Intel X520 and X540 Dual Port 10 GbE Adapters for System x and ThinkServer
Product Guide (withdrawn product)

The Intel X520 and X540 Dual Port 10 GbE adapters for System x are powered by reliable and proven 10 Gb Ethernet technology. These adapters offer full line-rate 10 Gbps performance for high-IO intensive applications, and showcase the next generation in 10 GbE networking features for the enterprise network and data center. For ThinkServer, the X520 and X540 adapters also include FCoE and iSCSI Converged Ethernet support.

The Intel X520 adapter provides SFP+ based connectivity options (fiber or DAC cabling). The Intel X540 adapter offers 10GBASE-T connectivity with RJ-45 ports, with compatibility with the existing 1000BASE-T network, simplifying the transition to the 10 Gb Ethernet technology. Both the X520 and X540 are available in either standard PCIe low-profile card form factor or mezzanine card form factor.
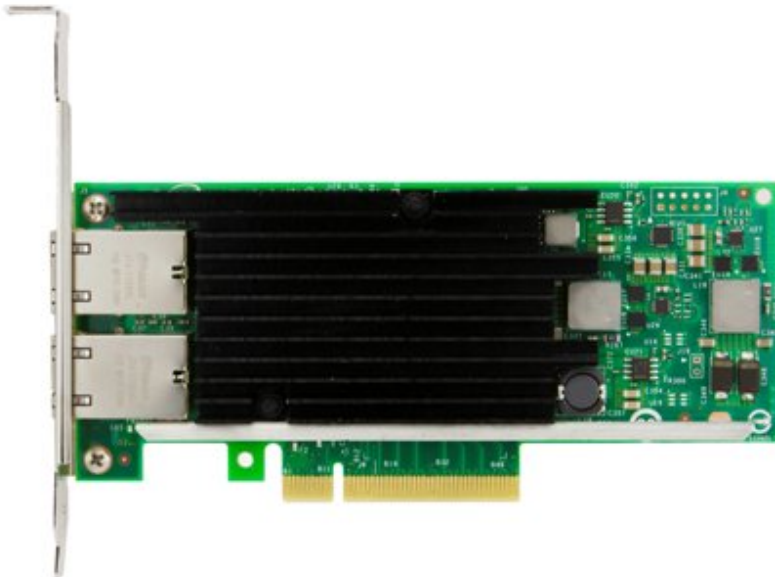

Figure 1. Intel X540-T2 Dual Port 10GBaseT Adapter for System x

Did you know?

In a multicore platform, the Intel X520 and X540 adapters support Intel I/O Virtualization Technology (IOVT), which helps accelerate data across the platform, therefore improving application response times. For virtualized environments, Intel Ethernet adapters offer advanced features with VMDq that lower processor utilization and increase I/O performance.

The X520 and X540 adapters are available in special mezzanine form factors for supported System x and ThinkServer systems. This form factor allows you to use the server's standard PCIe slots for other technologies.

Part number information

Withdrawn: All X520 and X540 adapters are withdrawn from marketing.

The following tables provide the ordering part numbers and feature codes for the Intel X520 and X540 adapters.

Table 1. Ordering part numbers and feature codes - System x and sd350

Part number	Feature code	Description
Intel X520 SFP+ adapters		
49Y7960	A2EC	Intel X520 Dual Port 10GbE SFP+ Adapter
49Y7980	A3JS	Intel X520 Dual Port 10GbE SFP+ Embedded Adapter
00MM880	ATPH	Intel X520 Dual Port 10GbE SFP+ OCP Mezz
Intel X540 10GBaseT adapters		
49Y7970	A2ED	Intel X540-T2 Dual Port 10GBaseT Adapter
49Y7990	A3JT	Intel X540 Dual Port 10GBase-T Embedded Adapter
00D1994	A40P	Intel X540 ML2 Dual Port 10GbaseT Adapte

Table 2. Ordering part numbers - ThinkServer

Part number	Description
Intel X520 SFP+ adapters	
4XC0F28733	Lenovo ThinkServer X520-SR2 PCIe 10Gb 2 Port SFP+ Ethernet Adapter by Intel
4XC0F28734	Lenovo ThinkServer X520-DA2 PCIe 10Gb 2 Port SFP+ Ethernet Adapter by Intel
4XC0F28742	Lenovo ThinkServer X520-DA2 AnyFabric 10Gb 2 Port SFP+ Ethernet Adapter by Intel
Intel X540 10GBaseT adapters	
4XC0F28732	Lenovo ThinkServer X540-T2 PCIe 10Gb 2 Port Base-T Ethernet Adapter by Intel
4XC0F28741	Lenovo ThinkServer X540-T2 AnyFabric 10Gb 2 Port Base-T Ethernet Adapter By Intel

