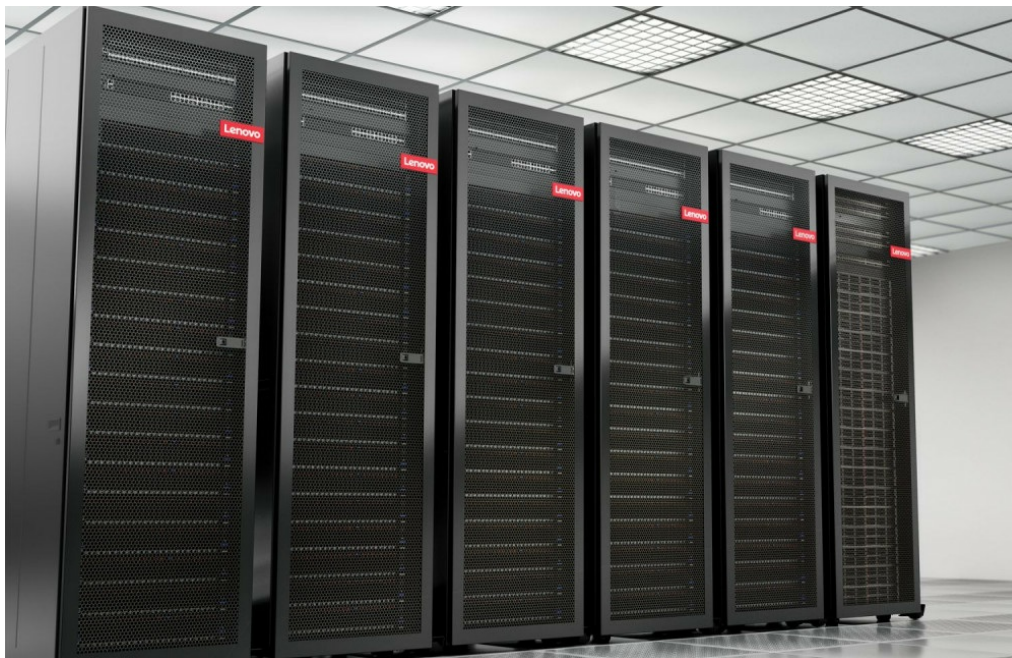


Lenovo Scalable Infrastructure (LeSI) Solutions Product Guide

Lenovo Scalable Infrastructure (LeSI) is a framework for designing, manufacturing, integrating and delivering data center solutions, with a focus on High Performance Computing (HPC), Technical Computing, and Artificial Intelligence (AI) environments.



Benefits

Lenovo Scalable Infrastructure provides [Best Recipe](#) guides to warrant interoperability of hardware, software and firmware among a variety of Lenovo and third-party components.

Addressing specific needs in the data center, while also optimizing the solution design for application performance requires a significant level of effort and expertise. Customers need to choose the right hardware and software components, solve interoperability challenges across multiple vendors, and determine optimal firmware levels across the entire solution to ensure operational excellence, maximize performance, and drive best total cost of ownership.

LeSI reduces this burden on the customer by pre-testing and validating a large selection of Lenovo and third-party components, to create a “Best Recipe” of components and firmware levels that work seamlessly together as a solution. From this testing, customers can be confident that such a best practice solution will run optimally for their workloads, tailored to the client’s needs.

In addition to interoperability testing, LeSI hardware is pre-integrated, pre-cabled, pre-loaded with the best recipe and optionally an OS-image and tested at the rack level in manufacturing, to ensure a reliable delivery and minimize installation time in the customer data center.

With LeSI, customers can focus their efforts on maximizing their business value, instead of consuming valuable resources to design, optimize, install, and support the infrastructure required to meet business demands. Whether the need is for a small AI training solution, a mid-sized HPC cluster, or the world's largest supercomputers, customers can take advantage of the decades of Lenovo experience, innovation, and expertise in solution deployment with Lenovo Scalable Infrastructure. LeSI delivers optimized IT solutions to the customer pre-integrated, pre-loaded, and tested, and ready to install, increasing time-to-value and reducing deployment risk.

LeSI solutions are based on:

- Industry-leading Lenovo ThinkSystem servers and storage
- Open source and OEM software
- Best-of-breed third-party components especially in high performance networking and acceleration.

Lenovo thoroughly tests and optimizes all LeSI components for reliability, interoperability and maximum performance, so clients can quickly deploy the system and get to work achieving their business goals.

Hardware components

LeSI supports the following hardware components.

- [Lenovo Servers](#)
- [Lenovo Ethernet Networking](#)
- [Lenovo Storage Expansion Units and Arrays](#)
- [Rack Cabinets and Options](#)
- [Other Lenovo ThinkSystem Hardware](#)
- [HPC Acceleration](#)
- [InfiniBand Interconnects](#)
- [Omni-Path Architecture](#)

Servers

Intel 3rd Gen Xeon Scalable Processor Generation

- ThinkSystem SD630 V2

The Lenovo ThinkSystem SD630 V2 is a dense and economical two-socket server in a 0.5U rack form factor. Combining the efficiency and density of blades with the value and simplicity of rack-based servers, the SD630 V2 delivers a cost-efficient scale-out platform that is thermally designed to deliver maximum performance in the smallest footprint. The solution consists of a 2U ThinkSystem DA240 Enclosure containing up to four front-access SD630 V2 servers (nodes). Each node incorporates two third-generation Intel Xeon Scalable processors. For more information, see the [SD630 V2 product guide](#).

- ThinkSystem SD650 V2

The ThinkSystem SD650 V2 server is the next-generation high-performance server based on Lenovo's fourth generation Lenovo Neptune™ direct water cooling platform. With two third-generation Intel Xeon Scalable processors, the ThinkSystem SD650 V2 server combines the latest Intel processors and Lenovo's market-leading water cooling solution, which results in extreme performance in an extreme dense packaging, supporting your application From Exascale to Everscale™. For more information, see the [SD650 V2 product guide](#).

- ThinkSystem SD650-N V2

The ThinkSystem SD650-N V2 server is the next-generation high-performance GPU-rich server based on Lenovo's fourth generation Lenovo Neptune™ direct water cooling platform. With four NVIDIA A100 SXM4 GPUs and two third-generation Intel Xeon Scalable processors, the ThinkSystem SD650-N V2 server combines advanced NVIDIA acceleration technology with the latest Intel processors and Lenovo's market-leading water cooling solution, which results in extreme performance in an extreme dense packaging supporting your accelerated application From Exascale to Everscale™. For more information, see the [SD650-N V2 product guide](#).

- ThinkSystem SR630 V2

The Lenovo ThinkSystem SR630 V2 is an ideal 2-socket 1U rack server designed to take full advantage of the features of the 3rd generation Intel Xeon Scalable processors, such as the full performance of 270W 40-core processors, support for 3200 MHz memory and PCIe Gen 4.0 support. The server also offers onboard NVMe PCIe ports that allow direct connections to 12x NVMe SSDs, which results in faster access to store and access data to handle a wide range of workloads. For more information, see the [SR630 V2 product guide](#).

- ThinkSystem SR650 V2

The Lenovo ThinkSystem SR650 V2 is an ideal 2-socket 2U rack server for small businesses up to large enterprises that need industry-leading reliability, management, and security, as well as maximizing performance and flexibility for future growth. The SR650 V2 is a very configuration-rich offering, supporting 28 different drive bay configurations in the front, middle and rear of the server and 5 different slot configurations at the rear of the server. This level of flexibility ensures that you can configure the server to meet the needs of your workload. For more information, see the [SR650 V2 product guide](#).

- ThinkSystem SR670 V2

The Lenovo ThinkSystem SR670 V2 is a versatile GPU-rich 3U rack server that supports eight double-wide GPUs including the new NVIDIA A100 and A40 Tensor Core GPUs, or the NVIDIA HGX A100 4-GPU offering with NVLink and Lenovo Neptune hybrid liquid-to-air cooling. The server is based on the new third-generation Intel Xeon Scalable processor family (formerly codenamed "Ice Lake"). The server delivers optimal performance for Artificial Intelligence (AI), High Performance Computing (HPC) and graphical workloads across an array of industries. For more information, see the [SR670 V2 product guide](#).

- ThinkSystem SR850 V2

The Lenovo ThinkSystem SR850 V2 is a 4-socket server that is densely packed into a 2U rack design. The server offers technology advances, including third-generation Intel Xeon Scalable processors with support for Intel Optane Persistent Memory 200 Series, and scale-up capacity with up to 12TB of system memory, up to 7x PCIe slots, and up to 24x 2.5-inch drive bays. It is ideally suited for mission-critical scaling up from 2S systems such as enterprise virtualization, CRM, ERP, SQL databases, VDI and small-mid sized SAP HANA computing environments. For more information, see the [SR850 V2 product guide](#).

AMD 2nd and 3rd Gen EPYC Processor Generations

- ThinkSystem SR645

The Lenovo ThinkSystem SR645 is a 2-socket 1U server that features the AMD EPYC 7002/3 family of processors. With up to 64 cores per processor and support for the new PCIe 4.0 standard for I/O, the SR645 offers the ultimate in two-socket server performance in a space saving 1U form factor. For more information, see the [SR645 product guide](#).

- ThinkSystem SR655

The Lenovo ThinkSystem SR655 is a 1-socket 2U server that features the new AMD EPYC 7002/3 family of processors. With up to 64 cores per processor and support for the new PCIe 4.0 standard for I/O, the SR655 offers the ultimate in single-socket server performance. For more information, see the [SR655 product guide](#).

Intel 2nd Gen Xeon Scalable Processor Generation

- ThinkSystem SD530

The Lenovo ThinkSystem SD530 is an ultra-dense and economical two-socket server in a 0.5U rack form factor. With four SD530 server nodes installed in the ThinkSystem D2 enclosure, and the ability to cable and manage up to seven D2 enclosures as one asset, you have an ideal high-density 2U four-node (2U4N) platform for performance-oriented enterprise and cloud workloads. Leveraging Lenovo Neptune liquid cooling technology within a Thermal Transfer Module it is the only dense system in the market supporting up to 205W TDP processors at 35°C (ASHRAE A2) ambient temperature without throttling. For more information, see the [SD530 product guide](#).

- ThinkSystem SR630

The Lenovo ThinkSystem SR630 is an ideal 2-socket 1U rack server for small businesses up to large enterprises that need industry-leading reliability, management, and security, as well as maximizing performance and flexibility for future growth. The SR630 server is designed to handle a wide range of workloads, such as databases, virtualization and cloud computing, virtual desktop infrastructure (VDI), infrastructure security, systems management, enterprise applications, collaboration/email, streaming media, web, and HPC. For more information, see the [SR630 product guide](#).

- ThinkSystem SR650

The Lenovo ThinkSystem SR650 is an ideal 2-socket 2U rack server for small businesses up to large enterprises that need industry-leading reliability, management, and security, as well as maximizing performance and flexibility for future growth. The SR650 server is designed to handle a wide range of workloads, such as databases, virtualization and cloud computing, virtual desktop infrastructure (VDI), enterprise applications, collaboration/email, and business analytics and big data. For more information, see the [SR650 product guide](#).

- ThinkSystem SR670

The Lenovo ThinkSystem SR670 is a purpose-built two-socket 2U node for GPU-accelerated workloads. Supporting the latest NVIDIA GPUs and Intel Xeon Scalable processors, the SR670 has been designed for optimal performance for high-end computation required by both Artificial Intelligence and High Performance Computing workloads, as well as high-end Virtual Desktop Infrastructure (VDI). The SR670 is key for Lenovo's AI strategy, delivering up to 4 double-wide or 8 single-wide GPUs per node and providing the optimal hardware for the LiCO platform. For more information, see the [SR670 product guide](#).

The following table lists all the Lenovo ThinkSystem Servers that are supported by LeSI.

Table 1. Lenovo Server Selection

Description	Machine Type-Model	Feature code	Summary
Intel 3rd Gen Xeon Scalable Processor Generation			
ThinkSystem DA240 Enclosure	7D1JCTOLWW	BAF9	2U4N chassis for SD630 V2
ThinkSystem DW612 Enclosure	7D1LCTO1WW	B950	6U12N / 6U6N chassis for SD650 V2 and SD650-N V2
ThinkSystem SD630 V2	7D1KCTOLWW	BAFQ	2-Socket half-wide 1U dense server
ThinkSystem SD650 V2	7D1MCTO1WW	B94Y	Tray with two 2-Socket Direct Water Cooled 1U Intel server
ThinkSystem SD650-N V2	7D1NCTO1WW	B94Z	Tray with 2-Socket Direct Water Cooled Accelerated 1U Intel server
ThinkSystem SR630 V2	7Z71CTOLWW	B8N6 (LFF) B8N5 (SFF)	2-Socket Mainstream Intel 1U rack server
ThinkSystem SR650 V2	7Z73CTOLWW	BH8G (LFF) BH8H (SFF)	2-Socket Mainstream Intel 2U rack server
ThinkSystem SR670 V2	7Z23CTOLWW	BFCV (SXM model) BFCX (4-DW GPU) BFCW (8-DW GPU)	2-Socket GPU-rich Intel 3U rack server
ThinkSystem SR850 V2	7D32CTOLWW	BCPH	4-Socket High-End Intel 2U rack server
AMD Epyc Rome / Milan Processor Generation			
ThinkSystem SR645	7D2YCTOLWW 7D2XCTOLWW	B8N6 (8/10 SFF) B8N5 (4 LFF)	2-Socket Mainstream AMD 1U rack server
ThinkSystem SR655	7Y00CTOLWW 7Z01CTOLWW	B5VK (12 LFF) B5VJ (24 SFF)	1-Socket Mainstream AMD 2U rack server
Intel 2nd Gen Xeon Scalable Processor Generation			
ThinkSystem D2 Enclosure	7X20CTOLWW	AUXM	2U4N chassis for SD530
ThinkSystem Modular Enclosure	7X22CTOLWW	AUXM	2U4N scalable chassis for SD530
ThinkSystem SD530	7X21CTOLWW	AUXN	2-Socket Dense 0.5U server
ThinkSystem SR630	7X02CTOLWW	AUW0 (8 SFF) AUW1 (10 SFF) AUW2 (4 LFF)	2-Socket Mainstream 1U rack server
ThinkSystem SR650	7X06CTOLWW	AUVV (8/16/24 SFF) AUVW (8/12 LFF) AUVX (8/16 SFF)	2-Socket Mainstream 2U rack server
ThinkSystem SR670	7Y37CTO1WW	B3XX (4x DW GPU) B3XY (8x SW GPU)	2-Socket Mainstream 4x-8x GPU 2U rack server

Ethernet Networking

Lenovo partners with NVIDIA Networking (formerly Mellanox) to provide Ethernet switches from the Spectrum Ethernet portfolio for LeSI. The Spectrum Ethernet switches are the most advanced on the market and are optimized for high-performance enterprise-class systems and storage. They offer a fully shared buffer to support fair bandwidth allocation and predictably low latency, as well as traffic flow prioritization and optimization technology. LeSI offers the NVIDIA Networking switches pre-installed with the NVIDIA Cumulus Linux Network Operating System, which provides rich routing and automation functionality for large scale applications.

