

ThinkSystem Mellanox ConnectX-6 HDR/200GbE VPI Adapters

Product Guide

The ThinkSystem Mellanox ConnectX-6 HDR/200GbE VPI Adapters offer 200 Gb/s Ethernet and InfiniBand connectivity for high-performance connectivity when running HPC, cloud, storage and machine learning applications.

The following figure shows the ThinkSystem Mellanox ConnectX-6 HDR/200GbE QSFP56 1-port PCIe 4 VPI Adapter connected to the ThinkSystem Mellanox HDR/200GbE Aux Adapter (the standard heat sink has been removed in this photo).

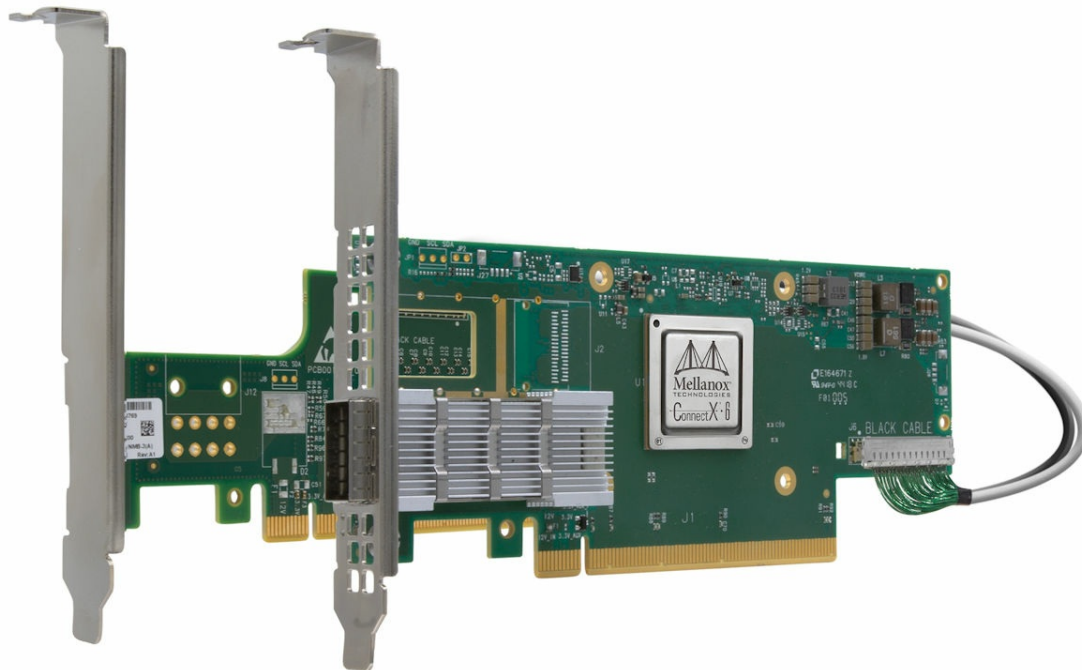


Figure 1. ThinkSystem Mellanox ConnectX-6 HDR/200GbE QSFP56 1-port PCIe 4 VPI Adapter (right) and ThinkSystem Mellanox HDR/200GbE Aux Adapter (left)

Did you know?

Mellanox ConnectX-6 brings new acceleration engines for maximizing High Performance, Machine Learning, Storage, Web 2.0, Cloud, Data Analytics and Telecommunications platforms. ConnectX-6 HDR adapters support up to 200 Gb/s total bandwidth at sub-600 nanosecond latency, and NVMe over Fabric offloads, providing the highest performance and most flexible solution for the most demanding applications and markets. ThinkSystem servers with Mellanox adapters and switches deliver the most intelligent fabrics for High Performance Computing clusters.

Part number information

For servers with support for PCIe 4.0 host interfaces, the ConnectX-6 HDR adapter can be used by itself in a single PCIe 4.0 x16 slot to provide 200 Gb/s connectivity. For servers with PCIe 3.0 interfaces, the ConnectX-6 HDR adapter is used in conjunction with the Aux adapter. The HDR adapter and the Aux adapter are connected together via a cable (included with the Aux adapter) and their combined host interfaces of PCIe 3.0 x32 provides enough bandwidth for 200 Gb/s connectivity.

The following table shows the part numbers for the adapters.

CTO orders: For configure-to-order builds, these adapters are only available when you select one of the HPC & AI modes in the [DCSC configurator](#). Not available in General Purpose mode of DCSC.

Table 1. Ordering information

Part number	Feature code	Mellanox equivalent	Description
Primary adapter			
4C57A15326	B4RC / BN38	MCX653105A-HDAT	ThinkSystem Mellanox ConnectX-6 HDR/200GbE QSFP56 1-port PCIe 4 VPI Adapter
CTO only	B4RG	None	ThinkSystem Mellanox ConnectX-6 HDR/200GbE QSFP56 1-port PCIe 4 VPI Adapter (SharedIO) DWC
CTO only	B951	None	ThinkSystem Mellanox ConnectX-6 HDR/200GbE QSFP56 1-Port PCIe 4 VPI Adapter (SharedIO) DWC
CTO only	B952	None	ThinkSystem Mellanox ConnectX-6 HDR/200GbE QSFP56 1-Port PCIe 4 VPI Adapter DWC
4XC7A86672	BKSK	None	ThinkSystem Mellanox ConnectX-6 HDR/200GbE QSFP56 1-Port PCIe 4 VPI Adapter (SharedIO) DWC
Shared I/O auxiliary adapter/cable			
4C57A14179	B4RB	MTMK0012	ThinkSystem Mellanox HDR/200GbE 2x PCIe Aux Kit
CTO only	BPZG	None	ThinkSystem SD665 V3 SharedIO Cable
CTO only	BRL2	None	ThinkSystem SD650, SD650-I V3 Auxiliary Cable

Part number 4C57A15326 includes the following:

- One Mellanox adapter with full-height (3U) adapter bracket attached
- Low-profile (2U) adapter bracket
- Documentation

Part number 4C57A14179 includes the following:

- One Mellanox adapter with full-height (3U) adapter bracket attached
- Low-profile (2U) adapter bracket
- 350mm cable
- Documentation

Note: 4C57A15326 was previously named ThinkSystem Mellanox ConnectX-6 HDR QSFP56 1-port PCIe 4 InfiniBand Adapter

Supported transceivers and cables

The adapter has an empty QSFP56 cage for connectivity.

The following table lists the supported transceivers.

Table 2. Transceivers

Part number	Feature code	Description
100Gb Transceivers		
4M27A67042	BFH1	Lenovo 100Gb SR4 QSFP28 Ethernet Transceiver
7G17A03539	AV1D	Lenovo 100GBase-SR4 QSFP28 Transceiver
4TC7A86257	BVA4	Lenovo 100GBase-SR4 QSFP28 Transceiver
Converters/Adapters		
4G17A10853	B306	Mellanox QSA 100G to 25G Cable Adapter

Configuration notes:

- Transceiver AV1D also supports 40Gb when installed in a Mellanox adapter.
- For the transceiver and cable support for the Mellanox QSA 100G to 25G Cable Adapter (4G17A10853), see the [25G Cable Adapter transceiver and cable support](#) section.