The adapter option part numbers includes the following items:

- One Intel 10 Gb Ethernet adapter
- Full-height (3U) bracket attached with low-profile (2U) bracket included in the box (except for the ML2, Embedded, AnyFabric and OCP Mezz adapters)
- Installation and warranty documentation

Note: The X520 adapters ship without any SFP+ transceivers or direct attach cables, with the exception of the X520-SR2 adapter. Cables and transceivers need to be ordered separately (see the following section for details).

Transceivers and cables

The X520-SR2 adapter includes two SR SFP+ transceivers. All other X520 dual-port adapters have two empty SFP+ cages that support SFP+ SR transceivers and direct-attached copper (DAC) cables.

Note: The X540 adapters do not require the use of transceivers or DAC cables.

The following table lists the supported 10Gb Ethernet SFP+ optical transceivers and DAC cables for the System x adapters listed in Table 1. Both adapter ports must have the same type of transceiver or DAC cable selected.

Table 3. Supported optical transceivers - System x

Part number	Feature code	Description
10 GbE SFP+ transceivers - System x		
46C3447	5053	Lenovo 10GBASE-SR SFP+ Transceiver
49Y4216	0069	Brocade 10Gb SFP+ SR Optical Transceiver
49Y4218	0064	QLogic 10Gb SFP+ SR Optical Transceiver

The following table lists the supported 10Gb Ethernet SFP+ optical transceiver for the ThinkServer adapters listed in Table 2 as well as the X520 OCP adapter listed in Table 1. These adapters also support the DAC cables listed in the preceding table. Both adapter ports must have the same type of transceiver or DAC cable selected.

Table 4. Supported optical transceivers - ThinkServer

Part number	Description
4XC0F28735	Lenovo ThinkServer 10Gb Optical Module by Intel

The following table lists the supported fiber optic cables.

Table 5. Optical cables

Part number	Feature code	Description
LC-LC 0M3 Fiber Optic Cables (requires transceivers)		
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

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

Table 6. Copper cables

Part number	Feature code	Description
SFP+ 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
90Y9436*	A1PL	8.5m Passive DAC SFP+ Cable
SFP+ 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

* Withdrawn from marketing

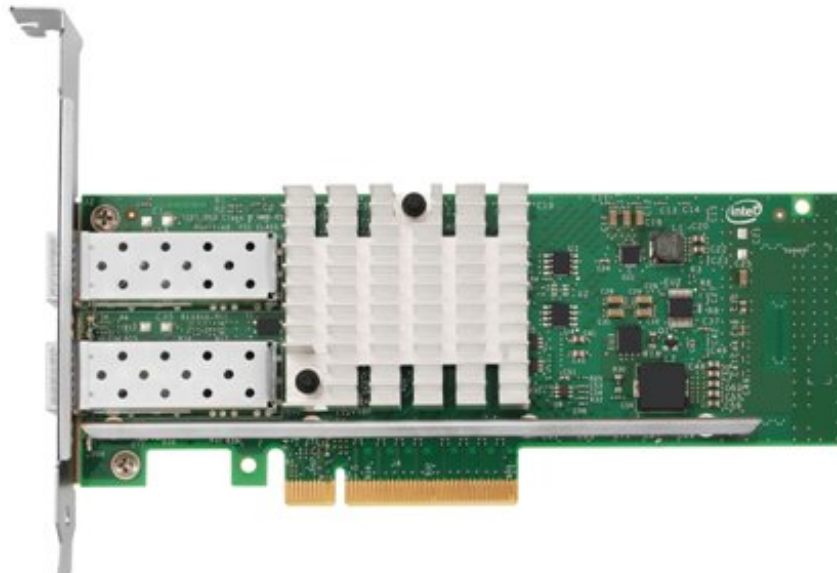The following figure shows the Intel X520 Dual Port 10GbE SFP+ Adapter.

Figure 2. Intel X520 Dual Port 10GbE SFP+ Adapter

The following figure shows the Intel X540 Dual Port 10GBase-T Embedded Adapter.