- 1 Gb Ethernet

The AS4610-54T is a high-performance Gigabit Ethernet Layer 3 switch family featuring 54 ports; with 48 10/100/1000BASE-T ports, 4 x 10G SFP+ uplink ports, and 2 x 20G QSFP+ stacking ports (Stacking capability subject to NOS implementations. The AS4610-54T is ideal as a data center top-of-rack switch or IPMI switch. For more information, see the [AS4610-54T datasheet](#).

- 10 Gb Ethernet

The NVIDIA Networking SN2410B Spectrum Ethernet switch is a high-performance 10 Gigabit Ethernet Layer 3 switch family featuring 56 ports; with 48 x SFP28 ports running at 10Gb/s and 8 x QSFP28 ports running at 100Gb/s. The SN2410B is an ideal top-of-rack solution, allowing for maximum flexibility and predictable, high performance Ethernet switching. For more information, see the [SN2410B datasheet](#).

- 25 Gb Ethernet

The NVIDIA Networking Spectrum Ethernet portfolio is an ideal top-of-rack solution for HPC, hyperconverged, and storage fabric deployments. LeSI offers two 25GbE switches from this family: the SN2410, with 48 x QSFP28 ports running at 25Gb/s and 8 x QSFP28 ports running at 100Gb/s, and the half-wide SN2010, with 18 x QSFP28 ports running at 25Gb/s and 4 x QSFP28 ports running at 100Gb/s. The SN2410 is ideal for 25GbE fabrics and larger aggregation scenarios, while the SN2010 is more suited for storage and hyperconverged use cases, as well as small aggregation for HPC deployments. For more information, see the [SN2410 datasheet](#) and [SN2010 datasheet](#).

- 100 Gb Ethernet

The NVIDIA Networking SN3700C Spectrum-2 Ethernet Switch is a high performance 100 Gigabit Ethernet Layer 3 switch family featuring 32 ports; with 32 x QSFP28 ports running at 100Gb/s. The SN3700C also fully supports 4-to-1 breakout cables, enabling 128 ports running at 25Gb/s. The 3700C is ideal for high-performance Ethernet fabrics as well as 100G aggregation scenarios. For more information, see the [SN3700 series datasheet](#).

- 200 Gb Ethernet

The NVIDIA Networking SN3700V offers 32 ports of 200GbE in a compact 1U form factor. It enables connectivity to endpoints at different speeds and carries a throughput of 12.8Tb/s, with a landmark 8.33Bpps processing capacity. As an ideal spine solution, the SN3700 allows maximum flexibility, with port speeds spanning from 10GbE to 200GbE per port. For more information, see the [SN3700 series datasheet](#).

The following table summarizes all the Lenovo Ethernet Switches that are supported by LeSI.

Table 2. NVIDIA Networking Ethernet Switch Selection

Description	Orientation	MTM	Summary
Mellanox AS4610 1GbE Managed Switch with Cumulus*	Rear to Front (PSE)	7D5FCTO1WW	1U ToR L2/3 1Gbit Switch with 48 GBASE-T RJ45 and 4 10Gbit SFP+ ports
	Front to Rear (oPSE)	7D5FCTO2WW	
Mellanox SN2410B 10GbE Managed Switch with Cumulus	Rear to Front (PSE)	7D5FCTO5WW	1U ToR L2/3 10Gbit Switch with 48 10Gbit SFP28 and 8 100Gbit QSFP28 ports
	Front to Rear (oPSE)	7D5FCTO6WW	
Mellanox SN2010 25GbE Managed Switch with Cumulus	Rear to Front (PSE)	7D5FCTO3WW	1U "half-wide" 25Gbit Switch with 18 25Gbit QSFP28 and 4 100Gbit QSFP28 ports
	Front to Rear (oPSE)	7D5FCTO4WW	
Mellanox SN2410 25GbE Managed Switch with Cumulus	Rear to Front (PSE)	7D5FCTO7WW	1U 25Gbit Switch with 48 25Gbit QSFP28 and 8 100Gbit QSFP28 ports
	Front to Rear (oPSE)	7D5FCTO8WW	
Mellanox SN3700C 100GbE Managed Switch with Cumulus	Rear to Front (PSE)	7D5FCTO9WW	1U 100Gbit Switch with 32 100Gbit QSFP28 ports
	Front to Rear (oPSE)	7D5FCTOAWW	
Mellanox SN3700V 200GbE Managed Switch with Cumulus	Rear to Front (PSE)	7D5FCTOBWW	1U 200Gbit Switch with 32 200Gbit QSFP56 ports
	Front to Rear (oPSE)	7D5FCTOCWW	

* Note: Mellanox AS4610 have a long lead time and are only available for fully racked LeSI solutions.

The following cable types can be purchased, with the lists of cables given in the tables below:

- [Cables for 10 GbE and 1 GbE RJ-45 adapters](#)
- [Cables for 10 GbE SFP+ adapters](#)
- [Cables for 25 GbE SFP28 adapters](#)
- [Cables for 100 GbE QSFP28 network adapters](#)
- [Transceivers](#)
- [Cables for network transceivers](#)

For 200 GbE cables, LeSI leverages the HDR InfiniBand cables found in the [InfiniBand section](#) below.

The following table lists cables for the 10 GbE and 1 GbE RJ-45 adapters.

Table 3. Cables for 10 GbE and 1 GbE RJ-45 ports

Description	Part number	Feature code
UTP Category 5e cables (Blue) for 1 GbE RJ-45 ports		
0.6m Blue Cat5e Cable	40K5679	3801
0.75m Blue Cat5e Cable	00WE111	AVFT
1.0m Blue Cat5e Cable	00WE114	AVFU
1.25m Blue Cat5e Cable	00WE119	AVFV
1.5m Blue Cat5e Cable	40K8785	3802
3m Blue Cat5e Cable	40K5581	3803
10m Blue Cat5e Cable	40K8927	3804
25m Blue Cat5e Cable	40K8930	3805
UTP Category 5e cables (Green) for 1 GbE RJ-45 ports		
0.6m Green Cat5e Cable	40K5563	3796
0.75m Green Cat5e Cable	00WE099	AVFQ
1.0m Green Cat5e Cable	00WE103	AVFR
1.25m Green Cat5e Cable	00WE107	AVFS
1.5m Green Cat5e Cable	40K5643	3797
3m Green Cat5e Cable	40K5793	3798
10m Green Cat5e Cable	40K5794	3799
25m Green Cat5e Cable	40K8869	3800
UTP Category 5e cables (Yellow) for 1 GbE RJ-45 ports		
0.6m Yellow Cat5e Cable	40K8933	3791
1.5m Yellow Cat5e Cable	40K8951	3792
3m Yellow Cat5e Cable	40K8957	3793
10m Yellow Cat5e Cable	40K8801	3794
25m Yellow Cat5e Cable	40K8807	3795

The following table lists cables for 10 GbE SFP+ port connection.

Table 4. Cables for 10 GbE SFP+ ports

Description	Part number	Feature code
SFP+ passive direct-attach cables - 10 GbE		
Lenovo 0.5m Passive SFP+ DAC Cable	00D6288	A3RG
Lenovo 1m Passive SFP+ DAC Cable	90Y9427	A1PH
Lenovo 1.5m Passive SFP+ DAC Cable	00AY764	A51N
Lenovo 2m Passive SFP+ DAC Cable	00AY765	A51P
Lenovo 3m Passive SFP+ DAC Cable	90Y9430	A1PJ
Lenovo 5m Passive SFP+ DAC Cable	90Y9433	A1PK
Lenovo 7m Passive SFP+ DAC Cable	00D6151	A3RH
SFP+ active direct-attach cables - 10 GbE		
Lenovo 1m Active DAC SFP+ Cable	00VX111	AT2R
Lenovo 3m Active DAC SFP+ Cable	00VX114	AT2S
Lenovo 5m Active DAC SFP+ Cable	00VX117	AT2T
SFP+ active optical cables - 10 GbE		
Lenovo 1m SFP+ to SFP+ Active Optical Cable	00YL634	ATYX
Lenovo 3m SFP+ to SFP+ Active Optical Cable	00YL637	ATYY
Lenovo 5m SFP+ to SFP+ Active Optical Cable	00YL640	ATYZ
Lenovo 7m SFP+ to SFP+ Active Optical Cable	00YL643	ATZ0
Lenovo 15m SFP+ to SFP+ Active Optical Cable	00YL646	ATZ1
Lenovo 20m SFP+ to SFP+ Active Optical Cable	00YL649	ATZ2

The following table lists cables for 25 GbE SFP28 port connection.

Table 5. Cables for 25 GbE SFP28 ports

Description	Part number	Feature code
SFP28 passive direct-attach copper cables - 25 GbE		
Lenovo 1m Passive 25G SFP28 DAC Cable	7Z57A03557	AV1W
Lenovo 3m Passive 25G SFP28 DAC Cable	7Z57A03558	AV1X
Lenovo 5m Passive 25G SFP28 DAC Cable	7Z57A03559	AV1Y
SFP28 active optical cables - 25 GbE		
Lenovo 3m 25G SFP28 Active Optical Cable	7Z57A03541	AV1F
Lenovo 5m 25G SFP28 Active Optical Cable	7Z57A03542	AV1G
Lenovo 10m 25G SFP28 Active Optical Cable	7Z57A03543	AV1H
Lenovo 15m 25G SFP28 Active Optical Cable	7Z57A03544	AV1J

The following table lists cables for 100 GbE QSFP28 port connection.

Table 7. Cables for 100 GbE QSFP28 ports

Description	Part number	Feature code
QSFP28 passive direct-attach copper cables - 100 GbE		
Lenovo 1m Passive 100G QSFP28 DAC Cable	7Z57A03561	AV1Z
Lenovo 3m Passive 100G QSFP28 DAC Cable	7Z57A03562	AV20
Lenovo 5m Passive 100G QSFP28 DAC Cable	7Z57A03563	AV21
QSFP28 active optical cables - 100 GbE		
Lenovo 1m 100G QSFP28 Active Optical Cable	4Z57A10844	B2UZ
Lenovo 3m 100G QSFP28 Active Optical Cable	7Z57A03546	AV1L
Lenovo 10m 100G QSFP28 Active Optical Cable	7Z57A03548	AV1N
Lenovo 15m 100G QSFP28 Active Optical Cable	7Z57A03549	AV1P
QSFP28 direct attach copper breakout cables - 100 GbE to 4x 25 GbE		
Lenovo 1m 100G QSFP28 to 4x25G SFP28 Breakout DAC Cable	7Z57A03564	AV22
Lenovo 3m 100G QSFP28 to 4x25G SFP28 Breakout DAC Cable	7Z57A03565	AV23
Lenovo 5m 100G QSFP28 to 4x25G SFP28 Breakout DAC Cable	7Z57A03566	AV24
QSFP28 active optical breakout cables - 100 GbE to 4x 25 GbE		
Lenovo 3m 100G to 4x25G Breakout Active Optical Cable	7Z57A03551	AV1R
Lenovo 10m 100G to 4x25G Breakout Active Optical Cable	7Z57A03553	AV1T
Lenovo 15m 100G to 4x25G Breakout Active Optical Cable	7Z57A03554	AV1U

The following table lists support transceivers.

Table 8. Network transceivers

Description	Part number	Feature code
Transceivers		
SFP 1000Base-T (RJ-45) Transceiver	00FE333	A5DL
SFP+ SR Transceiver	46C3447	5053
SFP+ LR Transceiver	90Y9412	A1PM
10GBASE-LR SFP+Transceiver	00FE331	B0RJ
Lenovo 25GBase-SR SFP28 Transceiver	7G17A03537	AV1B
Lenovo Dual Rate 10G/25G SFP28 85C Transceiver	4TC7A69045	BF10
Lenovo 100GBase-SR4 QSFP28 Transceiver	7G17A03539	AV1D
Mellanox 100GBase-LR4 QSFP28 transceiver (LC-LC, 1310nm, upto 10km)	7G17A03540	AV1E

The following table lists cables for 10 GbE SR SFP+, 25Gbit SR SFP28, 40Gb SR QSFP+ and 100Gb SR QSFP28 transceiver connections.

Table 9. Cables for network transceiver ports

Description	Part number	Feature code
OM3 optical cables for 10 GbE SR SFP+ and 25 GbE SR SFP28 transceivers		
Lenovo 0.5m LC-LC OM3 MMF Cable	00MN499	ASR5
Lenovo 1m LC-LC OM3 MMF Cable	00MN502	ASR6
Lenovo 3m LC-LC OM3 MMF Cable	00MN505	ASR7
Lenovo 5m LC-LC OM3 MMF Cable	00MN508	ASR8
Lenovo 10m LC-LC OM3 MMF Cable	00MN511	ASR9
Lenovo 15m LC-LC OM3 MMF Cable	00MN514	ASRA
Lenovo 25m LC-LC OM3 MMF Cable	00MN517	ASRB
Lenovo 30m LC-LC OM3 MMF Cable	00MN520	ASRC
OM4 optical cables for 10 GbE SR SFP+ and 25 GbE SR SFP28 transceivers		
Lenovo 0.5m LC-LC OM4 MMF Cable	4Z57A10845	B2P9
Lenovo 1m LC-LC OM4 MMF Cable	4Z57A10846	B2PA
Lenovo 3m LC-LC OM4 MMF Cable	4Z57A10847	B2PB
Lenovo 5m LC-LC OM4 MMF Cable	4Z57A10848	B2PC
Lenovo 10m LC-LC OM4 MMF Cable	4Z57A10849	B2PD
Lenovo 15m LC-LC OM4 MMF Cable	4Z57A10850	B2PE
Lenovo 25m LC-LC OM4 MMF Cable	4Z57A10851	B2PF
Lenovo 30m LC-LC OM4 MMF Cable	4Z57A10852	B2PG
OM4 Optical cables for 100 GbE QSFP28 SR4 transceivers		
Lenovo 5m MPO-MPO OM4 MMF Cable	7Z57A03567	AV25
Lenovo 7m MPO-MPO OM4 MMF Cable	7Z57A03568	AV26
Lenovo 10m MPO-MPO OM4 MMF Cable	7Z57A03569	AV27
Lenovo 15m MPO-MPO OM4 MMF Cable	7Z57A03570	AV28
Lenovo 20m MPO-MPO OM4 MMF Cable	7Z57A03571	AV29
Lenovo 30m MPO-MPO OM4 MMF Cable	7Z57A03572	AV2A
OM4 Optical breakout cables for 100 GbE QSFP28 SR4 transceivers		
Lenovo 1m MPO-4xLC Breakout OM4 MMF Cable	7Z57A03573	AV2B
Lenovo 3m MPO-4xLC Breakout OM4 MMF Cable	7Z57A03574	AV2C
Lenovo 5m MPO-4xLC Breakout OM4 MMF Cable	7Z57A03575	AV2D

Storage Expansion Units and Arrays

The Lenovo Expansion Units are designed to provide simplicity, speed, scalability, security, and high availability for small to large businesses. For more information on these products, see the product guides.