The following table lists the supported fiber optic cables and Active Optical Cables.

Table 3. Optical cables

Part number	Feature code	Description
QSFP 40Gb Active Optical Cables		
7Z57A04256	AX42	Lenovo 1m 40G QSFP+ Active Optical Cable
00YL652	ATZ3	Lenovo 3m 40G QSFP+ to QSFP+ Active Optical Cable
00YL655	ATZ4	Lenovo 5m 40G QSFP+ to QSFP+ Active Optical Cable
00YL658	ATZ5	Lenovo 7m 40G QSFP+ to QSFP+ Active Optical Cable
00YL661	ATZ6	Lenovo 15m 40G QSFP+ to QSFP+ Active Optical Cable
00YL664	ATZ7	Lenovo 20m 40G QSFP+ to QSFP+ Active Optical Cable
QSFP OM3 Optical Cables (these cables require a transceiver)		
00VX003	AT2U	Lenovo 10m QSFP+ MPO-MPO OM3 MMF Cable
00VX005	AT2V	Lenovo 30m QSFP+ MPO-MPO OM3 MMF Cable
QSFP28 100Gb Ethernet Active Optical Cables		
4X97A94703	B2UZ	Lenovo 1m 100G QSFP28 Active Optical Cable
4X97A94014	AV1L	Lenovo 3m 100G QSFP28 Active Optical Cable
4X97A94015	AV1M	Lenovo 5m 100G QSFP28 Active Optical Cable
4X97A94016	AV1N	Lenovo 10m 100G QSFP28 Active Optical Cable
4X97A94704	AV1P	Lenovo 15m 100G QSFP28 Active Optical Cable
4X97A94705	AV1Q	Lenovo 20m 100G QSFP28 Active Optical Cable
7Z57A03546	C10P	Lenovo 3m 100G QSFP28 Active Optical Cable
100G MPO OM4 MMF Cables (these cables require a transceiver)		
7Z57A03567	AV25	Lenovo 5m MPO-MPO OM4 MMF Cable
7Z57A03568	AV26	Lenovo 7m MPO-MPO OM4 MMF Cable

Part number	Feature code	Description
7Z57A03569	AV27	Lenovo 10m MPO-MPO OM4 MMF Cable
7Z57A03570	AV28	Lenovo 15m MPO-MPO OM4 MMF Cable
7Z57A03571	AV29	Lenovo 20m MPO-MPO OM4 MMF Cable
7Z57A03572	AV2A	Lenovo 30m MPO-MPO OM4 MMF Cable
QSFP56 HDR IB Optical Cables		
4Z57A14188	B4QW	3m Mellanox HDR IB Active Optical QSFP56 Cable
4Z57A14189	B4QX	5m Mellanox HDR IB Active Optical QSFP56 Cable
4Z57A14190	B4QY	10m Mellanox HDR IB Active Optical QSFP56 Cable
4Z57A14191	B4QZ	15m Mellanox HDR IB Active Optical QSFP56 Cable
4Z57A14192	B4R0	20m Mellanox HDR IB Active Optical QSFP56 Cable
QSFP56 HDR IB to 2x HDR100 Optical Splitter Cables		
4Z57A14196	B4R4	3m Mellanox HDR IB to 2x HDR100 Splitter Optical QSFP56 Cable
4Z57A14197	B4R5	5m Mellanox HDR IB to 2x HDR100 Splitter Optical QSFP56 Cable
4Z57A14198	B4R6	10m Mellanox HDR IB to 2x HDR100 Splitter Optical QSFP56 Cable
4Z57A14199	B4R7	15m Mellanox HDR IB to 2x HDR100 Splitter Optical QSFP56 Cable
4Z57A14214	B4R8	20m Mellanox HDR IB to 2x HDR100 Splitter Optical QSFP56 Cable
Mellanox NDR NDRx2 OSFP800 to 2x HDR QSFP56 Optical Splitter Cables		
4X97A81844	BQKC	Lenovo 5m NVIDIA NDRx2 OSFP800 to 2x HDR QSFP56 Active Optical Splitter Cable
4X97A81845	BQKD	Lenovo 10m NVIDIA NDRx2 OSFP800 to 2x HDR QSFP56 Active Optical Splitter Cable

The following table lists the supported direct-attach copper (DAC) cables.

Table 4. Copper cables

Part number	Feature code	Description
QSFP28 EDR InfiniBand Passive Copper Cables		
00MP516	ASQT	0.5m Mellanox EDR IB Passive Copper QSFP28 Cable
00MP520	ASQU	0.75m Mellanox EDR IB Passive Copper QSFP28 Cable
00MP528	ASQW	1.25m Mellanox EDR IB Passive Copper QSFP28 Cable
00MP532	ASQX	1.5m Mellanox EDR IB Passive Copper QSFP28 Cable
QSFP28 100Gb Ethernet Passive DAC Cables		
7Z57A03561	AV1Z	Lenovo 1m Passive 100G QSFP28 DAC Cable
7Z57A03562	AV20	Lenovo 3m Passive 100G QSFP28 DAC Cable
7Z57A03563	AV21	Lenovo 5m Passive 100G QSFP28 DAC Cable
QSFP56 HDR InfiniBand Passive DAC Cables		
4Z57A14182	B4QQ	0.5m Mellanox HDR IB Passive Copper QSFP56 Cable
4Z57A14183	B4QR	1m Mellanox HDR IB Passive Copper QSFP56 Cable
4Z57A14184	B4QS	1.5m Mellanox HDR IB Passive Copper QSFP56 Cable
4Z57A14185	B4QT	2m Mellanox HDR IB Passive Copper QSFP56 Cable
QSFP56 HDR InfiniBand to 2x HDR100 Passive DAC Splitter Cables		
4Z57A14193	B4R1	1m Mellanox HDR IB to 2x HDR100 Splitter Passive Copper QSFP56 Cable
4Z57A14194	B4R2	1.5m Mellanox HDR IB to 2x HDR100 Splitter Passive Copper QSFP56 Cable
4Z57A11477	B68L	2m Mellanox HDR IB to 2x HDR100 Splitter Passive Copper QSFP56 Cable
Mellanox NDR NDRx2 OSFP800 to 2x HDR QSFP56 Copper Splitter Cables		
4X97A81841	BQK9	Lenovo 1m NVIDIA NDRx2 OSFP800 to 2x HDR QSFP56 Passive Copper Splitter Cable
4X97A81842	BQKA	Lenovo 1.5m NVIDIA NDRx2 OSFP800 to 2x HDR QSFP56 Passive Copper Splitter Cable
4X97A81843	BQKB	Lenovo 2m NVIDIA NDRx2 OSFP800 to 2x HDR QSFP56 Passive Copper Splitter Cable
4X97A81844	BQKC	Lenovo 5m NVIDIA NDRx2 OSFP800 to 2x HDR QSFP56 Active Optical Splitter Cable
4X97A81845	BQKD	Lenovo 10m NVIDIA NDRx2 OSFP800 to 2x HDR QSFP56 Active Optical Splitter Cable
4X97A87753	BVB8	Lenovo 20M NVIDIA NDRx2 OSFP800 to 2x HDR QSFP56 Active Optical Splitter Cable
4X97A87754	BVB9	Lenovo 30M NVIDIA NDRx2 OSFP800 to 2x HDR QSFP56 Active Optical Splitter Cable
Mellanox NDR NDRx2 OSFP800 to 4x HDR QSFP56 Copper Splitter Cables		
4X97A81846	BQKE	Lenovo 1m NVIDIA NDRx2 OSFP800 to 4x HDR100 QSFP56 Passive Copper Splitter Cable
4X97A81847	BQKF	Lenovo 1.5m NVIDIA NDRx2 OSFP800 to 4x HDR100 QSFP56 Passive Copper Splitter Cable
4X97A81848	BQKG	Lenovo 2m NVIDIA NDRx2 OSFP800 to 4x HDR100 QSFP56 Passive Copper Splitter Cable

25G Cable Adapter transceiver and cable support

The Mellanox QSA 100G to 25G Cable Adapter (4G17A10853) supports the transceivers listed in the following table.

