Lenovo Flex System Interoperability Guide

Last Update: 11 July 2017

Provides reference information for compatiblity of key components

Covers all internal components for Lenovo ThinkSystem, Lenovo Flex System and IBM Flex System compute nodes

Includes networking and storage interoperability

Partner document to the Lenovo Press Product Guides and Operating System Interoperability Guide

David Watts

Note: Before using this information and the product it supports, read the information in “Notices” on page 83.

Last update on 11 July 2017

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Preface

To meet today's complex and ever-changing business demands, you need a solid foundation of compute, storage, networking, and software resources. This system must be simple to deploy, and be able to quickly and automatically adapt to changing conditions. You also need to be able to take advantage of broad expertise and proven guidelines in systems management, applications, hardware maintenance, and more.

Flex System is a no-compromise design that integrates servers and networking in one chassis. The solution is easily scalable with the addition of another chassis with the required nodes. With Lenovo XClarity Administrator, multiple chassis can be monitored from a single panel. The 14 node, 10U chassis delivers high speed performance complete with integrated servers, storage, and networking. This flexible chassis is simple to deploy, and scales to meet your needs in the future.

This document is a reference to compatibility and interoperability of components inside and connected to Flex System solutions.

The latest version of this document can be downloaded from:

http://lenovopress.com/fsig

The team who wrote this paper

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Summary of recent changes

This section describes the technical changes made in this edition of the Interoperability Guide and in recent editions. This edition might also include minor corrections and editorial changes that are not identified.

11 July 2017

- New ThinkSystem compute nodes - 1.1, “Chassis to compute node compatibility” on page 2
  - ThinkSystem SN550 2-socket blade server, machine type 7X16
  - ThinkSystem SN850 4-socket blade server, machine type 7X15
- New memory options - 2.2.1, “Memory for ThinkSystem compute nodes” on page 17
  - ThinkSystem 64GB TruDDR4 2666 MHz (4Rx4 1.2V) LRDIMM
  - ThinkSystem 8GB TruDDR4 2666 MHz (1Rx8 1.2V) RDIMM
  - ThinkSystem 32GB TruDDR4 2666 MHz (2Rx4 1.2V) RDIMM
  - ThinkSystem 16GB TruDDR4 2666 MHz (2Rx8 1.2V) RDIMM
  - ThinkSystem 128GB TruDDR4 2666 MHz (8Rx4 1.2V) 3DS RDIMM
  - ThinkSystem 16GB TruDDR4 2666 MHz (1Rx4 1.2V) RDIMM
- New HDD and SSD options - 2.4.1, “Drives for ThinkSystem compute nodes” on page 22
- New I/O adapters - 2.1.1, “Adapters for ThinkSystem compute nodes” on page 12
  - ThinkSystem QLogic QML2692 Mezz 16Gb 2-Port Fibre Channel Adapter
  - ThinkSystem Emulex LPm16002B-L Mezz 16Gb 2-Port Fibre Channel Adapter
  - ThinkSystem Emulex LPm16004B-L Mezz 16Gb 4-Port Fibre Channel Adapter
  - ThinkSystem Mellanox ConnectX-3 Mezz 40Gb 2-Port Ethernet Adapter
  - ThinkSystem Mellanox ConnectX-3 Mezz FDR 2-Port InfiniBand Adapter
  - ThinkSystem RAID 530-4i 2 Drive Adapter Kit for SN550
  - ThinkSystem RAID 530-4i 4 Drive Adapter Kit for SN850
  - ThinkSystem RAID 930-4i-2GB 2 Drive Adapter Kit for SN550
  - ThinkSystem RAID 930-4i-2GB 4 Drive Adapter Kit for SN850

1 June 2017

- 16GB (1x16GB, 2Rx4, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP RDIMM, 46W0672 is supported in the x440 (7917, v1), Table 2-6 on page 17.
- Removed 32GB TruDDR4 Memory (4Rx4, 1.2V) PC4-19200 CL17 2400MHz LP LRDIMM, 46W0837

23 May 2017

- Added new memory option, Table 2-6 on page 17
  - 16GB TruDDR4 Memory (2Rx8, 1.2V) PC4-19200 CL17 2400MHz LP RDIMM, 01KN301