- **Lenovo Storage D1224 Drive Enclosure**
The Lenovo Storage D1224 delivers enterprise-class storage technology in a cost-effective solution with flexible drive configurations and RAID or JBOD (non-RAID) host connectivity. For more information, see the [D1224 product guide](#).
- **Lenovo Storage D3284 External High Density Drive Expansion Enclosure**
The Lenovo Storage D3284 High Density Expansion Enclosure delivers enterprise-class storage technology in a cost-effective dense solution with flexible drive configurations of up to 84 drives in 5U and RAID or JBOD (non-RAID) host connectivity or Lenovo ThinkSystem DS Series storage area network (SAN) array expansion. For more information, see the [D3284 product guide](#).

The following table lists all the Lenovo Storage Enclosures that are supported by LeSI.

Table 10. Lenovo Storage Enclosure selection

Description	Machine Type - Model	Feature Code	Summary
Lenovo Storage D1224 Drive Enclosure	4587-LC2	AU15	12Gb SAS 2U Enclosure for up to 24x 2.5-inch SFF SAS drives
Lenovo Storage D3284 External High Density Drive Expansion Enclosure	6413-LC1	AUDV	12G SAS 5U enclosure for up to 84x 3.5-inch LFF NL-SAS drives

In addition to the storage enclosures listed above, LeSI clusters may leverage the Lenovo ThinkSystem DE Series Storage arrays.

- **ThinkSystem DE Series All-Flash Storage Array**
The Lenovo ThinkSystem DE Series All-Flash Storage Arrays are designed to provide performance, simplicity, capacity, security, and high availability for customers. These storage arrays deliver enterprise-class storage management capabilities with a wide choice of host connectivity options, flexible drive configurations, and enhanced data management features. For more information, see the [DE Series All-Flash Storage Array datasheet](#).
- **ThinkSystem DE Series Hybrid Storage Array**
The Lenovo ThinkSystem DE Series Hybrid Storage Arrays are designed to provide high performance, simplicity, capacity security, and high availability for customers. These storage arrays deliver enterprise-class storage management capabilities in a performance-optimized system with a wide choice of host connectivity options, flexible drive configurations, and enhanced data management features. For more information, see the [DE Series Hybrid Flash Array datasheet](#).

The following table lists the DE Series Storage arrays for use with LeSI. These arrays are not fully tested within LeSI and are not part of the Best Recipe but may be used in conjunction with LeSI deployments.

Table 11. Lenovo ThinkSystem DE Series Storage Array selection

Description	Machine Type Model	Summary
Lenovo ThinkSystem DE4000F All Flash Storage Array	7Y76CTOLWW (2U24 SFF)	2U form factor storage systems supporting up to 192 SSDs
Lenovo ThinkSystem DE6000F All Flash Storage Array	7Y79CTOLWW (2U24 SFF)	2U form factor storage systems supporting up to 192 SSDs (higher IOPS, throughput)
Lenovo ThinkSystem DE2000H Hybrid Storage Array	7Y70CTOLWW (2U12 LFF) 7Y71CTOLWW (2U24 SFF)	2U form factor storage systems supporting up to 96 HDDs/SSDs
Lenovo ThinkSystem DE4000H Hybrid Storage Array	7Y74CTOLWW (2U12 LFF) 7Y75CTOLWW (2U24 SFF) 7Y77CTOLWW (4U60 LFF)	2U/4U form factor storage systems supporting up to 192 HDDs/120 SSDs
Lenovo ThinkSystem DE6000H Hybrid Storage Array	7Y78CTOLWW (2U24 SFF) 7Y80CTOLWW (4U60 LFF)	2U/4U form factor storage systems supporting up to 480 HDDs/120 SSDs

Rack Cabinets and Options

The Lenovo rack cabinets are industry-standard 19-inch server cabinets that are designed for high availability server environments. They are optimized to help maximize floor space, expedite installation, simplify cable management, and increase accessibility for improved serviceability. Lenovo also offers rack options, including accessories like a front extension to the rack, heat exchangers and console kits and a rear door heat exchanger, which is part of Lenovo Neptune liquid cooling technologies. These options improve thermal performance and simplify rack management.

The following table lists all the rack cabinets and rack options that are supported by LeSI.

Table 12. Rack Cabinets and Options

Description	MTM / PN	Feature Code	Summary
Rack cabinets			
EveryScale Heavy Duty Rack Cabinet - the new rack cabinet for LeSI Solutions	1410-O42	BHC4	Black 42U 1200mm rack
	1410-P42	BJ5W	White 42U 1200mm rack
	1410-O48	BHCH	Black 48U 1200mm rack
	1410-P48	BJ64	White 48U 1200mm rack
Scalable Infrastructure 42U 1100mm Enterprise V2 Dynamic Rack	1410-HPB	A2M8	Primary Rack for LeSI Solutions
	1410-HPB	AS9Y	RDHX ready Rack for LeSI Solutions
	1410-HEB	A2M9	Expansion Rack for LeSI Solutions
	1410-HEB	B27C	LeSI Rack with Enhanced Packaging
Scalable Infrastructure 42U 1200mm Deep Rack	1410-HPA	A1MP	Deep Primary Rack for LeSI Solutions
	1410-HEA	A1MQ	Deep Expansion Rack for LeSI Solutions
Client Site Integration Kit	7X74-CTO1WW	B1EN	Virtual Rack for DSS-G Solutions
		B59Y	Virtual Rack for LeSI Solutions
Other			
Local 1X8 Console Manager (LCM8)	1754-HC3/A1X	0725	8-port analog KVM switch
Local 2X16 Console Manager (LCM16)	1754-HC4/A2X	0725	16-port analog KVM switch
Global 2X2X16 Console Manager (GCM16)	1754-HC1/D1X	6694	16-port KVM supporting 2 remote users
Global 4X2X16 Console Manager (GCM32)	1754-HC2/D2X	6695	16-port KVM supporting 4 remote users
Rack Lift Tool	7D5Y	None	Genie Lift GL-8 material lift
VLH - 1U 12 C19/C13 switched and monitored 32A 3P WYE PDU**	1410	BK9X	Vertiv Geist DS30203 PDU

** Note: VLH products are supported directly by the manufacturer.

Other Lenovo ThinkSystem hardware

While LeSI maintains a set of best recipe configurations guaranteeing interoperability, this does not mean that other ThinkSystem hardware is never used. Other Lenovo ThinkSystem hardware system and configurations outside of the defined stack may be compatible with LeSI, though not formally covered by interoperability warranty/support.

For example, the ThinkSystem DM Series Unified Storage Arrays may be part of the optimal hardware choices for a client use case. Because LeSI strives to offer the optimal data center solution to every client, a special bid process is available for incorporating these hardware options. For more information, please check with your Lenovo sales representative.

HPC Acceleration

LeSI solutions include GPUs from NVIDIA. For a summary of GPU features, see the [Lenovo ThinkSystem GPU Summary](#).

Click the links below to read the product briefs from NVIDIA:

- NVIDIA Tesla Series
 - [NVIDIA Tesla M10](#)
 - [NVIDIA A100](#)
 - [NVIDIA A40](#)
 - [NVIDIA A30](#)
 - [NVIDIA A10](#)
 - [NVIDIA Tesla V100](#)
 - [NVIDIA Tesla V100S](#)
 - [NVIDIA Tesla T4](#)
- NVIDIA Quadro Series
 - [NVIDIA Quadro P2200](#)
 - [NVIDIA Quadro P620](#)
 - [NVIDIA Quadro RTX4000](#)
 - [NVIDIA Quadro RTX5000](#)
 - [NVIDIA Quadro RTX6000](#)
 - [NVIDIA Quadro RTX8000](#)

The following table lists all the graphics processing units (GPU) acceleration options that are supported by LeSI.

Table 13. GPU adapters

Description	Part Number	Feature Code	SD630 V2	SD650 V2	SD650-N V2	SR630 V2	SR650 V2	SR670 V2	SR850 V2	SR645	SR655	SR630	SR650	SR670	SD530
NVIDIA Tensor Core GPUs															
ThinkSystem NVIDIA A100 40GB PCIe Gen4 Passive GPU	4X67A13135	BEL5	N	N	N	N	3	8	N	N	3	N	2	4	N
ThinkSystem NVIDIA A40 48GB PCIe Gen4 Passive GPU	4X67A72593	BEL4	N	N	N	N	3	8	N	N	N	N	N	4	N
ThinkSystem NVIDIA A30 24GB PCIe Gen4 Passive GPU	4X67A76581	BJHG	N	N	N	N	N	8	N	N	N	N	N	N	N
ThinkSystem NVIDIA A10 24GB PCIe Gen4 Passive GPU	CTO only	BFTZ	N	N	N	N	4	N	N	N	N	N	N	N	N
ThinkSystem NVIDIA T4 16GB PCIe Gen4 Passive GPU	4X67A14926	B4YB	N	N	N	3	8	N	2	3	8	2	5	8	N
ThinkSystem NVIDIA HGX A100 40GB 400W 4-GPU Board	CTO only	BCSL	N	N	1	N	N	1	N	N	N	N	N	N	N
ThinkSystem NVIDIA HGX A100 80GB 500W 4-GPU Board	CTO only	BHT3	N	N	1	N	N	N	N	N	N	N	N	N	N
NVIDIA Tesla GPUs															
ThinkSystem NVIDIA Tesla V100S 32GB PCIe Passive GPU	4X67A13124	BB2E	N	N	N	N	3	N	N	N	3	N	2	4	N
ThinkSystem NVIDIA Tesla V100 32GB PCIe Passive GPU	4X67A12088	B34S	N	N	N	N	N	N	N	N	3	N	2	4	2
ThinkSystem NVIDIA Tesla V100 FHHL 16GB PCIe GPU	SBB7A09754	B32D	N	N	N	N	N	N	N	N	N	N	3	N	N

Description	Part Number	Feature Code	SD630 V2	SD650 V2	SD650-N V2	SR630 V2	SR650 V2	SR670 V2	SR850 V2	SR645	SR655	SR630	SR650	SR670	SD530
ThinkSystem NVIDIA Tesla M10 32GB PCIe Passive GPU	None	B0RK	N	N	N	N	N	N	N	N	N	N	N	N	2
	7C57A02891	B15V	N	N	N	N	N	N	N	N	N	N	2	N	N
NVIDIA Quadro GPUs															
ThinkSystem NVIDIA Quadro RTX A6000 48GB PCIe Active GPU	4X67A71310	BFT0	N	N	N	N	N	N	N	N	N	N	2	N	N
ThinkSystem NVIDIA Quadro RTX 8000 48GB PCIe Passive GPU	4X67A65441	BCGR	N	N	N	N	N	N	N	N	N	N	2	4	N
ThinkSystem NVIDIA Quadro RTX 6000 24GB PCIe Passive GPU	4X67A13125	BB2D	N	N	N	N	3	N	N	N	N	N	2	4	N
ThinkSystem NVIDIA Quadro RTX 5000 16GB PCIe Active GPU	4X67A17267	B6CH	N	N	N	N	N	N	N	N	N	N	2	N	N
ThinkSystem NVIDIA Quadro RTX 4000 8GB PCIe Active GPU	4X67A14934	B6CG	N	N	N	N	N	N	N	N	N	1	3	N	N
ThinkSystem NVIDIA Quadro P2200 5GB PCIe Active GPU	4X67A14935	B7JW	N	N	N	1	N	N	N	1	N	1	N	N	N
ThinkSystem NVIDIA Quadro P620 2GB PCIe Active GPU	4X67A11584	B31D	N	N	N	3	8	N	N	3	6	3	3	N	N
Supporting Options															
ThinkSystem NVIDIA Ampere NVLink 2-Slot Bridge	4X67A71309	BG3F	N	N	N	N	N	12	N	N	N	N	N	N	N

InfiniBand Interconnects

- Mellanox SB7800 Series

Built with NVIDIA Networking's Switch-IB 2 InfiniBand switch device, the SB7800 series provides up to 100Gb/s full bi-directional bandwidth per port. SB7800 smart network switch is designed to enable in-network computing through the Co-Design Scalable Hierarchical Aggregation Protocol (SHARP) technology. The Co-Design architecture enables the usage of all active data center devices to accelerate the communications frameworks using embedded hardware, resulting in significant applications performance improvements. For more information, see the product briefs below:

- [Mellanox SB7800](#) – 36-port Non-blocking Managed EDR 100Gb InfiniBand Smart Switch
- [Mellanox SB7890](#) – 36-port Non-blocking Externally-managed EDR 100Gb InfiniBand Smart Switch

- Mellanox QM8700 Series

Built with NVIDIA Networking's Quantum InfiniBand switch device, the QM8700 series provides up to 200Gb/s full bi-directional bandwidth per port. QM8700 is the world's smartest network switch, designed to enable in-network computing through the Co-Design Scalable Hierarchical Aggregation Protocol (SHARP) technology. The Co-Design architecture enables the usage of all active data center devices to accelerate the communications frameworks using embedded hardware, result in order of magnitude applications performance improvements. For more information, see the product briefs below:

- [Mellanox QM8700](#) – 40-port Non-blocking Managed HDR 200Gb InfiniBand Smart Switch
- [Mellanox QM8790](#) – 40-port Non-blocking Externally-managed HDR 200Gb InfiniBand Smart Switch

- Mellanox InfiniBand Adapters

Data centers, high scale storage systems and cloud computing require I/O services such as bandwidth, consolidation and unification, and flexibility. NVIDIA Networking InfiniBand adapters provide advanced levels of data center IT performance, efficiency and scalability. In addition, NVIDIA Networking's InfiniBand adapters support traffic consolidation and provides hardware acceleration for server virtualization as well as functioning as both InfiniBand and Ethernet adapters. For more information, see the product briefs below:

- [Mellanox ConnectX-5 EDR InfiniBand Adapter](#)
- [Mellanox ConnectX-6 HDR InfiniBand Adapter](#)

Note: The ConnectX-5 EDR InfiniBand adapters are only available to Lenovo customers through LeSI.