Figure 3. Intel X540 Dual Port 10GBase-T Embedded Adapter

Features

The Intel X520 and X540 adapters have the following features:

- Load balancing on multiple processors, which increases performance on multiprocessor systems by efficiently balancing network loads across processor cores when used with Receive Side Scaling from Microsoft or Scalable I/O on Linux.

- Header Splits and Replication in Receive helps the driver focus on the relevant part of the packet without needing to parse it.

- Multiple queues allow packet handling without the waiting/buffer overflow, which provides efficient packet prioritization.

- Storage offloads: The ThinkServer adapters listed in Table 2 support the following storage protocols:
    - FCoE (Data Center Bridging DCB, Converged Enhanced Ethernet CEE)
    - iSCSI

  The X520 OCP adapter for the sd350 supports iSCSI but does not support FCoE. System x servers support iSCSI boot as a software iSCSI initiator.

- Offload features:
    - IP, TCP, and UDP checksum offload (IPv4 and IPv6)
    - TCP segmentation/large send offload (IPv4 and IPv6)
    - IPsec offload
    - MACsec offload
    - Receive Side Scaling for Windows and Scalable I/O for Linux (IPv4, IPv6, and TCP/ UDP)

- Support for Intel Virtualization Technology (VT) with I/OAT and VMDq.

- IEEE 802.1Q VLAN support with VLAN tag insertion, with stripping and packet filtering for up to 4096 VLAN tags.

- IEEE 802.3x flow control support.

- IEEE 802.1p Class of Service/Quality of Service.

- Support for Advanced Packet Filtering.

- Jumbo frames support (up to 9,500 bytes).

- Support for both UEFI and PXE boot.

- Teaming support:
    - Adapter Fault Tolerance (AFT)

- Switch Fault Tolerance (SFT)
- Adaptive Load Balancing (ALB)
- Virtual Machine Load Balancing (VMLB)
- IEEE 802.3ad (link aggregation control protocol)

- Intel PROSet Utility for easy configuration and management.

Intel I/O Acceleration Technology (Intel I/OAT) is a suite of features that improves data acceleration across the platform, from networking devices to the chipset and processors, which helps improve system performance and application response times. The suite of features includes:

- Direct Cache Access (DCA): Enables the adapter to prefetch data from the memory cache, thereby avoiding cache misses and improving application response times.

- MSI-X interrupts: Minimizes the impact of I/O interrupts by load balancing interrupts across multiple processor cores.

- Low-Latency Interrupts: Allows the adapter to bypass the automatic moderation of time intervals between the interrupts (based on the sensitivity of the incoming data).

- Receive Side Scaling (RSS) and Scalable I/O: Directs the interrupts to a specific processor core based on the application's address.

Virtual Machine Device Queues (VMDq) reduces I/O impact on the hypervisor in a virtualized server by performing data sorting and coalescing in the network silicon. VMDq technology makes use of multiple queues in the network controller. As data packets enter the network adapter, they are sorted, and packets traveling to the same destination (or virtual machine) are grouped together in a single queue. The packets are then sent to the hypervisor, which directs them to their respective virtual machines. Relieving the hypervisor of packet filtering and sorting improves overall processor usage and throughput levels.

The ThinkServer and OCP adapter support full iSCSI and FCoE storage protocols. The System x adapters have iSCSI support for native OS and VM iSCSI initiators and for iSCSI boot.

All adapters support IPsec and MACsec offloads that provides full 10 Gbps line-rate performance in secured environments.

The following table compares the features of adapters.

Table 7. Feature comparison

	Part number	Server support	Form factor	Ports	FCoE & iSCSI support	NC-SI support	Includes transceiver	DAC support
Intel X520 SFP+ adapters								
X520 Dual Port 10GbE SFP+	49Y7960	System x	Low profile	2x SFP+	No	No	No	Yes
X520 Dual Port 10GbE SFP+ Embedded	49Y7980	System x	Mezz	2x SFP+	No	Yes	No	Yes
X520 Dual Port 10GbE SFP+ OCP Mezz	00MM880	sd350	OCP Mezz	2x SFP+	iSCSI only	Yes	No	Yes
X520-SR2 PCIe 10Gb 2 Port SFP+	4XC0F28733	ThinkServer	Low profile	2x SFP+	Yes	No	Yes (two, SR)	No
X520-DA2 PCIe 10Gb 2 Port SFP+	4XC0F28734	ThinkServer	Low profile	2x SFP+	Yes	No	No	Yes
X520-DA2 AnyFabric 10Gb 2 Port SFP+	4XC0F28742	ThinkServer	AnyFabric	2x SFP+	Yes	Yes	No	Yes
Intel X540 10GBaseT adapters								
X540-T2 Dual Port 10GBaseT	49Y7970	System x	Low profile	2x RJ45	No	No	Not applicable	
X540 Dual Port 10GBase-T Embedded	49Y7990	System x	Mezz	2x RJ45	No	Yes	Not applicable	
X540 ML2 Dual Port 10GbaseT	00D1994	System x	ML2 Mezz	2x RJ45	No	Yes	Not applicable	
X540-T2 PCIe 10Gb 2 Port Base-T	4XC0F28732	ThinkServer	Low profile	2x RJ45	Yes	No	Not applicable	
X540-T2 AnyFabric 10Gb 2 Port Base-T	4XC0F28741	ThinkServer	AnyFabric	2x RJ45	Yes	Yes	Not applicable	