Table 5. Transceivers for Mellanox QSA 100G to 25G Cable Adapter (4G17A10853)

Part number	Feature code	Description
1Gb transceivers		
00FE333	A5DL	SFP 1000Base-T (RJ-45) Transceiver
10Gb transceivers		
46C3447	5053	SFP+ SR Transceiver
7G17A03130	AVV1	Lenovo 10GBaseT SFP+ Transceiver
4TC7A78615	BNDR	ThinkSystem Accelink 10G SR SFP+ Ethernet transceiver
25Gb transceivers		
7G17A03537	AV1B	Lenovo Dual Rate 10G/25G SR SFP28 Transceiver
4M27A67041	BFH2	Lenovo 25Gb SR SFP28 Ethernet Transceiver

The Mellanox QSA 100G to 25G Cable Adapter (4G17A10853) supports the fiber optic cables and Active Optical Cables listed in the following table.

Table 6. Optical cables for Mellanox QSA 100G to 25G Cable Adapter (4G17A10853)

Part number	Feature code	Description
LC-LC OM3 Fiber Optic Cables (these cables require a 10 GbE SFP+ SR or 25 GbE SFP28 SR transceiver)		
00MN499	ASR5	Lenovo 0.5m LC-LC OM3 MMF Cable
00MN502	ASR6	Lenovo 1m LC-LC OM3 MMF Cable
00MN505	ASR7	Lenovo 3m LC-LC OM3 MMF Cable
00MN508	ASR8	Lenovo 5m LC-LC OM3 MMF Cable
00MN511	ASR9	Lenovo 10m LC-LC OM3 MMF Cable
00MN514	ASRA	Lenovo 15m LC-LC OM3 MMF Cable
00MN517	ASRB	Lenovo 25m LC-LC OM3 MMF Cable
00MN520	ASRC	Lenovo 30m LC-LC OM3 MMF Cable
MTP-4xLC OM3 MMF Breakout Cables (these cables require a transceiver)		
00FM412	A5UA	Lenovo 1m MPO-4xLC OM3 MMF Breakout Cable
00FM413	A5UB	Lenovo 3m MPO-4xLC OM3 MMF Breakout Cable
00FM414	A5UC	Lenovo 5m MPO-4xLC OM3 MMF Breakout Cable
SFP+ 10Gb Active Optical Cables		
00YL634	ATYX	Lenovo 1m SFP+ to SFP+ Active Optical Cable
00YL637	ATYY	Lenovo 3m SFP+ to SFP+ Active Optical Cable
00YL640	ATYZ	Lenovo 5m SFP+ to SFP+ Active Optical Cable
00YL643	ATZ0	Lenovo 7m SFP+ to SFP+ Active Optical Cable
00YL646	ATZ1	Lenovo 15m SFP+ to SFP+ Active Optical Cable
00YL649	ATZ2	Lenovo 20m SFP+ to SFP+ Active Optical Cable
QSFP28 100Gb Ethernet Breakout Active Optical Cables		
7Z57A03554	AV1U	Lenovo 15m 100G to 4x25G Breakout Active Optical Cable
OM4 LC to LC Cables (these cables require a transceiver)		
4Z57A10845	B2P9	Lenovo 0.5m LC-LC OM4 MMF Cable
4Z57A10846	B2PA	Lenovo 1m LC-LC OM4 MMF Cable
4Z57A10847	B2PB	Lenovo 3m LC-LC OM4 MMF Cable
4Z57A10848	B2PC	Lenovo 5m LC-LC OM4 MMF Cable
4Z57A10849	B2PD	Lenovo 10m LC-LC OM4 MMF Cable
4Z57A10850	B2PE	Lenovo 15m LC-LC OM4 MMF Cable
4Z57A10851	B2PF	Lenovo 25m LC-LC OM4 MMF Cable
4Z57A10852	B2PG	Lenovo 30m LC-LC OM4 MMF Cable

The Mellanox QSA 100G to 25G Cable Adapter (4G17A10853) supports the direct-attach copper (DAC) cables listed in the following table.

Table 7. Copper cables for Mellanox QSA 100G to 25G Cable Adapter (4G17A10853)

Part number	Feature code	Description
SFP+ 10Gb Passive DAC Cables		
00D6288	A3RG	0.5m Passive DAC SFP+ Cable
90Y9427	A1PH	1m Passive DAC SFP+ Cable
00AY764	A51N	1.5m Passive DAC SFP+ Cable
00AY765	A51P	2m Passive DAC SFP+ Cable
90Y9430	A1PJ	3m Passive DAC SFP+ Cable
90Y9433	A1PK	5m Passive DAC SFP+ Cable
00D6151	A3RH	7m Passive DAC SFP+ Cable
SFP+ 10Gb Active DAC Cables		
00VX111	AT2R	Lenovo 1m Active DAC SFP+ Cables
00VX114	AT2S	Lenovo 3m Active DAC SFP+ Cables
00VX117	AT2T	Lenovo 5m Active DAC SFP+ Cables
SFP28 25Gb Passive DAC Cables		
7Z57A03557	AV1W	Lenovo 1m Passive 25G SFP28 DAC Cable
7Z57A03558	AV1X	Lenovo 3m Passive 25G SFP28 DAC Cable
7Z57A03559	AV1Y	Lenovo 5m Passive 25G SFP28 DAC Cable
QSFP28 100G-to-4x25G Ethernet Breakout Cables		
7Z57A03564	AV22	Lenovo 1m 100G QSFP28 to 4x25G SFP28 Breakout DAC Cable
4Z57A85043	BS32	Lenovo 1.5m 100G to 4x25G Breakout SFP28 Breakout DAC Cable
4Z57A85044	BS33	Lenovo 2m 100G to 4x25G Breakout SFP28 Breakout DAC Cable
7Z57A03565	AV23	Lenovo 3m 100G QSFP28 to 4x25G SFP28 Breakout DAC Cable
7Z57A03566	AV24	Lenovo 5m 100G QSFP28 to 4x25G SFP28 Breakout DAC Cable

Features

Machine learning and big data environments

Data analytics has become an essential function within many enterprise data centers, clouds and hyperscale platforms. Machine learning relies on especially high throughput and low latency to train deep neural networks and to improve recognition and classification accuracy. ConnectX-6 offers an excellent solution to provide machine learning applications with the levels of performance and scalability that they require.