  - 32GB TruDDR4 Memory (4Rx4, 1.2V) PC4-19200 CL17 2400MHz LP LRDIMM, 46W0837
- Added new drive options, Table 2-18 on page 30:
  - 1.92TB NVMe 2.5" Enterprise Mainstream PCIe SSD, 00YK285
  - 960GB NVMe 2.5" Enterprise Mainstream PCIe SSD, 00YK284
- Added new virtualization options, 2.5, “M.2 Adapters, SD Media Adapters, USB Hypervisors” on page 34:
  - Adapter for SD Media w/ VMware ESXi 6.5 (1 SD Media), feature AVNX
  - Adapter for SD Media w/ VMware ESXi 6.5 (2 SD Media, RAIDed), feature AVNY
  - USB Memory Key for VMware ESXi 6.5, feature AVNW
- Added new GPU option, 2.6.3, “PCIe I/O adapters - PCIe Expansion Node” on page 40:
  - NVIDIA Tesla M10 GPU, PCIe (passive), 7C57A02891

5 April 2017

- Added CN4052S, CN4054S and the X6 7196 LOM to the table in 3.4, “vNIC and UFP support” on page 62.
- Indicated that the following drives are now withdrawn from marketing, 2.4.2, “Drives for Flex System x86 compute nodes: 2.5-inch drives” on page 24:
  - 500GB 7.2K 6Gbps NL SAS 2.5" SFF G2HS HDD, 90Y8953
  - 600GB 10K 12Gbps SAS 2.5" G3HS 512e HDD, 00NA241
  - 900GB 10K 12Gbps SAS 2.5" G3HS 512e HDD, 00NA251
  - 1.2TB 10K 12Gbps SAS 2.5" G3HS 512e SED, 00NA301
  - Intel S3510 120GB Enterprise Entry SATA G3HS 2.5" SSD, 00WG620
  - Intel S3510 240GB Enterprise Entry SATA G3HS 2.5" SSD, 00WG625

28 March 2017

- New QSFP+ to 4xSFP+ Active Optical Cables, Table 3-3 on page 51
  - 1M QSFP+ to 4xSFP+ Active Optical Cable, 00YL667
  - 3M QSFP+ to 4xSFP+ Active Optical Cable, 00YL670
  - 5M QSFP+ to 4xSFP+ Active Optical Cable, 00YL673
- Flex System CN4054 Virtual Fabric Adapter (SW Upgrade), 90Y3558 withdrawal has been reversed and is available again, Table 2-2 on page 14.

10 March 2017

- CN4054S 4-port 10Gb Virtual Fabric Adapter Advanced is supported in the x240 (8737, v2) and x240 (7162), Table 2-2 on page 14.

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Chassis interoperability

Lenovo offers two Flex System chassis, the Enterprise Chassis and the Carrier-Grade Chassis.

The Flex System Enterprise Chassis, machine type 7893, is a 10U platform with integrated chassis management. It is a compact, high-density, high-performance, rack-mount, and scalable server platform system. It supports up to 14 one-bay compute nodes that share common resources, such as power, cooling, management, and I/O resources within a single Enterprise Chassis. In addition, it can also support up to seven 2-bay compute nodes or three 4-bay compute nodes when the shelves are removed. You can mix and match 1-bay, 2-bay, and 4-bay compute nodes to meet your specific hardware needs.

The Flex System Carrier-Grade Chassis, machine type 7385, is a ruggedized 11U chassis that is designed for telecommunications industry where tolerance of harsher environments is required. The I/O modules and compute nodes that it supports with NEBS compliance are a subset of those that are supported by the Enterprise Chassis.

Topics in this chapter are:

1.1 Chassis to compute node compatibility

The next two tables list the maximum number of compute nodes installed in the chassis:

- Table 1-1 lists the compute nodes available from Lenovo
- Table 1-2 on page 3 lists the compute nodes available from IBM

The actual number of compute nodes that can be installed depends on factors such as the number and capacity of the power supplies used, the power policy activated, and the TDP rating of the processors installed in the compute nodes.