The following figure shows the Intel X520 Dual Port 10GbE SFP+ OCP Mezz adapter for use in the ThinkServer sd350.

Figure 4. Intel X520 Dual Port 10GbE SFP+ OCP Mezz

Standards supported

Both the Intel X520 and Intel X540 adapters support the following IEEE standards:

- IEEE 802.1p Class of Service (CoS) traffic prioritization
- IEEE 802.1Q VLAN tagging
- IEEE 802.3ad Link Aggregation Control Protocol
- IEEE 802.3x Full-duplex flow control

The Intel X540 adapters supports the following standards:

- IEEE 802.3u 100BASE-TX Fast Ethernet
- IEEE 802.3ab 1000BASE-T copper twisted pair Gigabit Ethernet
- IEEE 802.3an 10GBASE-T copper twisted pair 10 Gb Ethernet

The Intel X520 adapters supports the following standards:

- IEEE 802.3ae 10GBASE-SR short range fiber optics 10 Gb Ethernet
- 10GSFP+Cu SFP+ Direct Attach copper

The following figure shows the Intel X540 ML2 Dual Port 10GbaseT Adapter for those System x servers with an ML2 adapter slot.

Figure 5. Intel X540 ML2 Dual Port 10GbaseT Adapter

Server support

The Intel X520 and X540 10 Gb Ethernet adapters are supported in the System x servers that are listed in the following table.

Support for System x and NeXtScale servers with Xeon E5/E7 v4 and E3 v5 processors

Table 8. Support for System x and NeXtScale servers with Xeon E5/E7 v4 and E3 v5 processors

Part number	Description	x3250 M6 (3943)	x3250 M6 (3633)	x3550 M5 (8869)	x3650 M5 (8871)	x3850 X6/x3950 X6 (6241, E7 v4)	nx360 M5 (5465, E5-2600 v4)	sd350 (5493)
49Y7960	Intel X520 Dual Port 10GbE SFP+ Adapter	N	N	Y	Y	Y	Y	N
49Y7980	Intel X520 Dual Port 10GbE SFP+ Embedded Adapter	N	N	N	N	N	N	N
00MM880	Intel X520 Dual Port 10GbE SFP+ OCP Mezz	N	N	N	N	N	N	Y
49Y7970	Intel X540-T2 Dual Port 10GBaseT Adapter	N	N	Y	Y	Y	Y	N
49Y7990	Intel X540 Dual Port 10GBase-T Embedded Adapter	N	N	N	N	N	N	N
00D1994	Intel X540 ML2 Dual Port 10GbaseT Adapter	N	N	Y	Y	Y	N	N

Support for System x and NeXtScale servers with Intel Xeon v3 processors

Table 9. Support for System x and NeXtScale servers with Intel Xeon v3 processors

Part number	Description	x3100 M5 (5457)	x3250 M5 (5458)	x3500 M5 (5464)	x3550 M5 (5463)	x3650 M5 (5462)	x3850 X6/x3950 X6 (6241, E7 v3)	nx360 M5 (5465)
49Y7960	Intel X520 Dual Port 10GbE SFP+ Adapter	Y	Y	Y	Y	Y	Y	Y
49Y7980	Intel X520 Dual Port 10GbE SFP+ Embedded Adapter	N	N	N	N	N	N	N
00MM880	Intel X520 Dual Port 10GbE SFP+ OCP Mezz	N	N	N	N	N	N	N
49Y7970	Intel X540-T2 Dual Port 10GBaseT Adapter	Y	Y	Y	Y	Y	Y	Y
49Y7990	Intel X540 Dual Port 10GBase-T Embedded Adapter	N	N	N	N	N	N	N
00D1994	Intel X540 ML2 Dual Port 10GbaseT Adapter	N	N	N	Y	Y	Y	N