ConnectX-6 utilizes the RDMA technology to deliver low-latency and high performance. ConnectX-6 enhances RDMA network capabilities even further by delivering end-to-end packet level flow control.

Security

ConnectX-6 block-level encryption offers a critical innovation to network security. As data in transit is stored or retrieved, it undergoes encryption and decryption. The ConnectX-6 hardware offloads the IEEE AES-XTS encryption/decryption from the CPU, saving latency and CPU utilization. It also guarantees protection for users sharing the same resources through the use of dedicated encryption keys.

By performing block-storage encryption in the adapter, ConnectX-6 excludes the need for self-encrypted disks. This allows customers the freedom to choose their preferred storage device, including those that traditionally do not provide encryption. ConnectX-6 can support Federal Information Processing Standards (FIPS) compliance.

ConnectX-6 also includes a hardware Root-of-Trust (RoT), which uses HMAC relying on a device-unique key. This provides both a secure boot as well as cloning-protection. Delivering best-in-class device and firmware protection, ConnectX-6 also provides secured debugging capabilities, without the need for physical access.

Storage environments

NVMe storage devices offer very fast access to storage media. The evolving NVMe over Fabric (NVMe-oF) protocol leverages RDMA connectivity to remotely access NVMe storage devices efficiently, while keeping the end-to-end NVMe model at lowest latency. With its NVMe-oF target and initiator offloads, ConnectX-6 brings further optimization to NVMe-oF, enhancing CPU utilization and scalability.

Cloud and Web 2.0 environments

Telco, Cloud and Web 2.0 customers developing their platforms on software-defined network (SDN) environments are leveraging the Virtual Switching capabilities of server operating systems to enable maximum flexibility in the management and routing protocols of their networks.

Open V-Switch (OVS) is an example of a virtual switch that allows virtual machines to communicate among themselves and with the outside world. Software-based virtual switches, traditionally residing in the hypervisor, are CPU intensive, affecting system performance and preventing full utilization of available CPU for compute functions.

To address such performance issues, ConnectX-6 offers Mellanox Accelerated Switching and Packet Processing (ASAP²) Direct technology. ASAP² offloads the vSwitch/vRouter by handling the data plane in the NIC hardware while maintaining the control plane unmodified. As a result, significantly higher vSwitch/vRouter performance is achieved minus the associated CPU load.

The vSwitch/vRouter offload functions supported by ConnectX-5 and ConnectX-6 include encapsulation and de-encapsulation of overlay network headers, as well as stateless offloads of inner packets, packet headers re-write (enabling NAT functionality), hairpin, and more.

In addition, ConnectX-6 offers intelligent flexible pipeline capabilities, including programmable flexible parser and flexible match-action tables, which enable hardware offloads for future protocols.

Socket Direct

Mellanox's Socket Direct technology improves the performance of dual-socket servers in numerous ways, such as by enabling each of their CPUs to access the network through a dedicated PCIe interface. As the connection from each CPU to the network bypasses the QPI (UPI) and the second CPU, Socket Direct reduces latency and CPU utilization. Moreover, each CPU handles only its own traffic (and not that of the second CPU), thus optimizing CPU utilization even further.

Socket Direct also enables GPUDirect RDMA for all CPU/GPU pairs by ensuring that GPUs are linked to the CPUs closest to the adapter card. Socket Direct enables Intel DDIO optimization on both sockets by creating a direct connection between the sockets and the adapter card.

Socket Direct technology is enabled by a main card housing the ConnectX-6 and an auxiliary PCIe card bringing in the remaining PCIe lanes. The ConnectX-6 Socket Direct card is installed into two PCIe x16 slots and connected using the supplied 350mm cable.

The two PCIe x16 slots may also be connected to the same CPU. In this case, the main advantage of the technology lies in delivering 200Gb/s to servers with PCIe Gen3-only support.

SharedIO

An implementation of Sockets Direct is SharedIO (Shared I/O), where a Mellanox VPI adapter is installed in one slot in one server and an auxiliary adapter is installed in a slot in second server in the same enclosure.

The result is that the two servers or processors share the network connection of the VPI adapter with significant savings both in the cost of the adapters but also the cost of switch ports.

The following figure shows the Mellanox SharedIO Adapter and Auxiliary Card installed in two ThinkSystem SD650 V2 servers in the same tray.

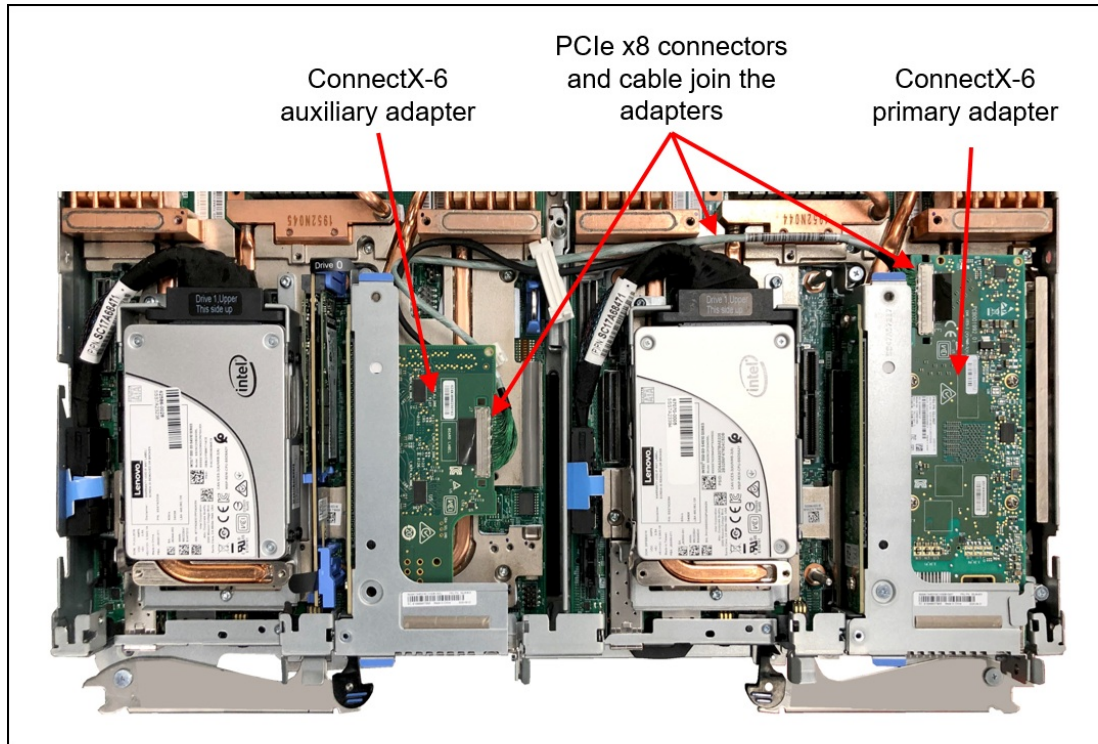


Figure 2. SharedIO adapters installed in the two SD650 V2 servers on a tray

Technical specifications

The adapters have the following technical specifications.