Table 1-1 Maximum number of x86-based compute nodes installed in the chassis (Lenovo compute nodes)

Compute nodes	Mach. type	Firmware code base	Maximum number of compute nodes in the chassis				
			Enterprise 8721 with CMM 68Y7030	Enterprise 8721 with CMM2 00FJ669	Enterprise 7893-92X with CMM 68Y7030	Enterprise 7893-92X with CMM2 00FJ669[a]	Carrier-Grade 7385-DCx (NEBS)[b]
x86 compute nodes							
x220[c]	7906	IBM signed	14	14	14	14	No support
x222[c]	7916	IBM signed	14	14	14	14	No support
x240[c]	8737	IBM signed	14	14	14	14	No support
x240[c]	7162	Lenovo signed	No support	14	No support	14	No support
x240 M5 (v3)	9532	Lenovo signed	14	14	14	14	14
x240 M5 (v4)	9532	Lenovo signed	No support	14	No support	14	No support
x440	7917	IBM signed	7	7	7	7	No support
x440	7167	Lenovo signed	7	7	7	7	No support
x280 X6[c]	7903	IBM signed	7	7	7	7	No support
x480 X6[c]	7903	IBM signed	7	7	7	7	No support
x880 X6[c]	7903	IBM signed	7	7	7	7	No support
x280 X6[c]	7196	Lenovo signed	No support	7	No support	7	No support
x480 X6	7196	Lenovo signed	7	7	7	7	No support
x880 X6	7196	Lenovo signed	7	7	7	7	No support
SN550	7X16	Lenovo signed	No support	14[d]	No support	14[d]	No support
SN850	7X15	Lenovo signed	No support	7[d]	No support	7[d]	No support
Management node							
FSM[c]	8731	IBM signed	1[e]	1[e]	1[e]	1[e]	No support

a. This configuration is primarily for field upgrades. The CMM2 must be ordered from Lenovo and is not orderable via the IBM AAS (e-config) ordering system, either as an initial order or an MES upgrade.
b. These are support statements for NEBS compliance
c. Withdrawn from marketing
d. CMM2 firmware should be 1.6.1 or later to support ThinkSystem compute nodes
e. One Flex System Manager management node can manage up to 16 chassis; To support the CMM2 and new Lenovo I/O modules, update the Flex System Manager appliance software to version 1.3.3.x or later.

Table 1-2 Maximum number of compute nodes installed in the chassis (compute nodes available from IBM)

Compute nodes	Model	Maximum number of compute nodes in the chassis				
		Enterprise 8721 with CMM 68Y7030	**Enterprise 8721 with CMM2 00FJ669**	**Enterprise 7893-92X with CMM 68Y7030**	**Enterprise 7893-92X with CMM2 00FJ669[a]**	**Carrier-Grade 7385-DCx[b]**
x86 compute nodes						
x240	8956-15X	14	14	14	14	Not supported
x240	8737-15X	14	14	14	14	Not supported
x240	7863-10X	14	14	14	14	Not supported
Power Systems compute nodes						
p24L	1457-7FL	14[c]	Not supported	14[c]	Not supported	Not supported
p260	7895-22X	14[c]	Not supported	14[c]	Not supported	Not supported
p260	7895-23A 7895-23X	14[c]	Not supported	14[c]	Not supported	Not supported
p270	7954-24X	14[c]	Not supported	14[c]	Not supported	Not supported
p460	7895-42X	7[c]	Not supported	7[c]	Not supported	Not supported
p460	7895-43X	7[c]	Not supported	7[c]	Not supported	Not supported
Management node						
FSM	7955-01M	1[d]	1[d]	1[d]	1[d]	Not supported

a. This configuration is primarily for field upgrades. The CMM2 must be ordered from Lenovo and is not orderable via the IBM AAS (e-config) ordering system, either as an initial order or an MES upgrade.

b. These are support statements for NEBS compliance

c. For Power Systems compute nodes: if the chassis is configured with the power management policy “AC Power Source Redundancy with Compute Node Throttling Allowed”, some maximum chassis configurations containing Power Systems compute nodes with large populations of 32GB DIMMs may result in the chassis having insufficient power to power on all 14 compute nodes bays. In such circumstances, only 13 of the 14 bays would be allowed to be powered on.