The following table lists all the InfiniBand switches that are supported by LeSI.

Table 14. InfiniBand switches

Description	Orientation	Part Number	Machine Type - Model	Feature Code	Summary
InfiniBand Switches					
Mellanox SB7800 EDR InfiniBand Switch	PSE	None	0724-HD3	AUPK	1U 36 Port Managed 100Gb/s Switch-IB2 InfiniBand Switch
	oPSE	None	0724-HD4	AUPL	
Mellanox SB7890 EDR InfiniBand Switch	PSE	None	0724-HD5	AUPM	1U 36 Port Unmanaged 100Gb/s Switch-IB2 InfiniBand Switch
	oPSE	None	0724-HD6	AUPN	
Mellanox QM8700 HDR InfiniBand Switch	PSE	None	0724-HD7	B4RH	1U 40 Port Managed 200Gb/s Quantum InfiniBand Switch
	oPSE	None	0724-HD8	B4RJ	
Mellanox QM8790 HDR InfiniBand Switch	PSE	None	0724-HD9	B4RK	1U 40 Port Unmanaged 200Gb/s Quantum InfiniBand Switch
	oPSE	None	0724-HEA	B4RL	
InfiniBand Switch Options					
Mellanox QM87xx RMK w/ Air Duct	PSE	4M27A16331	None	B5RV	Mounting kit with air duct for 1U HDR InfiniBand Switches
Mellanox QM87xx RMK for Recessed Mounting	oPSE	4M27A16332	None	B5RW	Recessed Mounting kit for 1U HDR InfiniBand Switches

The following table lists all InfiniBand adapters that are supported by LeSI.

Table 15. InfiniBand adapters

Description	Part Number	Feature Code	SD630 V2	SD650 V2	SD650-N V2	SR630 V2	SR650 V2	SR670 V2	SR850 V2	SR645	SR655	SR630	SR650	SR670	SD530
EDR Adapters															
Mellanox ConnectX-5 1x100GbE/EDR IB QSFP28 VPI Adapter *	4C57A08979	B0RL	N	N	N	N	N	N	N	N	N	Y	Y	N	Y
Mellanox ConnectX-5 2x100GbE/EDR IB QSFP28 VPI Adapter *	4C57A08980	B0RM	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y
Specialized EDR Adapters															
Lenovo ThinkSystem SharedIO ConnectX-5 Adapter*	CTO only	B3RZ	N	N	N	N	N	N	N	N	N	N	N	N	Y
HDR Adapters															
ThinkSystem Mellanox ConnectX-6 HDR100/100GbE QSFP56 1-port PCIe VPI Adapter	4C57A14177	B4R9	1	N	N	3	6	4	2	3	Y	Y	Y	Y	Y
ThinkSystem Mellanox ConnectX-6 HDR100/100GbE QSFP56 2-port PCIe VPI Adapter	4C57A14178	B4RA	N	N	N	3	6	4	2	3	Y	Y	Y	Y	Y
ThinkSystem Mellanox ConnectX-6 HDR/200GbE QSFP56 1-port PCIe 4 VPI Adapter	4C57A15326	B4RC	1	N	N	3	3	4	2	3	Y	Y	Y	Y	N
ThinkSystem Mellanox ConnectX-6 HDR/200GbE QSFP56 1-Port PCIe 4 VPI Adapter DWC	CTO only	B952	N	2	2	N	N	N	N	N	N	N	N	N	N
ThinkSystem Mellanox ConnectX-6 HDR/200GbE QSFP56 1-Port PCIe 4 VPI Adapter (SharedIO) DWC	CTO only	B951	N	1	N	N	N	N	N	N	N	N	N	N	N
ThinkSystem Mellanox HDR IB 2x PCIe Aux Kit	4C57A14179	B4RB	N	1	N	1	3	N	2	1	N	N	N	N	N

* Note: These InfiniBand Adapters are only available to Lenovo customers through LeSI.

The following table lists all the InfiniBand cables that are supported by LeSI.

Table 16. InfiniBand cables

Description	Part number	Feature code
QSFP to 10Gb Ethernet (SFP+) Conversion		
Mellanox QSFP to SFP+ adapter	00D9676	ARZH
QSFP28 EDR InfiniBand Passive Copper Cables		
0.75m Mellanox EDR IB Passive Copper QSFP28 Cable	00MP520	ASQU
1m Mellanox EDR IB Passive Copper QSFP28 Cable	00MP524	ASQV
1.25m Mellanox EDR IB Passive Copper QSFP28 Cable	00MP528	ASQW
1.5m Mellanox EDR IB Passive Copper QSFP28 Cable	00MP532	ASQX
2m Mellanox EDR IB Passive Copper QSFP28 Cable	00MP536	ASQY
3m Mellanox EDR IB Passive Copper QSFP28 Cable	00MP560	ASRM
QSFP28 EDR InfiniBand Active Optical Cables		
3m Mellanox EDR IB Optical QSFP28 Cable	00MP563	ASRN
5m Mellanox EDR IB Optical QSFP28 Cable	00MP540	ASQZ
10m Mellanox EDR IB Optical QSFP28 Cable	00MP544	ASR0
15m Mellanox EDR IB Optical QSFP28 Cable	00MP548	ASR1
20m Mellanox EDR IB Optical QSFP28 Cable	00MP552	ASR2
30m Mellanox EDR IB Optical QSFP28 Cable	00MP556	ASR3
50m Mellanox EDR IB Optical QSFP28 Cable	00MP566	ASRP

Description	Part number	Feature code
QSFP56 HDR InfiniBand Passive Copper Cables		
0.5m Mellanox HDR IB Passive Copper QSFP56 Cable	4Z57A14182	B4QQ
1m Mellanox HDR IB Passive Copper QSFP56 Cable	4Z57A14183	B4QR
1.5m Mellanox HDR IB Passive Copper QSFP56 Cable	4Z57A14184	B4QS
2m Mellanox HDR IB Passive Copper QSFP56 Cable	4Z57A14185	B4QT
QSFP56 HDR to 2x HDR100 InfiniBand Passive Copper Splitter Cables		
1m Mellanox HDR IB Passive Copper Splitter QSFP56 Cable	4Z57A14193	B4R1
1.5m Mellanox HDR IB Passive Copper Splitter QSFP56 Cable	4Z57A14194	B4R2
2m Mellanox HDR IB Passive Copper Splitter QSFP56 Cable	4Z57A11477	B68L
QSFP56 HDR InfiniBand Active Optical Cables		
3m Mellanox HDR IB Active Optical QSFP56 Cable	4Z57A14188	B4QW
5m Mellanox HDR IB Active Optical QSFP56 Cable	4Z57A14189	B4QX
10m Mellanox HDR IB Active Optical QSFP56 Cable	4Z57A14190	B4QY
15m Mellanox HDR IB Active Optical QSFP56 Cable	4Z57A14191	B4QZ
20m Mellanox HDR IB Active Optical QSFP56 Cable	4Z57A14192	B4R0
30m Mellanox HDR IB Active Optical QSFP56 Cable	4Z57A16016	B68P
50m Mellanox HDR IB Active Optical QSFP56 Cable	4Z57A16017	B68N
QSFP56 HDR to 2x HDR100 InfiniBand Active Optical Splitter Cables		
3m Mellanox HDR IB Active Optical Splitter QSFP56 Cable	4Z57A14196	B4R4
5m Mellanox HDR IB Active Optical Splitter QSFP56 Cable	4Z57A14197	B4R5
10m Mellanox HDR IB Active Optical Splitter QSFP56 Cable	4Z57A14198	B4R6
15m Mellanox HDR IB Active Optical Splitter QSFP56 Cable	4Z57A14199	B4R7
20m Mellanox HDR IB Active Optical Splitter QSFP56 Cable	4Z57A14214	B4R8
QSFP56 HDR InfiniBand Active Optical Low Latency Cables*		
3m Mellanox HDR IB Active Optical QSFP56 Low Latency Cable	4Z57A72553	BFXR
5m Mellanox HDR IB Active Optical QSFP56 Low Latency Cable	4Z57A72554	BFXS
10m Mellanox HDR IB Active Optical QSFP56 Low Latency Cable	4Z57A72555	BFXT
15m Mellanox HDR IB Active Optical QSFP56 Low Latency Cable	4Z57A72556	BFXU
20m Mellanox HDR IB Active Optical QSFP56 Low Latency Cable	4Z57A72557	BFXV
30m Mellanox HDR IB Active Optical QSFP56 Low Latency Cable	4Z57A72558	BFXW
QSFP56 HDR to 2x HDR100 InfiniBand Active Optical Low Latency Splitter Cables*		
3m Mellanox HDR IB Active Optical Splitter QSFP56 Low Latency Cable	4Z57A72561	BFY0
5m Mellanox HDR IB Active Optical Splitter QSFP56 Low Latency Cable	4Z57A72562	BFY1
10m Mellanox HDR IB Active Optical Splitter QSFP56 Low Latency Cable	4Z57A72563	BFY2
15m Mellanox HDR IB Active Optical Splitter QSFP56 Low Latency Cable	4Z57A72564	BFY3
20m Mellanox HDR IB Active Optical Splitter QSFP56 Low Latency Cable	4Z57A72565	BFY4
30m Mellanox HDR IB Active Optical Splitter QSFP56 Low Latency Cable	4Z57A72566	BFY0

* Note: Standard and low latency cables should not be mixed interconnecting compute nodes. Standard cables can be used however for example to connect to Storage in a cluster using low latency cables for the compute node interconnect. Low Latency cables are only supported on SD630 V2, SD650 V2 and SD650-N V3 with front-cablings.

Omni-Path Architecture

Cornelis Networks: Intel has spun out the Omni-Path business to [Cornelis Networks](#), an independent Intel Capital portfolio company. Cornelis Networks will continue to serve and sell to existing and new customers by delivering leading purpose-built high-performance network products for high performance computing and artificial intelligence.

- Cornelis Omni-Path Express Edge Switch

Cornelis Omni-Path Express Edge Switches deliver 100Gb port bandwidth with low latency at scale. They cost-effectively deliver high bandwidth and use advanced technologies to meet the key challenges to application performance, maximizing message rate while minimizing average and tail latency. For more information, see the product brief:

- [Cornelis 48-Port Omni-Path Express Edge Switch](#)

- OPA Adapters

Omni-Path Express adapters cost-effectively deliver high bandwidth and use advanced technologies to meet the key challenges to application performance, maximizing cluster scalability and message rate while minimizing average and tail latency. For more information, see the product brief:

- [Cornelis Omni-Path Express Accelerated Host Fabric Adapter](#)

The following table lists all the Omni-Path switches that are supported by LeSI.

Table 17. OPA switches

Description	Orientation	Part Number	Machine Type - Model	Feature Code	Summary
OPA Switches					
Intel OPA 100 Series 48-port Unmanaged Edge Switch	PSE	None	0449-HCR	AU08	1U 48 Port Unmanaged 100Gb/s OPA Switch
	oPSE	None	0449-HCS	AU09	
OPA Switch Options					
Intel OPA 100 Series Edge Switch Management Card	Not applicable	00WE075	None	AU0C	Management Card for 1U 48P OPA Switch
Intel 1U Switch Air Duct Kit for Enterprise Racks	Not applicable	00WE079	None	AU0D	Air duct for recessed 1U 48P OPA Switch

The following table lists all Omni-Path adapters that are supported by LeSI.

Table 18. OPA adapters

Description	Part Number	Feature Code	SD630 V2	SD650 V2	SD650-N V2	SR630 V2	SR650 V2	SR670 V2	SR850 V2	SR645	SR655	SR630	SR650	SR670	SD530
Intel OPA 100 Series Single-port PCIe 3.0 x16 HFA	00WE027	AU0B	1	1	2	3*	6*	4	N	N	N	Y	Y	Y	Y

* Special bid only

The following table lists all the Omni-Path cables that are supported by LeSI.

Table 19. OPA cables

Description	Part number	Feature code
QSFP28 OPA Passive Copper Cables		
0.5m Intel OPA 100 Series Passive Copper QSFP28 Cable	00WE031	AU0E
1m Intel OPA 100 Series Passive Copper QSFP28 Cable	00WE039	AU0G
1.5m Intel OPA 100 Series Passive Copper QSFP28 Cable	00WE047	AU0J
2m Intel OPA 100 Series Passive Copper QSFP28 Cable	00WE051	AU0K
QSFP28 OPA Active Optical Cables		
5m Intel OPA 100 Series Active Optical QSFP28 Cable	00WE059	AU0M
15m Intel OPA 100 Series Active Optical QSFP28 Cable	00WE067	AU0P
20m Intel OPA 100 Series Active Optical QSFP28 Cable	00WE071	AU0Q
QSFP28 OPA Active Optical Low Power Cables		
5m Intel OPA 100 Series Active Optical QSFP28 Low Power Cable	4X97A11034	B22J
10m Intel OPA 100 Series Active Optical QSFP28 Low Power Cable	4X97A11035	B22K
15m Intel OPA 100 Series Active Optical QSFP28 Low Power Cable	4X97A11036	B22L
20m Intel OPA 100 Series Active Optical QSFP28 Low Power Cable	4X97A11037	B22M

Software components

LeSI best recipe supports the following software components. The licenses are usually packaged with 3 years subscription and/or support, with the option to extend the license coverage to 5 years. For additional years or renewal of existing licenses bought through Lenovo, please contact your Lenovo Services sales representative.

Operating systems

- **SUSE Linux Enterprise Server** (Best Recipe interoperability)

SUSE Linux Enterprise Server (SLES) is a world-class, secure open source server operating system, built to power physical, virtual and cloud-based mission-critical workloads. The operating system further raises the bar in helping organizations to accelerate innovation, enhance system reliability, meet tough security requirements and adapt to new technologies. For more information, see the [SLES Product Features](#) web page.