Form factor

- Single-slot low-profile main adapter (6.6-inch x 2.71 in.)
- Single-slot low-profile auxiliary adapter

PCI Express Interface

- Supports PCIe 4.0 or PCIe 3.0
 - In PCIe 4.0 servers, the ConnectX-6 adapter is used by itself to connect 16 PCIe lanes. For two-socket servers, the adapter can be used with the Aux adapter to enable the Socket Direct feature.
 - In PCIe 3.0 servers, the ConnectX-6 adapter is used with the Aux adapter to connect 32 PCIe lanes. For two-socket servers, the adapter can be used with the Aux adapter to enable the Socket Direct feature.
- PCIe Atomic
- TLP (Transaction Layer Packet) Processing Hints (TPH)

- PCIe switch Downstream Port Containment (DPC) enablement for PCIe hot-plug
- Advanced Error Reporting (AER)
- Access Control Service (ACS) for peer-to-peer secure communication
- Process Address Space ID (PASID) Address Translation Services (ATS)
- IBM CAPIv2 (Coherent Accelerator Processor Interface)
- Support for MSI/MSI-X mechanisms

Connectivity

- One QSFP56 port
- Supports passive copper cables with ESD protection
- Powered connectors for optical and active cable support

InfiniBand

- Supports interoperability with InfiniBand switches (up to HDR, as 4 lanes of 50Gb/s data rate)
- Total connectivity is 200 Gb/s:
 - One port adapter supports a single 200 Gb/s link
- HDR / HDR100 / EDR / FDR / QDR / DDR / SDR
- IBTA Specification 1.3 compliant
- RDMA, Send/Receive semantics
- Hardware-based congestion control
- Atomic operations
- 16 million I/O channels
- 256 to 4Kbyte MTU, 2Gbyte messages
- 8 virtual lanes + VL15

Ethernet (requires firmware 20.28.1002 or later)

- Support interoperability with Ethernet switches (up to 200GbE, as 4 lanes of 50Gb/s data rate)
- Total connectivity is 200 Gb/s:
 - One port adapter supports a single 200 Gb/s link
- Supports 200 GbE / 100GbE / 50GbE / 40GbE / 25GbE / 10GbE / 1GbE
- IEEE 802.3bj, 802.3bm 100 Gigabit Ethernet
- IEEE 802.3by, Ethernet Consortium 25, 50 Gigabit Ethernet, supporting all FEC modes
- IEEE 802.3ba 40 Gigabit Ethernet
- IEEE 802.3ae 10 Gigabit Ethernet
- IEEE 802.3az Energy Efficient Ethernet
- IEEE 802.3ap based auto-negotiation and KR startup
- IEEE 802.3ad, 802.1AX Link Aggregation
- IEEE 802.1Q, 802.1P VLAN tags and priority
- IEEE 802.1Qau (QCN) – Congestion Notification
- IEEE 802.1Qaz (ETS)
- IEEE 802.1Qbb (PFC)
- IEEE 802.1Qbg
- IEEE 1588v2
- Jumbo frame support (9.6KB)
- IPv4 (RFQ 791)
- IPv6 (RFC 2460)

Enhanced Features

- Hardware-based reliable transport
- Collective operations offloads
- Vector collective operations offloads
- PeerDirect RDMA (GPUDirect) communication acceleration
- 64/66 encoding
- Enhanced Atomic operations
- Advanced memory mapping support, allowing user mode registration and remapping of memory

(UMR)

- Extended Reliable Connected transport (XRC)
- Dynamically Connected transport (DCT)
- On demand paging (ODP)
- MPI Tag Matching
- Rendezvous protocol offload
- Out-of-order RDMA supporting Adaptive Routing
- Burst buffer offload
- In-Network Memory registration-free RDMA memory access

CPU Offloads

- RDMA over Converged Ethernet (RoCE)
- TCP/UDP/IP stateless offload
- LSO, LRO, checksum offload
- RSS (also on encapsulated packet), TSS, HDS, VLAN and MPLS tag insertion/stripping, Receive flow steering
- Data Plane Development Kit (DPDK) for kernel bypass applications
- Open VSwitch (OVS) offload using ASAP²
 - Flexible match-action flow tables
 - Tunneling encapsulation / de-capsulation
- Intelligent interrupt coalescence
- Header rewrite supporting hardware offload of NAT router

Storage Offloads

- Block-level encryption: XTS-AES 256/512 bit key
- NVMe over Fabric offloads for target machine
- Erasure Coding offload - offloading Reed-Solomon calculations
- T10 DIF - signature handover operation at wire speed, for ingress and egress traffic
- Storage Protocols: SRP, iSER, NFS RDMA, SMB Direct, NVMe-oF

Overlay Networks

- RoCE over overlay networks
- Stateless offloads for overlay network tunneling protocols
- Hardware offload of encapsulation and decapsulation of VXLAN, NVGRE, and GENEVE overlay networks

Hardware-Based I/O Virtualization

- Single Root IOV
- Address translation and protection
- VMware NetQueue support
- SR-IOV: Up to 512 Virtual Functions
- SR-IOV: Up to 16 Physical Functions per host
- Virtualization hierarchies (network partitioning, NPAR)
 - Virtualizing Physical Functions on a physical port
 - SR-IOV on every Physical Function
- Configurable and user-programmable QoS
- Guaranteed QoS for VMs

HPC Software Libraries

- HPC-X, OpenMPI, MVAPICH, MPICH, OpenSHMEM, PGAS and varied commercial packages

Management and Control

- NC-SI, MCTP over SMBus and MCTP over PCIe - BMC interface
- PLDM for Monitor and Control DSP0248

- PLDM for Firmware Update DSP0267
- SDN management interface for managing the eSwitch
- I2C interface for device control and configuration
- General Purpose I/O pins
- SPI interface to Flash
- JTAG IEEE 1149.1 and IEEE 1149.6

Remote Boot

- Remote boot over InfiniBand
- Remote boot over Ethernet
- Remote boot over iSCSI
- Unified Extensible Firmware Interface (UEFI)
- Pre-execution Environment (PXE)

NVIDIA Unified Fabric Manager

NVIDIA Unified Fabric Manager (UFM) is InfiniBand networking management software that combines enhanced, real-time network telemetry with fabric visibility and control to support scale-out InfiniBand data centers.

The two offerings available from Lenovo are as follows:

- UFM Telemetry** for Real-Time Monitoring
 The UFM Telemetry platform provides network validation tools to monitor network performance and conditions, capturing and streaming rich real-time network telemetry information, application workload usage, and system configuration to an on-premises or cloud-based database for further analysis.
- UFM Enterprise** for Fabric Visibility and Control
 The UFM Enterprise platform combines the benefits of UFM Telemetry with enhanced network monitoring and management. It performs automated network discovery and provisioning, traffic monitoring, and congestion discovery. It also enables job schedule provisioning and integrates with industry-leading job schedulers and cloud and cluster managers, including Slurm and Platform Load Sharing Facility (LSF).

The following table lists the subscription licenses available from Lenovo.