d. One Flex System Manager management node can manage up to 16 chassis

1.2 Chassis to storage node compatibility

Table 1-3 lists the maximum number of storage nodes installed in the chassis:

Table 1-3 Maximum number of storage nodes installed in the chassis

Compute nodes	Machine type	Firmware code base	Maximum number of compute nodes in the chassis				
			Enterprise 8721 with CMM 68Y7030	Enterprise 8721 with CMM2 00FJ669	Enterprise 7893-92X with CMM 68Y7030	Enterprise 7893-92X with CMM2 00FJ669[a]	Carrier-Grade 7385-DCx[b]
Flex System V7000 Storage Node[c]	4939	IBM signed	3	3	3	3	Not supported

a. This configuration is primarily for field upgrades. The CMM2 must be ordered from Lenovo and is not orderable via the IBM AAS (e-config) ordering system, either as an initial order or an MES upgrade.
b. These are support statements for NEBS compliance
c. Withdrawn from marketing

1.3 Chassis to I/O module compatibility

Table 1-4 lists the compatibility between Flex System chassis machine types (and supported chassis management modules) and Flex System I/O modules.

Table 1-4 Chassis to I/O module compatibility

Description	Part number	Firm-ware base	Supported in chassis				
			Enterprise 8721 with CMM 68Y7030	Enterprise 8721 with CMM2 00FJ669	Enterprise 7893-92X with CMM 68Y7030	Enterprise 7893-92X with CMM2 00FJ669[a]	Carrier-Grade 7385-DCx[b]
Ethernet modules							
EN4093R 10Gb Scalable Switch	00FM514	Lenovo[c]	No	Supported	No	Supported	Supported
CN4093 10Gb Converged Switch	00FM510	Lenovo[c]	No	Supported	No	Supported	Supported
SI4091 10Gb System Interconnect Module	00FE327	Lenovo[c]	No	Supported	No	Supported	No
SI4093 System Interconnect Module	00FM518	Lenovo[c]	No	Supported	No	Supported	No
EN2092 1Gb Ethernet Scalable Switch	49Y4294	IBM[d]	Supported	Supported	Supported	Supported	Supported
EN4091 10Gb Ethernet Pass-thru	88Y6043	IBM	Supported	Supported	Supported	Supported	No
EN4093 10Gb Scalable Switch	49Y4270[e]	IBM[d]	Supported	Supported	Supported	Supported	No
EN4093R 10Gb Scalable Switch	95Y3309[e]	IBM[d]	Supported	Supported	Supported	Supported	No

Description	Part number	Firm-ware base	Supported in chassis				
			Enterprise 8721 with CMM 68Y7030	Enterprise 8721 with CMM2 00FJ669	Enterprise 7893-92X with CMM 68Y7030	Enterprise 7893-92X with CMM2 00FJ669[a]	Carrier-Grade 7385-DCx[b]
CN4093 10Gb Converged Switch	00D5823[e]	IBM[d]	Supported	Supported	Supported	Supported	No
SI4093 System Interconnect Module	95Y3313	IBM[d]	Supported	Supported	Supported	Supported	No
Cisco Nexus B22 Fabric Extender	94Y5350	Vendor	Supported	Supported	Supported	Supported	No
EN4023 10Gb Scalable Switch	94Y5212	Vendor	Supported	Supported	Supported	Supported	No
EN6131 40Gb Ethernet Switch	90Y9346	Vendor	Supported	Supported	Supported	Supported	No
Fibre Channel switches							
FC5022 16Gb SAN Switch	88Y6374	Vendor	Supported	Supported	Supported	Supported	Supported
FC5022 24-port 16Gb SAN Switch	00Y3324	Vendor	Supported	Supported	Supported	Supported	Supported
FC5022 24-port 16Gb ESB SAN Switch	90Y9356	Vendor	Supported	Supported	Supported	Supported	Supported
FC3171 8Gb SAN Switch	69Y1930	Vendor	Supported	Supported	Supported	Supported	No
FC3171 8Gb SAN Pass-thru	69Y1934	Vendor	Supported	Supported	Supported	Supported	No
InfiniBand switches							
IB6131 InfiniBand Switch	90Y3450	Vendor	Supported	Supported	Supported	Supported	No

a. This configuration is primarily for field upgrades. The CMM2 must be ordered from Lenovo and is not orderable via the IBM AAS (e-config) ordering system, either as an initial order or an MES upgrade.
b. These are support statements for NEBS compliance
c. Lenovo signed switch firmware is Version 8.x onwards
d. IBM signed switch firmware is up to Version 7.x
e. Withdrawn from marketing