- **Red Hat Enterprise Linux Server** (Best Recipe interoperability)

Red Hat Enterprise Linux Server (RHEL) is the world's leading enterprise Linux platform. Red Hat Enterprise Linux Server orchestrates the hardware resources that fulfill the infrastructure's basic computing requirements such as CPU, memory, networking, and storage. For more information, see the [RHEL product page](#).

- **CentOS** (Best Recipe interoperability)

CentOS is a stable, predictable, manageable and reproducible Linux distribution derived from the sources of Red Hat Enterprise Linux. CentOS provides a development framework for cloud providers, the hosting community, and scientific data processing. For more information, see the [CentOS Project Wiki](#).

Note: CentOS Linux is shifting focus from being a rebuild of Red Hat Enterprise Linux (RHEL), to CentOS Stream, which tracks just ahead of a current RHEL release. CentOS Linux 8, as a rebuild of RHEL 8, will end at the end of 2021. LeSI will discontinue support for CentOS at that point as well.

Orchestration

- **Confluent** (Best Recipe interoperability)

Confluent is Lenovo-developed open source software designed to discover, provision, and manage HPC clusters and the nodes that comprise them. Confluent provides powerful tooling to deploy and update software and firmware to multiple nodes simultaneously, with simple and readable modern software syntax. Additionally, Confluent's performance scales seamlessly from small workstation clusters to thousand-plus node supercomputers. For more information, see the [Confluent documentation](#).

Note: Confluent is the validated cluster management software for LeSI solutions and optimized for LeSI cluster environments beyond what [Lenovo OneCLI](#) as the standalone system management software can provide. We strongly recommend customers leverage Confluent for all LeSI system management.

- **xCAT** (Best Recipe interoperability)

xCAT enables users to easily manage large numbers of servers for technical computing and HPC/AI workloads. xCAT is known for its wide variety of supported hardware and operating systems, as well as being the cluster management software of choice for decades. While xCAT is part of the LeSI Best Recipe validation, most key xCAT functionality is also available in Confluent, and Confluent is Lenovo's suggested software for cluster deployment and management. For more information, see the [xCAT website](#).

- **Lenovo Intelligent Computing Orchestration** (Best Recipe interoperability)

Lenovo Intelligent Computing Orchestration (LiCO) is a Lenovo-developed software solution that simplifies the management and use of distributed clusters for High Performance Computing (HPC) and Artificial Intelligence (AI) environments. LiCO provides a consolidated Graphical User Interface (GUI) for monitoring and usage of LeSI cluster resources, allowing you to easily run both HPC and AI workloads across a choice of Lenovo infrastructure, including both CPU and GPU solutions to suit varying application requirements. For more information, see the [LiCO product guide](#).

Storage Software / File Systems

- **IBM Spectrum Scale** (Best Recipe interoperability)

IBM Spectrum Scale is a cluster file system that provides concurrent access to a single file system or a set of file systems from multiple nodes. The nodes can be SAN attached, network attached, a mixture of SAN and network attached, or in a shared nothing cluster configuration. This enables high performance access to this common set of data to support a scale-out solution or to provide a high availability platform. For more information, see the [IBM Spectrum Scale product documentation](#).

- **BeeGFS** (Tested for Best Recipe interoperability)

BeeGFS is a hardware-independent POSIX-compliant parallel file system (a.k.a Software-defined Parallel Storage) developed with a strong focus on performance and designed for ease of use, simple installation, and management. BeeGFS is created on an Available Source development model (source code is publicly available), offering a self-supported Community Edition and a fully supported Enterprise Edition with additional features and functionalities. BeeGFS is designed for all performance-oriented environments including HPC, AI and Deep Learning, Life Sciences, and Oil & Gas (to name a few). For more information, see the [BeeGFS website](#) and [documentation](#).

- **Excelero** (ISV supported)

Excelero delivers low-latency distributed block storage for web-scale applications. NVMesh enables shared NVMe network and supports any local or distributed file systems. The solution features an intelligent management layer that abstracts underlying hardware with CPU offload, creates logical volumes with redundancy, and provides centralized intelligent management and monitoring. Applications can enjoy the latency, throughput, and IOPs of a local NVMe device with the convenience of centralized storage while avoiding proprietary hardware lock-in and reducing the overall storage TCO. For more information, see the [Excelero NVMesh2 datasheet](#).

- **WekaIO** (ISV supported)

WekaIO Matrix software is the industry’s first flash-native parallel file system that delivers unmatched performance to the most demanding applications, scaling to massive amounts of data in a single namespace. The software-only solution is an NVMe-native, fully parallel and distributed, POSIX compliant file system designed from the ground up to scale to thousands of compute nodes and petabytes of storage. For more information, see the [WekaIO file system datasheet](#).

The following table lists the HPC versions of all the commercial operating systems that are supported by LeSI. Other versions are supported as well, but would exceed the limits of documentation here.

Table 20. Commercial Operating Systems

Description	Part number	Feature code
SUSE Linux Enterprise Server (SLES) – Single Server and HPC only listed, others available		
SLES X86 2 Socket Standard Subscription w/Lenovo Support 1Yr	7S0G0007WW	S0LM
SLES X86 2 Socket Standard Subscription w/Lenovo Support 3Yr	7S0G0008WW	S0LN
SLES X86 2 Socket Standard Subscription w/Lenovo Support 5Yr	7S0G0009WW	S0LP
SLES X86 2 Socket Priority Subscription w/Lenovo Support 1Yr	7S0G0024WW	S4N7
SLES X86 2 Socket Priority Subscription w/Lenovo Support 3Yr	7S0G0025WW	S4N8
SLES X86 2 Socket Priority Subscription w/Lenovo Support 5Yr	7S0G0026WW	S4N9
SUSE Linux Enterprise HPC Standard SUSE Support 1 Year (US/CA/AP)	00YC039	1860
SUSE Linux Enterprise HPC Standard SUSE Support 1 Year (EMEA/LA)	00YC149	1860
SUSE Linux Enterprise HPC Standard SUSE Support 3 Years (US/CA/AP)	00YC040	1861
SUSE Linux Enterprise HPC Standard SUSE Support 3 Years (EMEA/LA)	00YC150	1861
SUSE Linux Enterprise HPC Standard SUSE Support 5 Years (US/CA/AP)	00YC041	1859
SUSE Linux Enterprise HPC Standard SUSE Support 5 Years (EMEA/LA)	00YC151	1859
SUSE Linux Enterprise HPC Priority SUSE Support 1 Year (US/CA/AP)	00YC042	1856
SUSE Linux Enterprise HPC Priority SUSE Support 1 Year (EMEA/LA)	00YC152	1856
SUSE Linux Enterprise HPC Priority SUSE Support 3 Years (US/CA/AP)	00YC043	1857
SUSE Linux Enterprise HPC Priority SUSE Support 3 Years (EMEA/LA)	00YC153	1857
SUSE Linux Enterprise HPC Priority SUSE Support 5 Years (US/CA/AP)	00YC044	1858
SUSE Linux Enterprise HPC Priority SUSE Support 5 Years (EMEA/LA)	00YC154	1858
Red Hat Enterprise Linux (RHEL) – Single Server and HPC only listed, others available		
RHEL Server Physical or Virtual Node, 2 Skt Std Sub w/ Lenovo Sup 1Yr	7S0F0001WW	S0N5
RHEL Server Physical or Virtual Node, 2 Skt Std Sub w/ Lenovo Sup 3Yr	7S0F0002WW	S0N6
RHEL Server Physical or Virtual Node, 2 Skt Std Sub w/ Lenovo Sup 5Yr	7S0F0003WW	S0N7
RHEL Server Physical or Virtual Node, 2 Skt Prem Sub w/ Lenovo Sup 1Yr	7S0F0004WW	S0N8
RHEL Server Physical or Virtual Node, 2 Skt Prem Sub w/ Lenovo Sup 3Yr	7S0F0005WW	S0N9
RHEL Server Physical or Virtual Node, 2 Skt Prem Sub w/ Lenovo Sup 5Yr	7S0F0006WW	S0NA
RHEL for HPC Head Node Sub w/ Lenovo Std Sup 1Yr	7S0F002AWW	S4ML
RHEL for HPC Head Node Sub w/ Lenovo Std Sup 3Yr	7S0F002BWW	S4MM
RHEL for HPC Head Node Sub w/ Lenovo Std Sup 5Yr	7S0F002CWW	S4MN
RHEL for HPC Head Node Sub w/ Lenovo Prem Sup 1Yr	7S0F0027WW	S4MH
RHEL for HPC Head Node Sub w/ Lenovo Prem Sup 3Yr	7S0F0028WW	S4MJ
RHEL for HPC Head Node Sub w/ Lenovo Prem Sup 5Yr	7S0F0029WW	S4MK
RHEL for HPC Head Node w/ Smart Mgmt Sub w/ Lenovo Std Sup 1Yr	7S0F000RWW	S0NV

Description	Part number	Feature code
RHEL for HPC Head Node w/ Smart Mgmt Sub w/ Lenovo Std Sup 3Yr	7S0F000SWW	S0NW
RHEL for HPC Head Node w/ Smart Mgmt Sub w/ Lenovo Std Sup 5Yr	7S0F000TWW	S0NX
RHEL for HPC Head Node w/ Smart Mgmt Sub w/ Lenovo Prem Sup 1Yr	7S0F000UWW	S0NY
RHEL for HPC Head Node w/ Smart Mgmt Sub w/ Lenovo Prem Sup 3Yr	7S0F000VWW	S0NZ
RHEL for HPC Head Node w/ Smart Mgmt Sub w/ Lenovo Prem Sup 5Yr	7S0F000WWWW	S0P0
RHEL for HPC Compute Node Sub w/ RedHat L3 only Sup 1Yr	7S0F002DWW	S4MP
RHEL for HPC Compute Node Sub w/ RedHat L3 only Sup 3Yr	7S0F002EWW	S4MQ
RHEL for HPC Compute Node Sub w/ RedHat L3 only Sup 5Yr	7S0F002FWW	S4MR

The following table lists all Orchestration software available with LeSI. Only LiCO is being fully tested within LeSI and part of the Best Recipe. The other packages are supported by the respective software vendor for use within LeSI.

Table 21. Orchestration Software

Description	Part number	Feature code
Lenovo Intelligent Computing Orchestration (LiCO) HPC AI version		
Lenovo HPC AI LiCO Software 90 Day Evaluation License	7S090004WW	B1YC
Lenovo HPC AI LiCO Software w/1 yr S&S	7S090001WW	B1Y9
Lenovo HPC AI LiCO Software w/3 yr S&S	7S090002WW	B1YA
Lenovo HPC AI LiCO Software w/5 yr S&S	7S090003WW	B1YB
Lenovo Intelligent Computing Orchestration (LiCO) Kubernetes version		
Lenovo K8S AI LiCO Software Evaluation License (90 days)	7S090006WW	S21M
Lenovo K8S AI LiCO Software 4GPU w/1Yr S&S	7S090007WW	S21N
Lenovo K8S AI LiCO Software 4GPU w/3Yr S&S	7S090008WW	S21P
Lenovo K8S AI LiCO Software 4GPU w/5Yr S&S	7S090009WW	S21Q
Lenovo K8S AI LiCO Software 16GPU upgrade w/1Yr S&S	7S09000AWW	S21R
Lenovo K8S AI LiCO Software 16GPU upgrade w/3Yr S&S	7S09000BWW	S21S
Lenovo K8S AI LiCO Software 16GPU upgrade w/5Yr S&S	7S09000CWW	S21T
Lenovo K8S AI LiCO Software 64GPU upgrade w/1Yr S&S	7S09000DWW	S21U
Lenovo K8S AI LiCO Software 64GPU upgrade w/3Yr S&S	7S09000EWW	S21V
Lenovo K8S AI LiCO Software 64GPU upgrade w/5Yr S&S	7S09000FWW	S21W
IBM Spectrum LSF (not tested within LeSI / no Solution Interoperability Support)		
Spectrum LSF Suite for HPC per Inst w/1Yr S&S	7S0A0001WW	B1YW
Spectrum LSF Suite for HPC per Inst w/3Yr S&S	7S0A0002WW	B1YX
Spectrum LSF Suite for HPC per Inst w/4Yr S&S	7S0A0003WW	B1YY
Spectrum LSF Suite for HPC per Inst w/5Yr S&S	7S0A0004WW	B1YZ
Spectrum LSF Suite for Enterprise per Inst w/1Yr S&S	7S0A0005WW	B1Z0
Spectrum LSF Suite for Enterprise per Inst w/3Yr S&S	7S0A0006WW	B1Z1
Spectrum LSF Suite for Enterprise per Inst w/4Yr S&S	7S0A0007WW	B1Z2
Spectrum LSF Suite for Enterprise per Inst w/5Yr S&S	7S0A0008WW	B1Z3
Spectrum LSF Suite for Workgroup per Inst w/1Yr S&S	7S0A0009WW	B1Z4
Spectrum LSF Suite for Workgroup per Inst w/3Yr S&S	7S0A000AWW	B1Z5

Description	Part number	Feature code
Spectrum LSF Suite for Workgroup per Inst w/4Yr S&S	7S0A000BWW	B1Z6
Spectrum LSF Suite for Workgroup per Inst w/5Yr S&S	7S0A000CWW	B1Z7
Spectrum LSF Suite per Server w/1Yr S&S	7S0A000HWW	B1ZC
Spectrum LSF Suite per Server w/3Yr S&S	7S0A000JWW	B1ZD
Spectrum LSF Suite per Server w/4Yr S&S	7S0A000KWW	B1ZE
Spectrum LSF Suite per Server w/5Yr S&S	7S0A000LWW	B1ZF
Spectrum LSF Suite per User w/1Yr S&S	7S0A000DWW	B1Z8
Spectrum LSF Suite per User w/3Yr S&S	7S0A000EWW	B1Z9
Spectrum LSF Suite per User w/4Yr S&S	7S0A000FWW	B1ZA
Spectrum LSF Suite per User w/5Yr S&S	7S0A000GWW	B1ZB

The following table lists the storage software available with LeSI. Only IBM Spectrum Scale and BeeGFS file system software is being fully tested within LeSI and part of the Best Recipe. The other packages are supported by the respective software vendor for use within LeSI.