Support for System x and NeXtScale servers with Intel Xeon v2 processors

Table 10. Support for System x and NeXtScale servers with Intel Xeon v2 processors

Part number	Description	x3500 M4 (7383, E5-2600 v2)	x3530 M4 (7160, E5-2400 v2)	x3550 M4 (7914, E5-2600 v2)	x3630 M4 (7158, E5-2400 v2)	x3650 M4 (7915, E5-2600 v2)	x3650 M4 BD (5466)	x3650 M4 HD (5460)	x3750 M4 (8752)	x3750 M4 (8753)	x3850 X6/x3950 X6 (3837)	x3850 X6/x3950 X6 (6241, E7 v2)	dx360 M4 (E5-2600 v2)	nx360 M4 (5455)
49Y7960	Intel X520 Dual Port 10GbE SFP+ Adapter	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
49Y7980	Intel X520 Dual Port 10GbE SFP+ Embedded Adapter	N	N	Y	N	Y	Y	Y	N	N	N	N	Y	Y
00MM880	Intel X520 Dual Port 10GbE SFP+ OCP Mezz	N	N	N	N	N	N	N	N	N	N	N	N	N
49Y7970	Intel X540-T2 Dual Port 10GBaseT Adapter	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
49Y7990	Intel X540 Dual Port 10GBase-T Embedded Adapter	N	N	Y	N	Y	N	Y	N	N	N	N	Y	Y
00D1994	Intel X540 ML2 Dual Port 10GbaseT Adapter	N	N	N	N	N	N	N	Y	Y	Y	Y	N	N

For the latest information about the servers that support each adapter, see ServerProven at:
http://www.lenovo.com/us/en/serverproven/xseries/lan/matrix.shtml

The following tables list the ThinkServer systems that are compatible.

Support for ThinkServer Gen 5 servers (including the sd350)

Table 11. Support for ThinkServer Generation 5 servers

Part number	Description	TS150	TS450	TS460	RS160	TD350	RD350	RD450	RD550	RD650	sd350
4XC0F28733	ThinkServer X520-SR2 PCIe 10Gb 2 Port SFP+ Ethernet Adapter	N	N	N	N	Y	Y	Y	Y	Y	N
4XC0F28734	ThinkServer X520-DA2 PCIe 10Gb 2 Port SFP+ Ethernet Adapter	N	N	N	N	Y	Y	Y	Y	Y	N
4XC0F28742	ThinkServer X520-DA2 AnyFabric 10Gb 2 Port SFP+ Ethernet Adapter	N	N	N	N	N	N	N	Y	Y	N
4XC0F28732	ThinkServer X540-T2 PCIe 10Gb 2 Port Base-T Ethernet Adapter	N	Y	N	N	Y	Y	Y	Y	Y	N
4XC0F28741	ThinkServer X540-T2 AnyFabric 10Gb 2 Port Base-T Ethernet Adapter	N	N	N	N	N	N	N	Y	Y	N
00MM880	Intel X520 Dual Port 10GbE SFP+ OCP Mezz	N	N	N	N	N	N	N	N	N	Y

Network cabling requirements

The network cables that can be used with the adapters are described in the following sections.

Intel X520 adapters

- 10GBASE-SR (with supported 10 GbE SFP+ transceivers)
    - 850 nm communication using multimode fiber cable (50 μ or 62.5 μ), up to 300 m, using an LC duplex connector
- 10GSFP+Cu (with supported SFP+ DAC cables)

For supported transceivers and cables, see the Transceivers and direct-attach cables section.

Intel X540 adapters

- 10GBASE-T
    - UTP Category 7 (100 m maximum)
    - UTP Category 6a (100 m maximum)
    - UTP Category 6 (55 m maximum)
- 1000BASE-T and 100BASE-TX
    - UTP Category 7 (100 m maximum)
    - UTP Category 6a (100 m maximum)
    - UTP Category 6 (100 m maximum)
    - UTP Category 5e (100 m maximum)

The following figure shows the Intel X520 Dual Port 10GbE SFP+ Embedded Adapter.