1.4 Chassis power supplies

Additional power supplies are available in 2500W capacity (The 2100W power supply is now withdrawn). The standard chassis ship with either two 2100W or two 2500W power supplies. A maximum of six power supplies can be installed.

Table 1-5 shows the ordering information for the Enterprise Chassis power supplies. Power supplies cannot be mixed in the same chassis.

Table 1-5 Power supply module option part numbers

Part number	Feature codes[a]	Description	Chassis models where standard
43W9049	A0UC / 3590	Flex System Enterprise Chassis 2500W Power Module	8721-A1x 7893-92X
47C7633[b]	A3JH / 3666	Flex System Enterprise Chassis 2100W Power Module	8721-LRx
00AM765[b]	EPA9	Flex System Enterprise Chassis HVDC 2500W Power Module	-
00FJ635	A5VC	Flex System Enterprise Chassis -48V DC 2500W Power Module	8721-DCx 7385-DCx

a. The first feature code listed is for configurations ordered through Lenovo System x sales channels. The second feature code is for configurations ordered through the IBM Power Systems channel
b. Withdrawn from marketing

A chassis powered by the 2100W power supplies cannot provide N+N redundant power unless all the compute nodes are configured with 95W or lower Intel processors. N+1 redundancy is possible with any processors.

Table 1-6 shows the nodes that are supported in chassis when powered by either the 2100W or 2500W modules.

Table 1-6 Compute nodes supported by the power supplies

Node	2100W power supply[a]	2500W AC or DC power supply
Flex System Manager management node	Yes	Yes
x220 (with or without Storage Expansion Node or PCIe Expansion Node)	Yes	Yes
x222	Yes[b]	Yes[b]
x240 (with or without Storage Expansion Node or PCIe Expansion Node)	Yes[b]	Yes[b]
x240 M5 (with or without Storage Expansion Node or PCIe Expansion Node)	Yes[b]	Yes[b]
ThinkSystem SN550	Yes[b]	Yes[b]
ThinkSystem SN850	Yes[b]	Yes[b]
x440	Yes[b]	Yes[b]
x880 X6, x480 X6, x280 X6	Yes[b]	Yes[b]
p24L	Yes[b]	Yes[b]
p260	Yes[b]	Yes[b]
p460	Yes[b]	Yes[b]

Node	2100W power supply[a]	2500W AC or DC power supply
V7000 Storage Node (either primary or expansion node)	Yes	Yes

a. Withdrawn from marketing
b. Some restrictions based on the number of power supplies installed, TDP power of the processors installed, or the power policy enabled. See Table 1-7 on page 7.

Table 1-7 lists details of the support for compute nodes supported based on type and number of power supplies installed in the chassis and the power policy (N+N or N+1).

In this table, the colors of the cells have the following meaning:

Supported with no restrictions as to the number of compute nodes that can be installed

Supported but with restrictions on the number of compute nodes that can be installed.

Table 1-7 Specific number of compute nodes supported based on installed power supplies