Table 8. NVIDIA Unified Fabric Manager subscriptions

Part number	Feature code (7S02CTO1WW)	Description
UFM Telemetry		
7S02003HWW	S88D	UFM Telemetry 1-year License and Gold-Support for Lenovo clusters. Per node.
7S02003JWW	S88E	UFM Telemetry 3-year License and Gold-Support for Lenovo clusters. Per node.
7S02003KWW	S88F	UFM Telemetry 5-year License and Gold-Support for Lenovo clusters. Per node.
UFM Enterprise		
7S02003LWW	S88G	UFM Enterprise 1-year License and Gold-Support for Lenovo clusters. Per node.
7S02003MWW	S88H	UFM Enterprise 3-year License and Gold-Support for Lenovo clusters. Per node.
7S02003NWW	S88J	UFM Enterprise 5-year License and Gold-Support for Lenovo clusters. Per node.

For more information, see the following web page:

<https://www.nvidia.com/en-us/networking/infiniband/ufm/>

Server support

The following servers offer a PCIe 4.0 host interface. All other supported servers have a PCIe 3.0 host interface.

- ThinkSystem SR635
- ThinkSystem SR655
- ThinkSystem SR645
- ThinkSystem SR665

The following tables list the ThinkSystem servers that are compatible.

Table 9. Server support (Part 1 of 4)

Part Number	Description	AMD V3				2S Intel V3			4S 8S Intel V3			Multi Node			GPU Rich			1S V3			
		SR635 V3 (7D9H / 7D9G)	SR655 V3 (7D9F / 7D9E)	SR645 V3 (7D9D / 7D9C)	SR665 V3 (7D9B / 7D9A)	ST650 V3 (7D7B / 7D7A)	SR630 V3 (7D72 / 7D73)	SR650 V3 (7D75 / 7D76)	SR850 V3 (7D97 / 7D96)	SR860 V3 (7D94 / 7D93)	SR950 V3 (7DC5 / 7DC4)	SD535 V3 (7DD8 / 7DD1)	SD530 V3 (7DDA / 7DD3)	SD550 V3 (7DD9 / 7DD2)	SR670 V2 (7Z22 / 7Z23)	SR675 V3 (7D9Q / 7D9R)	SR680a V3 (7DHE)	SR685a V3 (7DHC)	ST50 V3 (7DF4 / 7DF3)	ST250 V3 (7DCF / 7DCE)	SR250 V3 (7DCM / 7DCL)
Mellanox adapters																					
4C57A15326	ThinkSystem Mellanox ConnectX-6 HDR/200GbE QSFP56 1-port PCIe 4 VPI Adapter	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	N	N	N	N
BKSK	ThinkSystem Mellanox ConnectX-6 HDR/200GbE QSFP56 1-Port PCIe 4 VPI Adapter (SharedIO) DWC	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Auxiliary adapters and cables																					
4C57A14179	ThinkSystem Mellanox HDR/200GbE 2x PCIe Aux Kit	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	N
BPZG	ThinkSystem SD665 V3 SharedIO Cable	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
BRL2	ThinkSystem SD650 V3 NDR Auxiliary Cable	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Table 10. Server support (Part 2 of 4)

Part Number	Description	Edge					Super Computing					1S Intel V2			2S Intel V2		
		SE350 (7Z46 / 7D1X)	SE350 V2 (7DA9)	SE360 V2 (7DAM)	SE450 (7D8T)	SE455 V3 (7DBY)	SD665 V3 (7D9P)	SD665-N V3 (7DAZ)	SD650 V3 (7D7M)	SD650-I V3 (7D7L)	SD650-N V3 (7D7N)	ST50 V2 (7D8K / 7D8J)	ST250 V2 (7D8G / 7D8F)	SR250 V2 (7D7R / 7D7Q)	ST650 V2 (7Z75 / 7Z74)	SR630 V2 (7Z70 / 7Z71)	SR650 V2 (7Z72 / 7Z73)
Mellanox adapters																	
4C57A15326	ThinkSystem Mellanox ConnectX-6 HDR/200GbE QSFP56 1-port PCIe 4 VPI Adapter	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	
BKSK	ThinkSystem Mellanox ConnectX-6 HDR/200GbE QSFP56 1-Port PCIe 4 VPI Adapter (SharedIO) DWC	N	N	N	N	N	Y	N	Y	Y	N	N	N	N	N	N	
Auxiliary adapters and cables																	
4C57A14179	ThinkSystem Mellanox HDR/200GbE 2x PCIe Aux Kit	N	N	N	N	N	N	N	Y	N	N	N	N	N	Y	Y	
BPZG	ThinkSystem SD665 V3 SharedIO Cable	N	N	N	N	N	Y	N	N	N	N	N	N	N	N	N	
BRL2	ThinkSystem SD650 V3 NDR Auxiliary Cable	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	

Table 11. Server support (Part 3 of 4)

Part Number	Description	AMD V1				Dense V2				4S V2	8S	4S V1		1S Intel V1						
		SR635 (7Y98 / 7Y99)	SR655 (7Y00 / 7Z01)	SR655 Client OS	SR645 (7D2Y / 7D2X)	SR665 (7D2W / 7D2V)	SD630 V2 (7D1K)	SD650 V2 (7D1M)	SD650-N V2 (7D1N)	SN550 V2 (7Z69)	SR850 V2 (7D31 / 7D32)	SR860 V2 (7Z59 / 7Z60)	SR950 (7X11 / 7X12)	SR850 (7X18 / 7X19)	SR850P (7D2F / 2D2G)	SR860 (7X69 / 7X70)	ST50 (7Y48 / 7Y50)	ST250 (7Y45 / 7Y46)	SR150 (7Y54)	SR250 (7Y52 / 7Y51)
Mellanox adapters																				
4C57A15326	ThinkSystem Mellanox ConnectX-6 HDR/200GbE QSFP56 1-port PCIe 4 VPI Adapter	Y	Y	N	Y	Y	Y	N	N	N	Y	Y	Y	N	N	N	N	N	N	N
BKSK	ThinkSystem Mellanox ConnectX-6 HDR/200GbE QSFP56 1-Port PCIe 4 VPI Adapter (SharedIO) DWC	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Auxiliary adapters and cables																				
4C57A14179	ThinkSystem Mellanox HDR/200GbE 2x PCIe Aux Kit	N	N	N	Y	Y	N	Y	N	N	Y	Y	Y	N	N	N	N	N	N	N
BPZG	ThinkSystem SD665 V3 SharedIO Cable	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
BRL2	ThinkSystem SD650 V3 NDR Auxiliary Cable	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Table 12. Server support (Part 4 of 4)

Part Number	Description	2S Intel V1						Dense V1					
		ST550 (7X09 / 7X10)	SR530 (7X07 / 7X08)	SR550 (7X03 / 7X04)	SR570 (7Y02 / 7Y03)	SR590 (7X98 / 7X99)	SR630 (7X01 / 7X02)	SR650 (7X05 / 7X06)	SR670 (7Y36 / 7Y37)	SD530 (7X21)	SD650 (7X58)	SN550 (7X16)	SN850 (7X15)
Mellanox adapters													
4C57A15326	ThinkSystem Mellanox ConnectX-6 HDR/200GbE QSFP56 1-port PCIe 4 VPI Adapter	N	N	N	N	N	Y	Y	Y	N	N	N	N
BKSK	ThinkSystem Mellanox ConnectX-6 HDR/200GbE QSFP56 1-Port PCIe 4 VPI Adapter (SharedIO) DWC	N	N	N	N	N	N	N	N	N	N	N	N
Auxiliary adapters and cables													
4C57A14179	ThinkSystem Mellanox HDR/200GbE 2x PCIe Aux Kit	N	N	N	N	N	Y	Y	Y	N	Y	N	N
BPZG	ThinkSystem SD665 V3 SharedIO Cable	N	N	N	N	N	N	N	N	N	N	N	N
BRL2	ThinkSystem SD650 V3 NDR Auxiliary Cable	N	N	N	N	N	N	N	N	N	N	N	N

Operating system support

The adapters support the operating systems listed in the following tables.