Table 22. File System Software

Description	Part number	Feature code
IBM Spectrum Scale		
Spectrum Scale Data Management Edition per Disk Drive w/1Yr S&S	None	AVZ7
Spectrum Scale Data Management Edition per Disk Drive w/3Yr S&S	None	AVZ8
Spectrum Scale Data Management Edition per Disk Drive w/4Yr S&S	None	AVZ9
Spectrum Scale Data Management Edition per Disk Drive w/5Yr S&S	None	AVZA
Spectrum Scale Data Management Edition per Flash Drive w/1Yr S&S	None	AVZB
Spectrum Scale Data Management Edition per Flash Drive w/3Yr S&S	None	AVZC
Spectrum Scale Data Management Edition per Flash Drive w/4Yr S&S	None	AVZD
Spectrum Scale Data Management Edition per Flash Drive w/5Yr S&S	None	AVZE
Spectrum Scale Data Management Edition per TiB w/1Yr S&S	None	AVZ3
Spectrum Scale Data Management Edition per TiB w/3Yr S&S	None	AVZ4
Spectrum Scale Data Management Edition per TiB w/4Yr S&S	None	AVZ5
Spectrum Scale Data Management Edition per TiB w/5Yr S&S	None	AVZ6
Spectrum Scale Data Access Edition per Disk Drive w/1Yr S&S	None	S189
Spectrum Scale Data Access Edition per Disk Drive w/3Yr S&S	None	S18A
Spectrum Scale Data Access Edition per Disk Drive w/4Yr S&S	None	S18B
Spectrum Scale Data Access Edition per Disk Drive w/5Yr S&S	None	S18C
Spectrum Scale Data Access Edition per Flash Drive w/1Yr S&S	None	S18D
Spectrum Scale Data Access Edition per Flash Drive w/3Yr S&S	None	S18E
Spectrum Scale Data Access Edition per Flash Drive w/4Yr S&S	None	S18F
Spectrum Scale Data Access Edition per Flash Drive w/5Yr S&S	None	S18G
Spectrum Scale Data Access Edition per TiB w/1Yr S&S	None	S185
Spectrum Scale Data Access Edition per TiB w/3Yr S&S	None	S186
Spectrum Scale Data Access Edition per TiB w/4Yr S&S	None	S187
Spectrum Scale Data Access Edition per TiB w/5Yr S&S	None	S188

Description	Part number	Feature code
Spectrum Scale Erasure Code Edition per TiB w/1Yr S&S	None	S2D0
Spectrum Scale Erasure Code Edition per TiB w/3Yr S&S	None	S2D1
Spectrum Scale Erasure Code Edition per TiB w/4Yr S&S	None	S2D2
Spectrum Scale Erasure Code Edition per TiB w/5Yr S&S	None	S2D3
BeeGFS and and BeeOND Enterprise Support*		
BeeGFS Single Target Server Support per node w/3Yr S&S	None	S4XR
BeeGFS Single Target Server Support per node w/4Yr S&S	None	S5EB
BeeGFS Single Target Server Support per node w/5Yr S&S	None	S4XX
BeeGFS Multi Target Server Support per node w/3Yr S&S	None	S4XS
BeeGFS Multi Target Server Support per node w/4Yr S&S	None	S5EC
BeeGFS Multi Target Server Support per node w/5Yr S&S	None	S4XY
BeeGFS Unlimited Target Server Support per node w/3Yr S&S	None	S4XT
BeeGFS Unlimited Target Server Support per node w/4Yr S&S	None	S5ED
BeeGFS Unlimited Target Server Support per node w/5Yr S&S	None	S4XZ
ThinkParq BeeGFS Remote Consulting and Training (per Day)	None	S4Y3

* Note: BeeGFS and BeeOND support requires Lenovo Premier Support both on the Server and Storage systems. For Storage components that are part of the BeeGFS system, the BeeGFS Solution Feature Code BHNM.

The following table lists the available Excelero block storage software.

Table 23. Excelero Block Storage Software

Description	Part number	Feature code
Excelero NVMesh (not tested within LeSI / no solution interoperability support)		
Excelero NVMesh, Per User w/1Yr Premium Support	7S0H0001WW	S0EF
Excelero NVMesh, Per User w/3Yr Premium Support	7S0H0002WW	S0EG
Excelero NVMesh, Per User w/4Yr Premium Support	7S0H0003WW	S0EH
Excelero NVMesh, Per User w/5Yr Premium Support	7S0H0004WW	S0EJ
Excelero NVMesh, Per User w/1Yr Mission Critical Support	7S0H0005WW	S0EK
Excelero NVMesh, Per User w/3Yr Mission Critical Support	7S0H0006WW	S0EL
Excelero NVMesh, Per User w/4Yr Mission Critical Support	7S0H0007WW	S0EM
Excelero NVMesh, Per User w/5Yr Mission Critical Support	7S0H0008WW	S0EN
Excelero NVMesh, Per NVMe Drive w/1Yr Premium Support	7S0H0009WW	S0EP
Excelero NVMesh, Per NVMe Drive w/3Yr Premium Support	7S0H000AWW	S0EQ
Excelero NVMesh, Per NVMe Drive w/4Yr Premium Support	7S0H000BWW	S0ER
Excelero NVMesh, Per NVMe Drive w/5Yr Premium Support	7S0H000CWW	S0ES
Excelero NVMesh, Per NVMe Drive w/1Yr Mission Critical Support	7S0H000DWW	S0ET
Excelero NVMesh, Per NVMe Drive w/3Yr Mission Critical Support	7S0H000EWW	S0EU
Excelero NVMesh, Per NVMe Drive w/4Yr Mission Critical Support	7S0H000FWW	S0EV
Excelero NVMesh, Per NVMe Drive w/5Yr Mission Critical Support	7S0H000GWW	S0EW
Excelero NVMesh, Client Inclusive, Per NVMe Drive w/1Yr Premium Support	7S0H000HWW	S0EX
Excelero NVMesh, Client Inclusive, Per NVMe Drive w/3Yr Premium Support	7S0H000JWW	S0EY

Description	Part number	Feature code
Excelero NVMesh, Client Inclusive, Per NVMe Drive w/4Yr Premium Support	7S0H000KWW	S0EZ
Excelero NVMesh, Client Inclusive, Per NVMe Drive w/5Yr Premium Support	7S0H000LWW	S0F0
Excelero NVMesh, Client Inclusive, Per NVMe Drive w/1Yr Mission Critical Support	7S0H000MWW	S0F1
Excelero NVMesh, Client Inclusive, Per NVMe Drive w/3Yr Mission Critical Support	7S0H000NWW	S0F2
Excelero NVMesh, Client Inclusive, Per NVMe Drive w/4Yr Mission Critical Support	7S0H000PWW	S0F3
Excelero NVMesh, Client Inclusive, Per NVMe Drive w/5Yr Mission Critical Support	7S0H000QWW	S0F4
Excelero Remote, NVMesh General Professional Services , Per Day	7S0H000RWW	S0F5
Excelero Remote, Webinar-based, NVMesh Training Services, Per Day	7S0H000SWW	S0F6

For more information about Excelero NVMesh, see the datasheet:
<https://www.excelero.com/wp-content/uploads/2018/10/NVMesh2-Data-Sheet.pdf>

The following table lists the available WekaIO MatrixFS software.

Table 24. WekaIO MatrixFS software

Description	Part Number	Feature Code
Weka MatrixFS (not tested within LeSI / no solution interoperability support)		
WekaIO Matrix SW License for Flash SSD Tier Per TB, 1Yr	7SZZ101589	V27G
WekaIO Matrix SW License for Flash SSD Tier Per TB, 3Yr	7SZZ101590	V27H
WekaIO Matrix SW License for Flash SSD Tier Per TB, 5Yr	7SZZ101591	V27J
WekaIO Matrix SW License for Object Tier Per TB Usable, 1Yr	7SZZ101592	V27K
WekaIO Matrix SW License for Object Tier Per TB Usable, 3Yr	7SZZ101593	V27L
WekaIO Matrix SW License for Object Tier Per TB Usable, 5Yr	7SZZ101594	V27M

LeSI factory integration

Lenovo manufacturing implements a robust testing and integration program to insure LeSI components are fully operational when shipped out of the factory. In addition to the standard component level validation performed on all hardware components produced by Lenovo, LeSI performs rack level testing to verify that the LeSI cluster operates as a solution. The rack level testing and validation includes the following:

- Performing a power on test. Assure device power is present, with no error indicators
- Set up RAID (when required)
- Set up storage devices and verify functionality
- Validate network connectivity and functionality
- Verify functionality of server hardware, network infrastructure, and server configuration correctness. Verify health of components
- Configure all devices per Best Recipe software settings
- Perform stress testing of server CPU and memory via software and power cycling
- Data collection for quality records and test results

LeSI onsite installation

Lenovo experts will manage the physical installation of your pre-integrated Racks so you can quickly benefit from your investment. Working at a time convenient to you, the technician will unpack and inspect the systems at your site, finalize the cabling, verify operation, and dispose of the packaging at the on-site location. Any racked LeSI solution is eligible for this basic Lenovo Hardware Installation services through a “Code 20” Hardware Install call based on the 1410 rack machine type and serial number. Customized installation services beyond the basic Lenovo Hardware Installation services are also available to meet the specific needs of the client and for solutions with Client Site Integration Kit.

Before installation, the client should complete the following steps to ensure the hardware will be successfully installed:

- Backing up the data being migrated to the new hardware
- Ensuring the new hardware is available and in place
- Assign a technical lead to act as liaison with LENOVO, who can coordinate access to other resources if required
- Designated data center location has the required power and cooling in place to support purchased solution
- Providing a safe workspace and appropriate access for the technician

Once the client is ready, an expert technician will perform the basic Lenovo Hardware Installation services. This process will include the following:

- Verify receipt and condition of all rack(s) and components
- Verify the client environment is ready for consequent installation
- Unpack and visually inspect hardware for damage
- Place rack(s) and complete installation and inter-rack cabling as specified by the solution configuration
- Connect the equipment to customer-supplied power
- Ensure the equipment is operational: Power on equipment, check for green lights and obvious issues
- Remove packaging and other waste materials to the customer designated dumpster
- Provide completion form for customer to authorize
- If a hardware failure occurs during the installation, service call will be opened.

Additional client requirements beyond the basic Lenovo Hardware Installation services scope, can be offered with customized installation services sized specifically to the client’s needs.

Lenovo can also provide comprehensive onsite configuration of software, including integration and validation for operating systems and software, virtualization and high-availability configurations.

For additional information, see the [Services](#) section.

Client Site Integration Kit onsite installation

Besides shipping fully integrated into the Lenovo 1410 rack cabinet, LeSI solution gives clients the choice of shipping with the Lenovo Client Site Integration Kit (7X74) which allows clients to contract Lenovo or a business partner to install the solution in a rack of their own choosing. The Lenovo Client Site Integration Kit enables clients to gain the interoperability warranty benefit of a LeSI solution while also providing them flexibility in custom-fitting into the client datacenter.

With the Lenovo Client Site Integration Kit, the LeSI solution is built and tested at the rack level in Lenovo manufacturing just like described for factory integration above. Afterwards it is disassembled again, and Servers, switches and other items are packaged in individual boxes with a ship group box for cables, publications, labeling, and other rack documentation. Clients are required to purchase installation services from Lenovo or a business partner for the physical setup. The installation team will install the solution at the customer site into the customer provided rack per racking diagrams and point-to-point instructions.

Operating environment

Lenovo Scalable Infrastructure does fully comply with ASHRAE class A2 specifications for the air-cooled data center, with ASHRAE class W4 for direct to node water cooling for the LeSI exclusive Lenovo ThinkSystem SD650 V2 and SD650-N V2.

Depending on the hardware configuration, some server models comply with ASHRAE class A3 and class A4 specifications, however the server performance might be impacted when the operating temperature is outside the ASHRAE A2 specifications. Please find more details in the product guides of the individual components.

- Air temperature:
 - Operating: ASHRAE Class A2: 10 °C - 35 °C (50 °F - 95 °F); for altitudes above 900 m (2,953 ft), decrease the maximum ambient temperature by 1 °C for every 300-m (984-ft) increase in altitude
 - Non-operating: 5 °C - 45 °C (41 °F - 113 °F)
 - Storage: -40 °C - +60 °C (-40 °F - 140 °F)
- Maximum altitude: 3,050 m (10,000 ft)
- Humidity:
 - Operating: ASHRAE Class A2: 8% - 80% (non-condensing); maximum dew point: 21 °C (70 °F)
 - Storage: 8% - 90% (non-condensing)
- Electrical:
 - 100 - 127 (nominal) V AC; 50 Hz / 60 Hz
 - 200 - 240 (nominal) V AC; 50 Hz / 60 Hz
 - 180 - 300 V DC (HVDC; supported in China only)

Regulatory compliance

Lenovo Scalable Infrastructure adopts the conformity of its individual components to international standards, as minimum however

- UL/IEC / CSA C22.2 No. 60950-1
- United States FCC Part 15, Class A
- Canada ICES-003, Class A
- Europe CE Mark (EN55032 Class A, EN60950-1, EN55024, EN61000-3-2, EN61000-3-3)
- New Zealand/Australia CISPR 22, Class A
- Russia/GOST ME01; IEC-60950-1; GOST R 51318.22, 51317.3.2, and 51317.3.3
- Japan VCCI, Class A
- China CCC Class A
- CISPR 22, Class A

Please find more details on the regulatory compliance for the individual components in their respective product guides.

Warranty and Support

LeSI exclusive components (Machine Types 1410, 7X74, 0724, 0449, 7D5F; for the other Hardware and Software components configured within LeSI their respective warranty terms apply) have a three-year customer replaceable unit (CRU) and onsite limited (for field-replaceable units (FRUs) only) warranty with standard call center support during normal business hours and 9x5 Next Business Day Parts Delivered.

Some countries might have different warranty terms and conditions than the standard warranty. This is due to local business practices or laws in the specific country. Local service teams can assist in explaining country-specific terms when needed. Examples of country-specific warranty terms are second or longer business day parts delivery or parts-only base warranty.

If warranty terms and conditions include onsite labor for repair or replacement of parts, Lenovo will dispatch a service technician to the customer site to perform the replacement. Onsite labor under base warranty is limited to labor for replacement of parts that have been determined to be field-replaceable units (FRUs). Parts that are determined to be customer-replaceable units (CRUs) do not include onsite labor under base warranty.

If warranty terms include parts-only base warranty, Lenovo is responsible for delivering only replacement parts that are under base warranty (including FRUs) that will be sent to a requested location for self-service. Parts-only service does not include a service technician being dispatched onsite. Parts must be changed at customer's own cost and labor and defective parts must be returned following the instructions supplied with the spares parts.