Compute node	CPU TDP rating	2100 W power supplies (AC)				2500 W power supplies (AC or DC)			
		N+1, N=5 6 total	N+1, N=4 5 total	N+1, N=3 4 total	N+N, N=3 6 total	N+1, N=5 6 total	N+1, N=4 5 total	N+1, N=3 4 total	N+N, N=3 6 total
Flex System Manager appliance	95 W	2	2	2	2	2	2	2	2
x220	50 W	14	14	14	14	14	14	14	14
	60 W	14	14	14	14	14	14	14	14
	70 W	14	14	14	14	14	14	14	14
	80 W	14	14	14	14	14	14	14	14
	95 W	14	14	14	14	14	14	14	14
x222	50 W	14	14	13	14	14	14	14	14
	60 W	14	14	12	13	14	14	14	14
	70 W	14	14	11	12	14	14	14	14
	80 W	14	14	10	11	14	14	13	14
	95 W	14	13	9	10	14	14	12	13
x240	60 W	14	14	11	11	14	14	14	14
	70 W	14	14	11	11	14	14	14	14
	80 W	14	14	11	11	14	14	14	14
	95 W	14	14	11	11	14	14	14	14
	115 W	14	14	11	11	14	14	14	14
	130 W	14	14	11	11	14	14	13	14
	135 W	14	14	11	11	14	14	13	14

Compute node	CPU TDP rating	2100 W power supplies (AC)				2500 W power supplies (AC or DC)			
		N+1, N=5 6 total	N+1, N=4 5 total	N+1, N=3 4 total	N+N, N=3 6 total	N+1, N=5 6 total	N+1, N=4 5 total	N+1, N=3 4 total	N+N, N=3 6 total
x240 M5	52	14	14	11	11	14	14	14	14
	55	14	14	11	11	14	14	14	14
	65	14	14	11	11	14	14	14	14
	75	14	14	11	11	14	14	14	14
	85	14	14	11	11	14	14	14	14
	90	14	14	11	11	14	14	14	14
	105	14	14	11	11	14	14	14	14
	120	14	14	11	11	14	14	13	14
	135	14	13	11	11	14	14	12	13
	145	14	13	11	11	14	14	12	13
x440	95 W	7	7	6	6	7	7	7	7
	115 W	7	7	5	5	7	7	7	7
	130 W	7	7	5	5	7	7	6	7
x280, x480, or x880 X6 with two sockets	105 W	7	7	5	5	7	7	7	7
	130 W	7	7	5	5	7	7	7	7
	155 W	7	7	5	5	7	7	7	7
x480 or x880 X6 with four sockets	105 W	3	3	3	3	3	3	3	3
	130 W	3	3	3	3	3	3	3	3
	155 W	3	3	2	3	3	3	3	3
x880 X6 with eight sockets	105 W	1	1	1	1	1	1	1	1
	130 W	1	1	1	1	1	1	1	1
	155 W	1	1	1	1	1	1	1	1
SN550	70 W	14	14	11	11	14	14	14	14
	85 W	14	14	11	11	14	14	14	14
	105 W	14	14	11	11	14	14	14	14
	125 W	14	14	11	11	14	14	13	14
	130 W	14	13	11	11	14	14	12	13
	140 W	14	13	11	11	14	14	12	13
	150 W	14	12	11	11	14	14	12	12
	165 W	14	12	11	11	14	14	11	12

Compute node	CPU TDP rating	2100 W power supplies (AC)				2500 W power supplies (AC or DC)			
		N+1, N=5 6 total	N+1, N=4 5 total	N+1, N=3 4 total	N+N, N=3 6 total	N+1, N=5 6 total	N+1, N=4 5 total	N+1, N=3 4 total	N+N, N=3 6 total
SN850	85 W	7	7	5	5	7	7	7	7
	105 W	7	7	5	5	7	7	7	7
	125 W	7	7	5	5	7	7	6	7
	130 W	7	6	5	5	7	7	6	6
	140 W	7	6	5	5	7	7	6	6
	150 W	7	6	5	5	7	7	6	6
	165 W	7	6	5	5	7	7	5	6

Assumptions:

- All Compute Nodes fully configured
- Throttling and over subscription is enabled

Tip: Consult the Power configurator for exact configuration support:

https://datacentersupport.lenovo.com/us/en/documents/LNVO-PWRCONF

1.5 Rack cabinets

Lenovo offers an extensive range of industry-standard and EIA-compatible rack enclosures and expansion units. Table 1-8 lists cabinets that support the Flex System Enterprise Chassis.

Carrier-Grade Chassis: None of the racks listed here are NEBS compliant. As a result, none are supported with the Carrier-Grade Chassis.