Figure 6. Intel X520 Dual Port 10GbE SFP+ Embedded Adapter

Operating system support

The following tables list the supported operating systems for the adapters:

- Intel X520 Dual Port 10GbE SFP+ Adapter, 49Y7960

- Intel X520 OCP Mezz 2 Port 10GbE SFP+, 00MM880
- Intel X540-T2 Dual Port 10GBaseT Adapter, 49Y7970
- Intel X540 ML2 Dual Port 10GbaseT Adapter, 00D1994

Tip: These tables are automatically generated based on data from Lenovo ServerProven.

Table 12. Operating system support for Intel x520 Dual Port 10GbE SFP+ Adapter, 49Y7960

Operating systems	x3850/3950 X6 (3837)	x3850/3950 X6 (6241, E7 v2)	x3850/3950 X6 (6241, E7 v3)	x3850/3950 X6 (6241, E7 v4)	nx360 M5 (5465)	x3500 M5 (5464)	x3550 M5 (5463)	x3550 M5 (8869)	x3650 M5 (5462)	x3650 M5 (8871)	x3100 M5 (5457)	x3250 M5 (5458)
Microsoft Windows Server 2008 R2	Y	Y	Y	N	N	N	Y	Y	Y	N	Y	Y
Microsoft Windows Server 2012	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2012 R2	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2016	N	Y [2]	Y [2]	Y [2]	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2019	N	N	N	Y	N	N	N	Y	N	Y	N	N
Microsoft Windows Server version 1709	N	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N
Microsoft Windows Server version 1803	N	N	N	N	N	N	N	Y	N	Y	N	N
Red Hat Enterprise Linux 5 Server Edition	N	N	N	N	N	N	N	N	N	N	Y	Y
Red Hat Enterprise Linux 5 Server with Xen x64 Edition	N	N	N	N	N	N	N	N	N	N	Y	Y
Red Hat Enterprise Linux 5 Server x64 Edition	N	N	N	N	N	N	N	N	N	N	Y	Y
Red Hat Enterprise Linux 6 Server Edition	N	N	N	N	N	N	N	N	N	N	N	Y
Red Hat Enterprise Linux 6 Server x64 Edition	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y
Red Hat Enterprise Linux 7	Y [1]	Y [3]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.0	N	N	N	Y	N	N	N	N	N	N	N	N
SUSE Linux Enterprise Server 11 for AMD64/EM64T	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y
SUSE Linux Enterprise Server 11 for x86	N	N	N	N	N	N	N	N	N	N	Y	Y
SUSE Linux Enterprise Server 11 with Xen for AMD64/EM64T	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y
VMware vSphere 5.1 (ESXi)	Y	Y	N	N	Y	N	Y	N	Y	N	Y	Y
VMware vSphere Hypervisor (ESXi) 5.5	Y	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.0	Y	Y	Y	Y	N	Y	Y	N	N	N	Y	Y
VMware vSphere Hypervisor (ESXi) 6.5	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7	N	N	N	Y	Y	Y	N	Y	N	Y	N	N

[1] SR-IOV not yet supported

[2] [in box driver support only]

[3] [SR-IOV not yet supported]

Table 13. Operating system support for Intel x520 OCP Mezz 2 Port 10GbE SFP+, 00MM880

Operating systems	sd350 (5493)
Microsoft Windows Server 2012	Y
Microsoft Windows Server 2012 R2	Y
Microsoft Windows Server 2016	Y
Microsoft Windows Server version 1709	Y
Red Hat Enterprise Linux 6 Server x64 Edition	Y
Red Hat Enterprise Linux 7	Y
SUSE Linux Enterprise Server 11 for AMD64/EM64T	Y
SUSE Linux Enterprise Server 11 with Xen for AMD64/EM64T	Y
SUSE Linux Enterprise Server 12	Y
SUSE Linux Enterprise Server 12 with Xen	Y
VMware vSphere Hypervisor (ESXi) 5.5	Y
VMware vSphere Hypervisor (ESXi) 6.0	Y
VMware vSphere Hypervisor (ESXi) 6.7	Y

Table 14. Operating system support for Intel X540-T2 Dual Port 10GBaseT Adapter, 49Y7970