- [ThinkSystem Mellanox ConnectX-6 HDR/200GbE QSFP56 1-port PCIe 4 VPI Adapter, 4C57A15326](#)
- [ThinkSystem Mellanox HDR/200GbE 2x PCIe Aux Kit, 4C57A14179](#)

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

Table 13. Operating system support for ThinkSystem Mellanox ConnectX-6 HDR/200GbE QSFP56 1-port PCIe 4 VPI Adapter, 4C57A15326 (Part 1 of 2)

Operating systems	SD530 V3	SD535 V3	SD550 V3	SR630 V3 (4th Gen Xeon)	SR630 V3 (5th Gen Xeon)	SR635 V3	SR645 V3	SR650 V3 (4th Gen Xeon)	SR650 V3 (5th Gen Xeon)	SR655 V3	SR665 V3	SR675 V3	SR850 V3	SR860 V3	SD630 V2	SR630 V2	SR650 V2	SR670 V2	SR850 V2	SR860 V2	
Microsoft Windows 10	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Microsoft Windows 11	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Microsoft Windows Server 2016	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2019	N	N	N	Y	Y	Y	Y	Y	Y ¹	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2022	Y	Y	Y	Y	Y	Y	Y	Y	Y ¹	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server version 1709	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Microsoft Windows Server version 1803	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Red Hat Enterprise Linux 6.10	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Red Hat Enterprise Linux 6.9	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Red Hat Enterprise Linux 7.3	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Red Hat Enterprise Linux 7.4	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Red Hat Enterprise Linux 7.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Red Hat Enterprise Linux 7.6	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Red Hat Enterprise Linux 7.7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Red Hat Enterprise Linux 7.8	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Red Hat Enterprise Linux 7.9	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.0	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Red Hat Enterprise Linux 8.1	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Red Hat Enterprise Linux 8.10	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.2	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.3	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.4	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.6	N	N	N	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.7	N	N	N	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

	SD530 V3	SD535 V3	SD550 V3	SR630 V3 (4th Gen Xeon)	SR630 V3 (5th Gen Xeon)	SR635 V3	SR645 V3	SR650 V3 (4th Gen Xeon)	SR650 V3 (5th Gen Xeon)	SR655 V3	SR665 V3	SR675 V3	SR850 V3	SR860 V3	SD630 V2	SR630 V2	SR650 V2	SR670 V2	SR850 V2	SR860 V2	
Operating systems																					
Red Hat Enterprise Linux 8.8	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.9	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.0	N	N	N	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.1	N	N	N	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.4	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP3	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
SUSE Linux Enterprise Server 12 SP4	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
SUSE Linux Enterprise Server 12 SP5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
SUSE Linux Enterprise Server 15 SP1	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
SUSE Linux Enterprise Server 15 SP2	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP3	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP4	N	N	N	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP6	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
Ubuntu 18.04.5 LTS	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	N	N	N
Ubuntu 20.04 LTS	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N
Ubuntu 20.04.5 LTS	N	Y	N	N	N	Y	Y	N	N	Y	Y	Y	Y	Y	N	N	N	N	N	N	N
Ubuntu 22.04 LTS	N	N	N	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Ubuntu 22.04.3 LTS	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Ubuntu 24.04 LTS	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N
VMware vSphere Hypervisor (ESXi) 6.7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
VMware vSphere Hypervisor (ESXi) 6.7 U1	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
VMware vSphere Hypervisor (ESXi) 6.7 U2	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
VMware vSphere Hypervisor (ESXi) 6.7 U3	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	N	N	N
VMware vSphere Hypervisor (ESXi) 7.0	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
VMware vSphere Hypervisor (ESXi) 7.0 U1	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U2	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 8.0	N	N	N	Y	N	Y	Y	Y	N	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 8.0 U1	N	N	N	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 8.0 U2	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Operating systems	SD530 V3	SD535 V3	SD550 V3	SR630 V3 (4th Gen Xeon)	SR630 V3 (5th Gen Xeon)	SR635 V3	SR645 V3	SR650 V3 (4th Gen Xeon)	SR650 V3 (5th Gen Xeon)	SR655 V3	SR665 V3	SR675 V3	SR850 V3	SR860 V3	SD630 V2	SR630 V2	SR650 V2	SR670 V2	SR850 V2	SR860 V2
	VMware vSphere Hypervisor (ESXi) 8.0 U3	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y

¹ IONG-11838 tips #TT1781

Table 14. Operating system support for ThinkSystem Mellanox ConnectX-6 HDR/200GbE QSFP56 1-port PCIe 4 VPI Adapter, 4C57A15326 (Part 2 of 2)

Operating systems	SR635	SR645	SR655	SR665	SR630 (Xeon Gen 2)	SR650 (Xeon Gen 2)	SR670 (Xeon Gen 2)	SR950 (Xeon Gen 2)	SR630 (Xeon Gen 1)	SR650 (Xeon Gen 1)	SR950 (Xeon Gen 1)
Microsoft Windows 10	N	N	Y ²	N	N	N	N	N	N	N	N
Microsoft Windows 11	N	N	Y	N	N	N	N	N	N	N	N
Microsoft Windows Server 2016	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y
Microsoft Windows Server 2019	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
Microsoft Windows Server 2022	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server version 1709	N	N	N	N	N	N	N	Y	N	Y	Y
Microsoft Windows Server version 1803	N	N	N	N	N	N	N	Y	N	Y	Y
Red Hat Enterprise Linux 6.10	N	N	N	N	N	N	N	Y	Y	Y	Y
Red Hat Enterprise Linux 6.9	N	N	N	N	N	N	N	Y	Y	Y	Y
Red Hat Enterprise Linux 7.3	N	N	N	N	N	N	N	Y	Y	Y	Y
Red Hat Enterprise Linux 7.4	N	N	N	N	N	N	N	Y	Y	Y	Y
Red Hat Enterprise Linux 7.5	N	N	N	N	N	N	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.6	Y ¹	Y ¹	N	Y ¹	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.7	Y ¹	Y ¹	Y ¹	Y ¹	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.8	Y ¹	Y ¹	Y ¹	Y ¹	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.9	Y ¹	Y ¹	Y ¹	Y ¹	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.0	Y ¹	N	Y ¹	N	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.1	Y ¹	Y ¹	Y ¹	Y ¹	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.10	Y	Y	Y	Y	N	N	N	Y	N	N	N
Red Hat Enterprise Linux 8.2	Y ¹	Y ¹	Y ¹	Y ¹	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