Table 1-8 Supported racks

Part number	Feature code	Rack cabinet	Supported
93634PX	A1RC	42U 1100 mm Enterprise V2 Deep Dynamic Rack	Recommended
93634EX	A1RD	42U 1100 mm Dynamic Enterprise V2 Expansion Rack	Recommended
93634CX	A3GR	PureFlex System 42U Rack	Recommended
93634DX	A3GS	PureFlex System 42U Expansion Rack	Recommended
93634AX	A31F	PureFlex System 42U Rack	Recommended
93634BX	A31G	PureFlex System 42U Expansion Rack	Recommended
201886X	2731	11U Office Enablement Kit	Yes[a]
93072PX	6690	S2 25U Static Standard Rack	Yes
93072RX	1042	S2 25U Dynamic Standard Rack	Yes
93074RX	1043	S2 42U Standard Rack	Yes

Part number	Feature code	Rack cabinet	Supported
99564RX	5629	S2 42U Dynamic Standard Rack	Yes
99564XX	5631	S2 42U Dynamic Standard Expansion Rack	Yes
93084PX	5621	42U Enterprise Rack	Yes
93084EX	5622	42U Enterprise Expansion Rack	Yes
93604PX	7649	42U 1200 mm Deep Dynamic Rack	Yes
93604EX	7650	42U 1200 mm Deep Dynamic Expansion Rack	Yes
93614PX	7651	42U 1200 mm Deep Static Rack	Yes
93614EX	7652	42U 1200 mm Deep Static Expansion Rack	Yes
93624PX	7653	47U 1200 mm Deep Static Rack	Yes
93624EX	7654	47U 1200 mm Deep Static Expansion Rack	Yes
14102RX	1047	eServer Cluster 25U Rack	Yes
14104RX	1048	Linux Cluster 42U Rack	Yes
9306-900	None	Netfinity® Rack	No
9306-910	None	Netfinity Rack	No
9306-42P	None	Netfinity Enterprise Rack	No
9306-42X	None	Netfinity Enterprise Rack Expansion Cabinet	No
9306-200	None	Netfinity NetBAY 22	No

a. The Flex System Enterprise Chassis can be installed within the 11U Office Enablement Kit with 1U of space remaining, however the acoustic footprint of a given configuration may not be acceptable for office use. We recommend that an evaluation be performed before deployment in an office environment.

2

Compute node component compatibility

This chapter lists the compatibility of components installed internally to each compute node.

Topics in this chapter are:

2.1 Compute node-to-adapter interoperability

This sections lists compatibility of adapters with compute nodes.

2.1.1 Adapters for ThinkSystem compute nodes

Table 2-1 lists the available I/O adapters and their compatibility with ThinkSystem compute nodes.

Table 2-1 I/O adapter compatibility matrix - Lenovo compute nodes

Part number	Feature code	Description	SN550 (7X16)	SN850 (7X15)
Ethernet adapters				
49Y7900	A10Y	EN2024 4-port 1Gb Ethernet Adapter	N	N
88Y5920	A4K3	CN4022 2-port 10Gb Converged Adapter	N	N
00JY800	A5RP	CN4052 2-port 10Gb Virtual Fabric Adapter	N	N
00AG540	ATBT	CN4052S 2-port 10Gb Virtual Fabric Adapter	Y	Y
01CV780	AU7X	CN4052S 2-port 10Gb VFA Advanced	Y	Y
None[a]	None	EN4054 4-port 10Gb Ethernet Adapter	N	N
90Y3554[b]	A1R1	CN4054 10Gb Virtual Fabric Adapter	N	N
00Y3306[b]	A4K2	CN4054R 10Gb Virtual Fabric Adapter	N	N
00AG590	ATBS	CN4054S 4-port 10Gb Virtual Fabric	Y	Y
01CV790	AU7Y	CN4054S 4-port 10Gb VFA Advanced	Y	Y
None[a]	None	CN4058 8-port 10Gb Converged Adapter	N	N
94Y5160	A4R6	CN4058S 8-port 10Gb Virtual Fabric Adapter	N	N
90Y3466	A1QY	EN4132 2-port 10 Gb Ethernet Adapter	N	N
None[a]	None	EN4132 2-port 10Gb RoCE Adapter	N	N
00AG530	A5RN	EN4172 2-port 10Gb Ethernet Adapter	N	N
90Y3482	A3HK	EN6132 2-port 40Gb Ethernet Adapter	N	N
7ZT7A00502	AVCU	ThinkSystem Mellanox ConnectX-3 Mezz 40Gb 2-Port Ethernet Adapter	Y	Y
Features on Demand upgrades for Ethernet adapters (enables FCoE and iSCSI, one upgrade needed per adapter)				
00JY804	A5RV	CN4052 Virtual Fabric Adapter Upgrade (supports CN4052 and CN4052S)	N	N
90Y3558	A1R0	CN4054 Virtual Fabric Adapter Upgrade (supports CN4054 and CN4054R)	N	N
00AG594	ATBU	CN4054S 4-port 10Gb Virtual Fabric Upgrade	N	N
94Y5164	A4R9	CN4058S Virtual Fabric Adapter Upgrade	N	N
Fibre Channel adapters				
69Y1938	A1BM	FC3172 2-port 8Gb FC Adapter	N	N
95Y2375	A2N5	FC3052 2-port 8Gb FC Adapter	N	N