Operating systems	x3850/3950 X6 (3837)	x3850/3950 X6 (6241, E7 v2)	x3850/3950 X6 (6241, E7 v3)	x3850/3950 X6 (6241, E7 v4)	nx360 M5 (5465)	x3500 M5 (5464)	x3550 M5 (5463)	x3550 M5 (8869)	x3650 M5 (5462)	x3650 M5 (8871)	x3100 M5 (5457)	x3250 M5 (5458)
Microsoft Windows Server 2008 R2	Y	Y	Y	N	N	N	Y	Y	Y	N	Y	Y
Microsoft Windows Server 2012	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2012 R2	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2016	N	Y [2]	Y [2]	Y [2]	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2019	N	N	N	Y	N	N	N	Y	N	Y	N	N
Microsoft Windows Server version 1709	N	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N
Microsoft Windows Server version 1803	N	N	N	N	N	N	N	Y	N	Y	N	N
Red Hat Enterprise Linux 5 Server Edition	N	N	N	N	N	N	N	N	N	N	Y	Y
Red Hat Enterprise Linux 5 Server with Xen x64 Edition	N	N	N	N	N	N	N	N	N	N	Y	Y
Red Hat Enterprise Linux 5 Server x64 Edition	N	N	N	N	N	N	N	N	N	N	Y	Y
Red Hat Enterprise Linux 6 Server Edition	N	N	N	N	N	N	N	N	N	N	N	Y
Red Hat Enterprise Linux 6 Server x64 Edition	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y
Red Hat Enterprise Linux 7	Y [1]	Y [3]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.0	N	N	N	Y	N	N	N	N	N	N	N	N
SUSE Linux Enterprise Server 11 for AMD64/EM64T	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y
SUSE Linux Enterprise Server 11 for x86	N	N	N	N	N	N	N	N	N	N	Y	Y
SUSE Linux Enterprise Server 11 with Xen for AMD64/EM64T	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y
VMware vSphere 5.1 (ESXi)	Y	Y	N	N	Y	N	Y	N	Y	N	Y	Y
VMware vSphere Hypervisor (ESXi) 5.5	Y	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.0	Y	Y	Y	Y	N	Y	Y	N	N	N	Y	Y
VMware vSphere Hypervisor (ESXi) 6.5	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7	N	N	N	Y	Y	Y	N	Y	N	Y	N	N

[1] SR-IOV not yet supported

[2] [in box driver support only]

[3] [SR-IOV not yet supported]

Table 15. Operating system support for Intel X540 ML2 Dual Port 10GbaseT Adapter, 00D1994

Operating systems	x3850/3950 X6 (3837)	x3850/3950 X6 (6241, E7 v2)	x3850/3950 X6 (6241, E7 v3)	x3850/3950 X6 (6241, E7 v4)	x3550 M5 (5463)	x3550 M5 (8869)	x3650 M5 (5462)	x3650 M5 (8871)
Microsoft Windows Server 2008 R2	Y	Y	Y	N	Y	Y	Y	N
Microsoft Windows Server 2012	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2012 R2	N	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2016	N	Y [2]	Y [2]	Y [2]	Y	Y	Y	Y
Microsoft Windows Server 2019	N	N	N	Y	N	Y	N	Y
Microsoft Windows Server version 1709	N	N	Y	Y	Y	Y	Y	Y
Microsoft Windows Server version 1803	N	N	N	N	N	Y	N	Y
Red Hat Enterprise Linux 6 Server x64 Edition	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7	Y [1]	Y [3]	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.0	N	N	N	Y	N	N	N	N
SUSE Linux Enterprise Server 11 for AMD64/EM64T	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 11 with Xen for AMD64/EM64T	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12	N	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15	N	N	Y	Y	N	Y	N	Y
SUSE Linux Enterprise Server 15 with Xen	N	N	Y	Y	N	Y	N	Y
VMware vSphere 5.1 (ESXi)	Y	Y	N	N	Y	N	Y	N
VMware vSphere Hypervisor (ESXi) 5.5	Y	Y	Y	N	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7	N	N	N	Y	N	Y	N	Y

[1] SR-IOV not yet supported

[2] [in box driver support only]

[3] [SR-IOV not yet supported]

The following figure shows the ThinkServer X520-DA2 AnyFabric 10Gb 2 Port SFP+ Ethernet Adapter.

Figure 7. ThinkServer X520-DA2 AnyFabric 10Gb 2 Port SFP+ Ethernet Adapter

Physical specifications

The adapters have the following physical specifications:

The PCIe low profile adapters dimensions has the following specifications (approximate, without bracket):

- Length: 168 mm (6.6 in.)
- Width: 69 mm (2.7 in.)
- Height: 15 mm (0.6 in.)