Lenovo's additional support services provide a sophisticated, unified support structure for your data center, with an experience consistently ranked number one in customer satisfaction worldwide. Available offerings include:

- **Premier Support**

Premier Support provides a Lenovo-owned customer experience and delivers direct access to technicians skilled in hardware, software, and advanced troubleshooting, in addition to the following:

- Direct technician-to-technician access through a dedicated phone line
- 24x7x365 remote support
- Single point of contact service
- End to end case management
- Third-party collaborative software support
- Online case tools and live chat support
- On-demand remote system analysis

- **Warranty Upgrade (Preconfigured Support)**

Services are available to meet the on-site response time targets that match the criticality of your systems.

- 3, 4, or 5 years of service coverage
- 1-year or 2-year post-warranty extensions
- **Foundation Service:** 9x5 service coverage with next business day onsite response. YourDrive YourData is an optional extra (see below).
- **Essential Service:** 24x7 service coverage with 4-hour onsite response or 24-hour committed repair (available only in select countries). Bundled with YourDrive YourData.
- **Advanced Service:** 24x7 service coverage with 2-hour onsite response or 6-hour committed repair (available only in select countries). Bundled with YourDrive YourData.

- **Managed Services**

Lenovo Managed Services provides continuous 24x7 remote monitoring (plus 24x7 call center availability) and proactive management of your data center using state-of-the-art tools, systems, and practices by a team of highly skilled and experienced Lenovo services professionals.

Quarterly reviews check error logs, verify firmware & OS device driver levels, and software as needed. We'll also maintain records of latest patches, critical updates, and firmware levels, to ensure you systems are providing business value through optimized performance.

- **Technical Account Management (TAM)**

A Lenovo Technical Account Manager helps you optimize the operation of your data center based on a deep understanding of your business. You gain direct access to your Lenovo TAM, who serves as your single point of contact to expedite service requests, provide status updates, and furnish reports to track incidents over time. In addition, your TAM will help proactively make service recommendations and manage your service relationship with Lenovo to make certain your needs are met.

- **Enterprise Server Software Support**

Enterprise Software Support is an additional support service providing customers with software support on Microsoft, Red Hat, SUSE, and VMware applications and systems. Around the clock availability for critical problems plus unlimited calls and incidents helps customers address challenges fast, without incremental costs. Support staff can answer troubleshooting and diagnostic questions, address product comparability and interoperability issues, isolate causes of problems, report defects to software vendors, and more.

- **YourDrive YourData**

Lenovo's YourDrive YourData is a multi-drive retention offering that ensures your data is always under your control, regardless of the number of drives that are installed in your Lenovo server. In the unlikely event of a drive failure, you retain possession of your drive while Lenovo replaces the failed drive part. Your data stays safely on your premises, in your hands. The YourDrive YourData service can be purchased in convenient bundles and is optional with Foundation Service. It is bundled with Essential Service and Advanced Service.

- **Health Check**

Having a trusted partner who can perform regular and detailed health checks is central to maintaining efficiency and ensuring that your systems and business are always running at their best. Health Check supports Lenovo-branded server, storage, and networking devices, as well as select Lenovo-supported products from other vendors that are sold by Lenovo or a Lenovo-Authorized Reseller.

Examples of region-specific warranty terms are second or longer business day parts delivery or parts-only base warranty.

If warranty terms and conditions include onsite labor for repair or replacement of parts, Lenovo will dispatch a service technician to the customer site to perform the replacement. Onsite labor under base warranty is limited to labor for replacement of parts that have been determined to be field-replaceable units (FRUs). Parts that are determined to be customer-replaceable units (CRUs) do not include onsite labor under base warranty.

If warranty terms include parts-only base warranty, Lenovo is responsible for delivering only replacement parts that are under base warranty (including FRUs) that will be sent to a requested location for self-service. Parts-only service does not include a service technician being dispatched onsite. Parts must be changed at customer's own cost and labor and defective parts must be returned following the instructions supplied with the spare parts.

Lenovo Service offerings are region-specific. Not all preconfigured support and upgrade options are available in every region. For information about Lenovo service upgrade offerings that are available in your region, refer to the following resources:

- Service part numbers in Lenovo Data Center Solution Configurator (DCSC):
<http://dcsc.lenovo.com/#!/services>
- Lenovo Services Availability Locator
<http://lenovolocator.com/>

For service definitions, region-specific details, and service limitations, please refer to the following documents:

- Lenovo Statement of Limited Warranty for Infrastructure Solutions Group (ISG) Servers and System Storage
<http://pcsupport.lenovo.com/us/en/solutions/ht503310>
- Lenovo Data Center Services Agreement
<http://support.lenovo.com/us/en/solutions/ht116628>

The Warranty Upgrades that are available for LeSI are listed in the following tables.

Table 25. Warranty upgrade part numbers – 1410 Rack

Description	Option Part Number	
	Standard Support	Premier Support
Scalable Infrastructure Rack Cabinets (1410-HPB, -HEB, -HPA, -HEA)		
Foundation Service w/Next Business Day Response, 3Yr	5WS7A17328	5WS7A69094
Foundation Service w/Next Business Day Response, 4Yr	5WS7A17332	5WS7A69098
Foundation Service w/Next Business Day Response, 5Yr	5WS7A17336	5WS7A69102
Essential Service w/24x7 4Hr Response, 3Yr	5WS7A17348	5WS7A69114
Essential Service w/24x7 4Hr Response, 4Yr	5WS7A17351	5WS7A69117
Essential Service w/24x7 4Hr Response, 5Yr	5WS7A17354	5WS7A69120
Scalable Infrastructure Rack Cabinets (1410-O42, -P42)		
Foundation Service w/Next Business Day Response, 3Yr	5WS7A92764	5WS7A92814
Foundation Service w/Next Business Day Response, 4Yr	5WS7A92766	5WS7A92816
Foundation Service w/Next Business Day Response, 5Yr	5WS7A92768	5WS7A92818
Essential Service w/24x7 4Hr Response, 3Yr	5WS7A92779	5WS7A92829
Essential Service w/24x7 4Hr Response, 4Yr	5WS7A92781	5WS7A92831
Essential Service w/24x7 4Hr Response, 5Yr	5WS7A92783	5WS7A92833
Advanced Service w/24x7 2Hr Response, 3Yr	5WS7A92794	5WS7A92844
Advanced Service w/24x7 2Hr Response, 4Yr	5WS7A92796	5WS7A92846
Advanced Service w/24x7 2Hr Response, 5Yr	5WS7A92798	5WS7A92848
Scalable Infrastructure Rack Cabinets (1410-O48, -P48)		
Foundation Service w/Next Business Day Response, 3Yr	5WS7A92864	5WS7A92914
Foundation Service w/Next Business Day Response, 4Yr	5WS7A92866	5WS7A92916
Foundation Service w/Next Business Day Response, 5Yr	5WS7A92868	5WS7A92918
Essential Service w/24x7 4Hr Response, 3Yr	5WS7A92879	5WS7A92929
Essential Service w/24x7 4Hr Response, 4Yr	5WS7A92881	5WS7A92931
Essential Service w/24x7 4Hr Response, 5Yr	5WS7A92883	5WS7A92933
Advanced Service w/24x7 2Hr Response, 3Yr	5WS7A92894	5WS7A92944
Advanced Service w/24x7 2Hr Response, 4Yr	5WS7A92896	5WS7A92946
Advanced Service w/24x7 2Hr Response, 5Yr	5WS7A92898	5WS7A92948

Table 26. Warranty upgrade part numbers – 7X74 Integration Kit

Description	Option Part Number	
	Standard Support	Premier Support
Client Side Integration Kit (7X74)		
Premier Support Service - 3Yr Integration Kit (DSS-G)	Not available	5WS7A35451
Premier Support Service - 4Yr Integration Kit (DSS-G)	Not available	5WS7A35452
Premier Support Service - 5Yr Integration Kit (DSS-G)	Not available	5WS7A35453
Premier Support Service - 3Yr Integration Kit (LeSI)	Not available	Available soon
Premier Support Service - 4Yr Integration Kit (LeSI)	Not available	Available soon
Premier Support Service - 5Yr Integration Kit (LeSI)	Not available	Available soon

Table 27. Warranty upgrade part numbers – Mellanox Ethernet Switches

Description	Option Part Number	
	Standard Support	Premier Support
Mellanox AS4610 1GbE Managed Switch (7D5F-CTO1WW, -CTO2WW)		
Foundation Service w/Next Business Day Response, 3Yr	5WS7A87780	5WS7A87830
Foundation Service w/Next Business Day Response, 4Yr	5WS7A87782	5WS7A87832
Foundation Service w/Next Business Day Response, 5Yr	5WS7A87784	5WS7A87834
Essential Service w/24x7 4Hr Response, 3Yr	5WS7A87795	5WS7A87845
Essential Service w/24x7 4Hr Response, 4Yr	5WS7A87797	5WS7A87847
Essential Service w/24x7 4Hr Response, 5Yr	5WS7A87799	5WS7A87849
Advanced Service w/24x7 2Hr Response, 3Yr	5WS7A87810	5WS7A87860
Advanced Service w/24x7 2Hr Response, 4Yr	5WS7A87812	5WS7A87862
Advanced Service w/24x7 2Hr Response, 5Yr	5WS7A87814	5WS7A87864
Mellanox SN2410B 10GbE Managed Switch (7D5F-CTO5WW, -CTO6WW)		
Foundation Service w/Next Business Day Response, 3Yr	5WS7A88480	5WS7A88330
Foundation Service w/Next Business Day Response, 4Yr	5WS7A88482	5WS7A88332
Foundation Service w/Next Business Day Response, 5Yr	5WS7A88484	5WS7A88334
Essential Service w/24x7 4Hr Response, 3Yr	5WS7A88495	5WS7A88345
Essential Service w/24x7 4Hr Response, 4Yr	5WS7A88497	5WS7A88347
Essential Service w/24x7 4Hr Response, 5Yr	5WS7A88499	5WS7A88349
Advanced Service w/24x7 2Hr Response, 3Yr	5WS7A88510	5WS7A88360
Advanced Service w/24x7 2Hr Response, 4Yr	5WS7A88512	5WS7A88362
Advanced Service w/24x7 2Hr Response, 5Yr	5WS7A88514	5WS7A88364
Mellanox SN2010 25GbE Managed Switch (7D5F-CTO3WW, -CTO4WW)		
Foundation Service w/Next Business Day Response, 3Yr	5WS7A88080	5WS7A88130
Foundation Service w/Next Business Day Response, 4Yr	5WS7A88082	5WS7A88132
Foundation Service w/Next Business Day Response, 5Yr	5WS7A88084	5WS7A88134
Essential Service w/24x7 4Hr Response, 3Yr	5WS7A88095	5WS7A88145
Essential Service w/24x7 4Hr Response, 4Yr	5WS7A88097	5WS7A88147
Essential Service w/24x7 4Hr Response, 5Yr	5WS7A88099	5WS7A88149

Description	Option Part Number	
	Standard Support	Premier Support
Advanced Service w/24x7 2Hr Response, 3Yr	5WS7A88110	5WS7A88160
Advanced Service w/24x7 2Hr Response, 4Yr	5WS7A88112	5WS7A88162
Advanced Service w/24x7 2Hr Response, 5Yr	5WS7A88114	5WS7A88164
Mellanox SN2410 25GbE Managed Switch (7D5F-CTO7WW, -CTO8WW)		
Foundation Service w/Next Business Day Response, 3Yr	5WS7A88580	5WS7A88630
Foundation Service w/Next Business Day Response, 4Yr	5WS7A88582	5WS7A88632
Foundation Service w/Next Business Day Response, 5Yr	5WS7A88584	5WS7A88634
Essential Service w/24x7 4Hr Response, 3Yr	5WS7A88595	5WS7A88645
Essential Service w/24x7 4Hr Response, 4Yr	5WS7A88597	5WS7A88647
Essential Service w/24x7 4Hr Response, 5Yr	5WS7A88599	5WS7A88649
Advanced Service w/24x7 2Hr Response, 3Yr	5WS7A88610	5WS7A88660
Advanced Service w/24x7 2Hr Response, 4Yr	5WS7A88612	5WS7A88662
Advanced Service w/24x7 2Hr Response, 5Yr	5WS7A88614	5WS7A88664
Mellanox SN3700C 100GbE Managed Switch (7D5F-CTO9WW, -CTOAWW)		
Foundation Service w/Next Business Day Response, 3Yr	5WS7A88880	5WS7A88930
Foundation Service w/Next Business Day Response, 4Yr	5WS7A88882	5WS7A88932
Foundation Service w/Next Business Day Response, 5Yr	5WS7A88884	5WS7A88934
Essential Service w/24x7 4Hr Response, 3Yr	5WS7A88895	5WS7A88945
Essential Service w/24x7 4Hr Response, 4Yr	5WS7A88897	5WS7A88947
Essential Service w/24x7 4Hr Response, 5Yr	5WS7A88899	5WS7A88949
Advanced Service w/24x7 2Hr Response, 3Yr	5WS7A88910	5WS7A88960
Advanced Service w/24x7 2Hr Response, 4Yr	5WS7A88912	5WS7A88962
Advanced Service w/24x7 2Hr Response, 5Yr	5WS7A88914	5WS7A88964
Mellanox SN3700V 200GbE Managed Switch (7D5F-CTOBWW, -CTOCWW)		
Foundation Service w/Next Business Day Response, 3Yr	Available soon	Available soon
Foundation Service w/Next Business Day Response, 4Yr	Available soon	Available soon
Foundation Service w/Next Business Day Response, 5Yr	Available soon	Available soon
Essential Service w/24x7 4Hr Response, 3Yr	Available soon	Available soon
Essential Service w/24x7 4Hr Response, 4Yr	Available soon	Available soon
Essential Service w/24x7 4Hr Response, 5Yr	Available soon	Available soon
Advanced Service w/24x7 2Hr Response, 3Yr	Available soon	Available soon
Advanced Service w/24x7 2Hr Response, 4Yr	Available soon	Available soon
Advanced Service w/24x7 2Hr Response, 5Yr	Available soon	Available soon

