7X15)
Feature B21T	8GB TruDDR4 2666 MHz (2Rx8 1.2V) RDIMM	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y*	N	N
7X77A01301	8GB TruDDR4 2666 MHz (1Rx8 1.2V) RDIMM	N	N	N	N	Y*	Y*	Y*	Y*	Y*	Y*	Y*	N	Y*	Y*	N	Y*	Y*	Y*	Y*
7X77A01302	16GB TruDDR4 2666 MHz (1Rx4 1.2V) RDIMM	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y
7X77A01303	16GB TruDDR4 2666 MHz (2Rx8 1.2V) RDIMM	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y*	Y*
7X77A01304	32GB TruDDR4 2666 MHz (2Rx4 1.2V) RDIMM	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y*	Y*
7X77A01305	64GB TruDDR4 2666 MHz (4Rx4 1.2V) LRDIMM	N	N	N	N	Y*	Y*	Y*	Y*	Y*	Y*	Y*	N	Y*	Y*	Y	Y*	Y*	Y*	Y*
4ZC7A08716	64GB TruDDR4 2666MHz (4Rx4, 1.2V) 3DS RDIMM	N	N	N	N	N	N	N	N	N	Y†	Y†	N	N	N	Y	N	N	N	N
7X77A01307	128GB TruDDR4 2666 MHz (8Rx4 1.2V) 3DS RDIMM	N	N	N	N	N	N	N	N	N	Y*	Y*	N	Y*	Y*	Y	Y*	Y*	Y*	Y*
4ZC7A08696	8GB TruDDR4 2666MHz (1Rx8, 1.2V) UDIMM	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4ZC7A08699	16GB TruDDR4 2666MHz (2Rx8, 1.2V) UDIMM	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4ZC7A08700	4GB TruDDR4 2666MHz (1Rx16, 1.2V) Non-ECC UDIMM	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4ZC7A08701	8GB TruDDR4 2666MHz (1Rx8, 1.2V) Non-ECC UDIMM	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4ZC7A08702	16GB TruDDR4 2666MHz (2Rx8, 1.2V) Non-ECC UDIMM	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

* Not supported with second-generation Intel Xeon Scalable processors
† Not supported with first-generation Intel Xeon Scalable processors

Table 8. Server support - Persistent Memory (Second-generation Intel Xeon Scalable processors only)

Part number	Description	1S Rack & Tower				2S Rack & Tower								4S Rack			Dense/ Blade			
		ST50 (7Y48/7Y50)	ST250 (7Y45/7Y46)	SR150 (7Y54)	SR250 (7Y51/7Y52)	ST550 (7X09/7X10)	SR530 (7X07/7X08)	SR550 (7X03/7X04)	SR570 (7Y02/7Y03)	SR590 (7X98/7X99)	SR630 (7X01/7X02)	SR650 (7X05/7X06)	SR670 (7Y36/7Y37/7Y38)	SR850 (7X18/7X19)	SR860 (7X69/7X70)	SR950 (7X11/12/13)	SD530 (7X21)	SD650 (7X58)	SN550 (7X16)	SN850 (7X15)
4ZC7A15110	128GB TruDDR4 2666MHz (1.2V) Intel Optane DC Persistent Memory	N	N	N	N	N	N	N	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y
4ZC7A15111	256GB TruDDR4 2666MHz (1.2V) Intel Optane DC Persistent Memory	N	N	N	N	N	N	N	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y
4ZC7A15112	512GB TruDDR4 2666MHz (1.2V) Intel Optane DC Persistent Memory	N	N	N	N	N	N	N	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y
Feature B691	128GB TruDDR4 2666MHz (1.2V) Intel Optane DC Persistent Memory for SD650	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N
Feature B692	256GB TruDDR4 2666MHz (1.2V) Intel Optane DC Persistent Memory for SD650	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N
Feature B693	512GB TruDDR4 2666MHz (1.2V) Intel Optane DC Persistent Memory for SD650	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N

Learn More

For more information, see these resources:

- Intel Optane DC Persistent Memory product guide
  https://lenovopress.com/lp1066-intel-optane-dc-persistent-memory
- Optimizing Memory Performance of Lenovo ThinkSystem Servers
  https://lenovopress.com/lp0697-optimizing-memory-performance-of-lenovo-thinksystem-servers
- Lenovo ThinkSystem SD530 Performance Considerations with 12 DIMMs and 16 DIMMs
  https://lenovopress.com/lp0659-thinksystem-sd530-performance-considerations
- ThinkSystem Enterprise Solutions Configurator - Memory
  http://lesc.lenovo.com/ss/#/memory_configuration

Related product families

Product families related to this document are the following:

- Memory

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, LP1021, was created or updated on August 7, 2019.

Send us your comments in one of the following ways:

- Use the online Contact us review form found at:
  http://lenovopress.com/LP1021

- Send your comments in an e-mail to:
  comments@lenovopress.com

This document is available online at http://lenovopress.com/LP1021.

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®
ThinkSystem
TruDDR4

The following terms are trademarks of other companies:

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

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