The mezzanine adapter has the following physical specifications:

- Height: 60 mm (2.4 in)
- Width: 160 mm (6.3 in)
- Depth: 17 mm (0.7 in)

The ML2 adapter has the following physical specifications:

- Height: 69 mm (2.7 in.)
- Length: 168 mm (6.6 in.)
- Width: 17 mm (0.7 in.)

Shipping box dimensions (approximate):

- Length: 238 mm (9.4 in.)
- Width: 143 mm (5.6 in.)
- Height: 51 mm (2.0 in.)

Operating environment

These adapters are supported in the following environment:

- Operating temperature: 0 - 55 °C (32 - 131 °F)
- Storage temperature: -20 - 65 °C (-4 - 149 °F)
- Shipping conditions: -20 - 70 °C (-4 - 158 °F)
- Air flow requirement (LFPM): 45 minimum
- Wet bulb (max): 27 °C (81 °F)
- Relative humidity (operating/nonoperating): 10% - 90%
- Relative humidity (shipping): 5% - 95%, no condensation
- Relative humidity (storage): 5% - 80%
- Maximum dew point (operating): 21 °C (70 °F)
- Maximum operating altitude: 7,000 feet (2,134 m)
- Vibration and shock: IEC 68, FCC Part 68.302, NSTA, 1A
- Electrostatic/electromagnetic susceptibility: IEC 801-2, -3, -4, and -5

Warranty

One-year limited warranty. When installed in a supported Lenovo server, these cards assume your system's base warranty and any warranty upgrade.

Agency approvals

The adapters conform to the following standards:

- EN55022
- EN55024
- EN60950 / CE
- EN 61000-3-2
- EN 61000-3-3
- ICES-003, Issue-004
- IEC 950 CB Scheme
- FCC 47 CFR Part 15 Class A
- UL 1950
- CSA C22.2 950-95
- VCCI
- AS/NZS CISPR 22 / C-tick
- RRL for KC
- BSMI
- UL 94-/V

Top-of-rack Ethernet switches

The following 10 Gb Ethernet top-of-rack switches are supported.

Table 16. 10Gb Ethernet Top-of-rack switches

Part number	Description
Switches mounted at the rear of the rack (rear-to-front airflow)	
7159A1X	Lenovo ThinkSystem NE1032 RackSwitch (Rear to Front)
7159B1X	Lenovo ThinkSystem NE1032T RackSwitch (Rear to Front)
7Z330O11WW	Lenovo ThinkSystem NE1064TO RackSwitch (Rear to Front, ONIE)
7159C1X	Lenovo ThinkSystem NE1072T RackSwitch (Rear to Front)
7159BR6	Lenovo RackSwitch G8124E (Rear to Front)
7159G64	Lenovo RackSwitch G8264 (Rear to Front)
7159DRX	Lenovo RackSwitch G8264CS (Rear to Front)
7159CRW	Lenovo RackSwitch G8272 (Rear to Front)
7159GR6	Lenovo RackSwitch G8296 (Rear to Front)
Switches mounted at the front of the rack (front-to-rear airflow)	
7159BF7	Lenovo RackSwitch G8124E (Front to Rear)
715964F	Lenovo RackSwitch G8264 (Front to Rear)
7159DFX	Lenovo RackSwitch G8264CS (Front to Rear)
7159CFV	Lenovo RackSwitch G8272 (Front to Rear)
7159GR5	Lenovo RackSwitch G8296 (Front to Rear)

For more information, see the Lenovo Press Product Guides in the 10Gb top-of-rack switch category:
https://lenovopress.com/networking/tor/10gb

Related publications

For more information, see the following documents:

- Intel-based Gigabit and 10 Gigabit Ethernet adapters and cards *Installation and User's Guide* (download and unpack the ISO image and open index.htm in a browser): http://ibm.com/support/entry/portal/docdisplay?lndocid=MIGR-5087548
- Lenovo System x networking options product page https://www3.lenovo.com/us/en/data-center/servers/server-options/system-x-options/networking-adapters/system-x-adapters/c/system-x-adapters
- Lenovo ServerProven compatibility information for network adapters: http://www.lenovo.com/us/en/serverproven/xseries/lan/matrix.shtml
- US Announcement Letter - X540 ML2: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS114-031
- US Announcement Letter - X540 Emedded: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS113-081
- US Announcement Letter - X520 Embedded: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS111-209
- US Announcement Letter - X520: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS111-222
- US Announcement Letter - X540-T2: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS112-088

Related product families

Product families related to this document are the following:

- 10 Gb Ethernet Connectivity
- Ethernet Adapters

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