Table 28. Warranty upgrade part numbers – Mellanox InfiniBand Switches

Description	Option Part Number	
	Standard Support	Premier Support
Mellanox SB7800 EDR InfiniBand Switch (0724-HD3, -HD4)		
Foundation Service w/Next Business Day Response, 3Yr	5WS7A17583	Not available
Foundation Service w/Next Business Day Response, 4Yr	5WS7A17587	Not available
Foundation Service w/Next Business Day Response, 5Yr	5WS7A17591	Not available
Essential Service w/24x7 4Hr Response, 3Yr	5WS7A17603	Not available
Essential Service w/24x7 4Hr Response, 4Yr	5WS7A17606	Not available
Essential Service w/24x7 4Hr Response, 5Yr	5WS7A17609	Not available
Advanced Service w/24x7 2Hr Response, 3Yr	5WS7A17618	Not available
Advanced Service w/24x7 2Hr Response, 4Yr	5WS7A17621	Not available
Advanced Service w/24x7 2Hr Response, 5Yr	5WS7A17624	Not available
Mellanox SB7890 EDR InfiniBand Switch (0724-HD5, -HD6)		
Foundation Service w/Next Business Day Response, 3Yr	5WS7A17683	Not available
Foundation Service w/Next Business Day Response, 4Yr	5WS7A17687	Not available
Foundation Service w/Next Business Day Response, 5Yr	5WS7A17691	Not available
Essential Service w/24x7 4Hr Response, 3Yr	5WS7A17703	Not available
Essential Service w/24x7 4Hr Response, 4Yr	5WS7A17706	Not available
Essential Service w/24x7 4Hr Response, 5Yr	5WS7A17709	Not available
Advanced Service w/24x7 2Hr Response, 3Yr	5WS7A17718	Not available
Advanced Service w/24x7 2Hr Response, 4Yr	5WS7A17721	Not available
Advanced Service w/24x7 2Hr Response, 5Yr	5WS7A17724	Not available
Mellanox QM8700 HDR InfiniBand Switch (0724-HD7, -HD8)		
Foundation Service w/Next Business Day Response, 3Yr	5WS7A30560	5WS7A30564
Foundation Service w/Next Business Day Response, 4Yr	5WS7A30574	5WS7A30578
Foundation Service w/Next Business Day Response, 5Yr	5WS7A30588	5WS7A30592
Essential Service w/24x7 4Hr Response, 3Yr	5WS7A30568	5WS7A30571
Essential Service w/24x7 4Hr Response, 4Yr	5WS7A30582	5WS7A30585
Essential Service w/24x7 4Hr Response, 5Yr	5WS7A30596	5WS7A30599
Mellanox QM8790 HDR InfiniBand Switch (0724-HD9, -HEA)		
Foundation Service w/Next Business Day Response, 3Yr	5WS7A30700	5WS7A30704
Foundation Service w/Next Business Day Response, 4Yr	5WS7A30714	5WS7A30718
Foundation Service w/Next Business Day Response, 5Yr	5WS7A30728	5WS7A30732
Essential Service w/24x7 4Hr Response, 3Yr	5WS7A30708	5WS7A30711
Essential Service w/24x7 4Hr Response, 4Yr	5WS7A30722	5WS7A30725
Essential Service w/24x7 4Hr Response, 5Yr	5WS7A30736	5WS7A30739

Table 29. Warranty upgrade part numbers – Intel Omni-Path Switches

Description	Option Part Number	
	Standard Support	Premier Support
Intel OPA 100 Series 48-port Edge Switch (0449-HCR, -HCS)		
Foundation Service w/Next Business Day Response, 3Yr	5WS7A17483	5WS7A69179
Foundation Service w/Next Business Day Response, 4Yr	5WS7A17487	5WS7A69183
Foundation Service w/Next Business Day Response, 5Yr	5WS7A17491	5WS7A69187
Essential Service w/24x7 4Hr Response, 3Yr	5WS7A17503	5WS7A69199
Essential Service w/24x7 4Hr Response, 4Yr	5WS7A17506	5WS7A69202
Essential Service w/24x7 4Hr Response, 5Yr	5WS7A17509	5WS7A69205
Advanced Service w/24x7 2Hr Response, 3Yr	5WS7A17518	5WS7A69214
Advanced Service w/24x7 2Hr Response, 4Yr	5WS7A17521	5WS7A69217
Advanced Service w/24x7 2Hr Response, 5Yr	5WS7A17524	5WS7A69220

Solution Interoperability Support

On top of their individual warranty and maintenance scope or support entitlement, LeSI offers solution-level interoperability support for HPC and AI configurations based on the above selection of Lenovo ThinkSystem portfolio and OEM components.

The extensive testing results in a “Best Recipe” release of software and firmware levels Lenovo warrants to work seamlessly together as a fully integrated data center solution instead of a collection of individual components at the time of implementation.

To see the latest Best Recipe for Scalable Infrastructure at Lenovo, see the following link:
<https://support.lenovo.com/us/en/solutions/HT505184#5>

The Solution Support is engaged by opening a hardware ticket based on the LeSI Rack (Model 1410) or LeSI Client Site Integration Kit (Model 7X74). The LeSI Support team then will triage the issue and recommend next steps for you, including potentially to open tickets with other components of the solution.

For issues that require debugging beyond hardware and firmware (Driver, UEFI, IMM/XCC) an additional ticket will have to be opened with the software vendor (e.g. Lenovo SW Support or 3rd party SW vendor) to assist working towards a fix. The LeSI Support team will then work with the SW Support team in isolating root cause and fixing the defect.

For more information about opening tickets, as well as the scope of support for different LeSI components, see the [Lenovo Scalable Infrastructure Support Plan information page](#).

When a cluster ships the most recent Best Recipe is its compliant version, which is always defined exactly for that specific Scalable Infrastructure release and the cluster is delivered as a solution of that specific release. Using a Support call clients can request a review if their solution is also compatible with a newer Best Recipe release and if it is, are able to upgrade to that while maintaining solution interoperability support.

As long as a cluster (Model 1410, 7X74) is under Lenovo warranty or maintenance entitlement, full solution interoperability support will be provided for the original Best Recipes. Even when newer Best Recipes are available the previous Recipe will remain valid and supported.

Of course, any client is free to choose to not adhere to the Best Recipe and instead deploy different software and firmware versions or integrate other components that were not tested for interoperability. While Lenovo cannot warrant interoperability with those deviations from the tested scope, a client continues to receive full break & fix support for the components based on the individual warranty and maintenance entitlement of the components. This is comparable to the level of support clients will receive when not buying it as a LeSI solution, but building the solution from individual components – so-called “roll your own” (RYO).

In those cases, to minimize risk we suggest still staying as close as possible to the Best Recipe even when deviating. We also suggest when deviating first to test it on a small portion of the cluster and only roll it out completely if this test was stable.

For clients who need to upgrade the firmware or software of a component – for example due to OS entitlement support issues or Common Vulnerabilities and Exposures (CVE) fixes – that is part of the best recipe, a support call should be placed on the 1410/7X74 rack and serial number. Lenovo product engineering will review the proposed changes, and advise the client on the viability of an upgrade path. If an upgrade can be supported and is performed, LeSI will note the change in the support records for the solution.

Services

Lenovo Services is a dedicated partner to your success. Our goal is to reduce your capital outlays, mitigate your IT risks, and accelerate your time to productivity.

Note: Some service options may not be available in all countries. For information about Lenovo service upgrade offerings that are available in your region, contact your local Lenovo sales representative or business partner.

Here's a more in-depth look at what we can do for you:

- **Asset Recovery Services**

Asset Recovery Services (ARS) helps customers recover the maximum value from their end-of-life equipment in a cost-effective and secure way. On top of simplifying the transition from old to new equipment, ARS mitigates environmental and data security risks associated with data center equipment disposal. Lenovo ARS is a cash-back solution for equipment based on its remaining market value, yielding maximum value from aging assets and lowering total cost of ownership for your customers. For more information, see the article, [Reduce E-Waste and Grow Your Bottom Line with Lenovo Asset Recovery Services](#).

- **Assessment Services**

An Assessment helps solve your IT challenges through an onsite, multi-day session with a Lenovo technology expert. We perform a tools-based assessment which provides a comprehensive and thorough review of a company's environment and technology systems. In addition to the technology based functional requirements, the consultant also discusses and records the non-functional business requirements, challenges, and constraints. Assessments help organizations like yours, no matter how large or small, get a better return on your IT investment and overcome challenges in the ever-changing technology landscape.

- **Design Services**

Professional Services consultants perform infrastructure design and implementation planning to support your strategy. The high-level architectures provided by the assessment service are turned into low level designs and wiring diagrams, which are reviewed and approved prior to implementation. The implementation plan will demonstrate an outcome-based proposal to provide business capabilities through infrastructure with a risk-mitigated project plan.

- **Basic Hardware Installation**

Lenovo experts can seamlessly manage the physical installation of your server, storage, or networking hardware. Working at a time convenient for you (business hours or off shift), the technician will unpack and inspect the systems on your site, install options, mount in a rack cabinet, connect to power and network, check and update firmware to the latest levels, verify operation, and dispose of the packaging, allowing your team to focus on other priorities.

- **Deployment Services**

When investing in new IT infrastructures, you need to ensure your business will see quick time to value with little to no disruption. Lenovo deployments are designed by development and engineering teams who know our Products & Solutions better than anyone else, and our technicians own the process from delivery to completion. Lenovo will conduct remote preparation and planning, configure & integrate systems, validate systems, verify and update appliance firmware, train on administrative tasks, and provide post-deployment documentation. Customer's IT teams leverage our skills to enable IT staff to transform with higher level roles and tasks.

- **Integration, Migration, and Expansion Services**

Move existing physical & virtual workloads easily, or determine technical requirements to support increased workloads while maximizing performance. Includes tuning, validation, and documenting ongoing run processes. Leverage migration assessment planning documents to perform necessary migrations.

- **Data Center Power and Cooling Services**

The Data Center Infrastructure team will provide solution design and implementation services to support the power and cooling needs of the multi-node chassis and multi-rack solutions. This includes designing for various levels of power redundancy and integration into the customer power infrastructure. The Infrastructure team will work with site engineers to design an effective cooling strategy based on facility constraints or customer goals and optimize a cooling solution to ensure high efficiency and availability. The Infrastructure team will provide the detailed solution design and complete integration of the cooling solution into the customer data center. In addition, the Infrastructure team will provide rack and chassis level commissioning and stand-up of the water-cooled solution which includes setting and tuning of the flow rates based on water temperature and heat recovery targets. Lastly, the Infrastructure team will provide cooling solution optimization and performance validation to ensure the highest overall operational efficiency of the solution.

Table 30. HPC Professional Services part numbers

Description	Part number	Feature code
Lenovo Professional Services		
HPC Technical Consultant Hourly Unit (Remote)	5MS7A85671	None
HPC Technical Consultant Labor Unit (Remote)	5MS7A85672	None
HPC Technical Consultant Hourly Unit (Onsite)	5MS7A85673	None
HPC Technical Consultant Labor Unit (Onsite)	5MS7A85674	None
HPC Principal Consultant Hourly Unit (Remote)	5MS7A85675	None
HPC Principal Consultant Labor Unit (Remote)	5MS7A85676	None
HPC Principal Consultant Hourly Unit (Onsite)	5MS7A85677	None
HPC Principal Consultant Labor Unit (Onsite)	5MS7A85678	None
HPC Technical Consultant Services Bundle (Small)	5MS7A85679	None
HPC Technical Consultant Services Bundle (Medium)	5MS7A85680	None
HPC Technical Consultant Services Bundle (Large)	5MS7A85681	None
HPC Technical Consultant Services Bundle (Extra Large)	5MS7A85682	None

Lenovo Financial Services

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

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

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

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

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

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

<https://www.lenovo.com/us/en/landingpage/lenovo-financial-services/>

LeSI solution - DSS-G

Lenovo Distributed Storage Solution for IBM Spectrum Scale (DSS-G) is a software-defined storage (SDS) solution for dense scalable file and object storage suitable for high-performance and data-intensive environments. Enterprises or organizations running HPC, Big Data or cloud workloads will benefit the most from the DSS-G implementation.

DSS-G combines the performance of the Lenovo ThinkSystem SR650 servers, Lenovo D1224 and D3284 storage enclosures, and industry leading IBM Spectrum Scale software to offer a high performance, scalable building block approach to modern storage needs.

For more information, see the [DSS-G product guide](#).

Case studies and references

These customers have already implemented LeSI solutions. Click the links to review the customer case studies.



Harvard University Faculty of Arts & Sciences (FAS) Research Computing

- [Harvard University Faculty of Arts & Sciences Research Computing](#)

Learn how Harvard University Faculty of Arts & Sciences Research Computing accelerates ground-breaking research with a new high-performance computing cluster based on Lenovo ThinkSystem servers, 2nd Gen Intel® Xeon® Scalable processors, and Lenovo Neptune™ liquid cooling technology.

- [University of Florida](#)

As a prominent academic institution on the cutting edge of research, The University of Florida is continually working to meet the needs of researchers with its powerful HiPerGator supercomputer. The latest version, HiPerGator 3.0, will be supported by Lenovo's ThinkSystem servers with AMD EPYC™ processors.

- [Vienna Scientific Cluster](#)

To push the boundaries of science, researchers need access to high-performance computing (HPC) resources. Supporting academics of all disciplines, the Vienna Scientific Cluster strengthened its HPC infrastructure with a next-generation supercomputer built on Lenovo ThinkSystem servers.

- [Leibniz Supercomputing Centre](#)

The Leibniz Supercomputing Centre supports trailblazing scientific research with an energy-efficient, next-generation HPC cluster from Lenovo. As scientific research advances, the need for computation power increases. With a new HPC cluster based on Lenovo ThinkSystem SD650 servers with Lenovo Neptune liquid cooling technologies and Intel Xeon Scalable processors, the Leibniz Supercomputing Center is supporting ground-breaking new research. Learn more with this [YouTube video](#).

Related publications and links

For more information, see these resources:

- LeSI product page:
<https://www.lenovo.com/us/en/data-center/servers/high-density/Lenovo-Scalable-Infrastructure/p/WMD00000276>
- LeSI support page:
<https://datacentersupport.lenovo.com/us/en/solutions/ht505184>
- Lenovo DSS-G product page:
<https://www.lenovo.com/us/en/data-center/servers/high-density/Distributed-Storage-Solution-for-IBM-Spectrum-Scale/p/WMD00000275>
- LiCO website:
<https://www.lenovo.com/us/en/data-center/software/lico/>
- Lenovo HPC website:
<https://www.lenovo.com/us/en/data-center/solutions/hpc/>
- x-config configurator:
<https://lesc.lenovo.com/products/hardware/configurator/worldwide/bhui/asit/x-config.jnlp>
- Best recipe index:
<https://support.lenovo.com/us/en/solutions/HT505184#5>

Related product families

Product families related to this document are the following:

- [Artificial Intelligence](#)
- [High Performance Computing](#)

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