	SR635	SR645	SR655	SR665	SR630 (Xeon Gen 2)	SR650 (Xeon Gen 2)	SR670 (Xeon Gen 2)	SR950 (Xeon Gen 2)	SR630 (Xeon Gen 1)	SR650 (Xeon Gen 1)	SR950 (Xeon Gen 1)
Operating systems											
Red Hat Enterprise Linux 8.6	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.7	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.8	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.9	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N
Red Hat Enterprise Linux 9.0	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.3	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N
Red Hat Enterprise Linux 9.4	Y	Y	Y	Y	N	N	N	Y	N	N	N
SUSE Linux Enterprise Server 12 SP3	N	N	N	N	N	N	N	N	Y	Y	Y
SUSE Linux Enterprise Server 12 SP4	Y ¹	N	Y ¹	N	Y	Y	N	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15	N	N	N	N	Y	Y	N	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP1	Y ¹	Y ¹	Y ¹	Y ¹	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP6	Y	Y	Y	Y	N	N	N	N	N	N	N
Ubuntu 18.04.5 LTS	N	N	N	N	N	N	N	N	N	N	N
Ubuntu 20.04 LTS	N	N	N	N	N	N	N	N	N	N	N
Ubuntu 20.04.5 LTS	N	N	N	N	N	N	N	N	N	N	N
Ubuntu 22.04 LTS	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Ubuntu 22.04.3 LTS	N	N	N	N	N	N	N	N	N	N	N
Ubuntu 24.04 LTS	N	N	N	N	N	N	N	N	N	N	N
VMware vSphere Hypervisor (ESXi) 6.7	N	N	N	N	N	N	N	N	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7 U1	N	N	N	N	Y	Y	N	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7 U2	N	N	N	N	Y	Y	N	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7 U3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0	Y ¹	Y ¹	Y ¹	Y ¹	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U1	Y ¹	Y	Y ¹	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 8.0	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 8.0 U1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 8.0 U2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Operating systems	SR635	SR645	SR655	SR665	SR630 (Xeon Gen 2)	SR650 (Xeon Gen 2)	SR670 (Xeon Gen 2)	SR950 (Xeon Gen 2)	SR630 (Xeon Gen 1)	SR650 (Xeon Gen 1)	SR950 (Xeon Gen 1)
VMware vSphere Hypervisor (ESXi) 8.0 U3	Y	Y	Y	Y	N	N	N	N	N	N	N

¹ The OS is not supported with EPYC 7003 processors.

² ISG will not sell/preload this OS, but compatibility and cert only.

Table 15. Operating system support for ThinkSystem Mellanox HDR/200GbE 2x PCIe Aux Kit, 4C57A14179

Operating systems	SR630 V2	SR650 V2	SR670 V2	SR850 V2	SR860 V2	SR645	SR665	SR630 (Xeon Gen 2)	SR650 (Xeon Gen 2)	SR670 (Xeon Gen 2)	SR950 (Xeon Gen 2)	SR630 (Xeon Gen 1)	SR650 (Xeon Gen 1)	SR950 (Xeon Gen 1)
Microsoft Windows Server 2016	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
Microsoft Windows Server 2019	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
Microsoft Windows Server 2022	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server version 1709	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y
Microsoft Windows Server version 1803	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y
Red Hat Enterprise Linux 6.10	N	N	N	N	N	N	N	N	N	N	N	Y	Y	Y
Red Hat Enterprise Linux 6.9	N	N	N	N	N	N	N	N	N	N	N	Y	Y	Y
Red Hat Enterprise Linux 7.3	N	N	N	N	N	N	N	N	N	N	N	Y	Y	Y
Red Hat Enterprise Linux 7.4	N	N	N	N	N	N	N	N	N	N	N	Y	Y	Y
Red Hat Enterprise Linux 7.5	N	N	N	N	N	N	N	N	N	Y	N	Y	Y	Y
Red Hat Enterprise Linux 7.6	N	N	N	N	N	Y ¹	Y ¹	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.7	N	N	N	N	N	Y ¹	Y ¹	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.8	N	N	N	N	N	Y ¹	Y ¹	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.9	Y	Y	Y	Y	Y	Y ¹	Y ¹	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.0	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.1	N	N	N	N	N	Y ¹	Y ¹	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.10	Y	Y	Y	Y	Y	Y	Y	N	N	N	Y	N	N	N
Red Hat Enterprise Linux 8.2	Y	Y	Y	Y	Y	Y ¹	Y ¹	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.6	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.7	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.8	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Operating systems	SR630 V2	SR650 V2	SR670 V2	SR850 V2	SR860 V2	SR645	SR665	SR630 (Xeon Gen 2)	SR650 (Xeon Gen 2)	SR670 (Xeon Gen 2)	SR950 (Xeon Gen 2)	SR630 (Xeon Gen 1)	SR650 (Xeon Gen 1)	SR950 (Xeon Gen 1)
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Red Hat Enterprise Linux 8.9	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N
Red Hat Enterprise Linux 9.0	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N
Red Hat Enterprise Linux 9.4	Y	Y	Y	Y	Y	Y	Y	N	N	N	Y	N	N	N
SUSE Linux Enterprise Server 12 SP3	N	N	N	N	N	N	N	N	N	N	N	Y	Y	Y
SUSE Linux Enterprise Server 12 SP4	N	N	N	N	N	N	N	Y	Y	N	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15	N	N	N	N	N	N	N	Y	Y	N	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP1	N	N	N	N	N	Y ¹	Y ¹	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP6	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N
Ubuntu 18.04.5 LTS	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N
Ubuntu 20.04 LTS	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N
Ubuntu 22.04 LTS	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7	N	N	N	N	N	N	N	N	N	N	N	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7 U1	N	N	N	N	N	N	N	Y	Y	N	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7 U2	N	N	N	N	N	N	N	Y	Y	N	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7 U3	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0	N	N	N	N	N	Y ¹	Y ¹	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U1	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 8.0	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 8.0 U1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 8.0 U2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 8.0 U3	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N

¹ The OS is not supported with EPYC 7003 processors.

Regulatory approvals

The adapters have the following regulatory approvals:

- Safety: CB / cTUVus / CE
- EMC: CE / FCC / VCCI / ICES / RCM / KC
- RoHS: RoHS Compliant

Operating environment

The adapters have the following operating characteristics:

- Typical power consumption (passive cables): 19.3W
- Maximum power available through QSFP56 port: 5W
- Temperature
 - Operational: 0°C to 55°C
 - Non-operational: -40°C to 70°C
- Humidity: 90% relative humidity

Warranty

One year limited warranty. When installed in a Lenovo server, the adapter assumes the server's base warranty and any warranty upgrades.

Related publications

For more information, refer to these documents:

- Networking Options for ThinkSystem Servers:
<https://lenovopress.com/lp0765-networking-options-for-thinksystem-servers>
- ServerProven compatibility:
<http://www.lenovo.com/us/en/serverproven>
- Mellanox InfiniBand product page:
<https://www.nvidia.com/en-us/networking/infiniband-adapters/>
- ConnectX-6 VPI user manual:
<https://docs.nvidia.com/networking/display/ConnectX6VPI>

Related product families

Product families related to this document are the following:

- [Ethernet Adapters](#)
- [InfiniBand & Omni-Path Adapters](#)

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