Part number	Feature code	Description	SN550 (7X16)	SN850 (7X15)
88Y6370[b]	A1BP	FC5022 2-port 16Gb FC Adapter	N	N
95Y2386	A45R	FC5052 2-port 16Gb FC Adapter	N	N
95Y2391	A45S	FC5054 4-port 16Gb FC Adapter	N	N
69Y1942	A1BQ	FC5172 2-port 16Gb FC Adapter	N	N
95Y2379[b]	A3HU	FC5024D 4-port 16Gb FC Adapter	N	N
7ZT7A00521	AVCW	ThinkSystem Emulex LPm16002B-L Mezz 16Gb 2-Port FC Adapter	Y	Y
7ZT7A00522	AVCX	ThinkSystem Emulex LPm16004B-L Mezz 16Gb 4-Port FC Adapter	Y	Y
7ZT7A00520	AVCV	ThinkSystem QLogic QML2692 Mezz 16Gb 2-Port Fibre Channel Adapter	Y	Y
InfiniBand adapters				
90Y3454	A1QZ	IB6132 2-port FDR InfiniBand Adapter	N	N
None[a]	None	IB6132 2-port QDR InfiniBand Adapter	N	N
90Y3486[b]	A365	IB6132D 2-port FDR InfiniBand Adapter	N	N
7ZT7A00508	AUKV	ThinkSystem Mellanox ConnectX-3 Mezz FDR 2-Port InfiniBand Adapter	Y	Y
SAS				
90Y4390	A2XW	ServeRAID™ M5115 SAS/SATA[c]	N	N
00JX142	A5SE	ServeRAID M5215 with 2GB Flash	N	N
7M27A03918	AUYR	ThinkSystem RAID 530-4i 2 Drive Adapter Kit for SN550	Y	N
7M17A03932	AVEC	ThinkSystem RAID 530-4i 4 Drive Adapter Kit for SN850	N	Y
7M27A03917	AUYS	ThinkSystem RAID 930-4i-2GB 2 Drive Adapter Kit for SN550	Y	N
7M17A03933	AVED	ThinkSystem RAID 930-4i-2GB 4 Drive Adapter Kit for SN850	N	Y

a. Supported in Power Systems compute nodes only. See Table 2-3.
b. Withdrawn from marketing
c. aa Various enablement kits and Features on Demand upgrades are available for the ServeRAID M5115. See the ServeRAID M5115 Product Guide, http://lenovopress.com/tips0884

2.1.2 Adapters for Flex System x86 compute nodes

Table 2-2 on page 14 lists the available I/O adapters and their compatibility with x86 compute nodes. For ThinkSystem compute nodes, see 2.1.1, “Adapters for ThinkSystem compute nodes” on page 12.

PCIe Expansion Node support: For PEN support of I/O adapters, see 2.6.2, “Flex System I/O adapters - PCIe Expansion Node” on page 38.

Table 2-2 I/O adapter compatibility matrix - Lenovo compute nodes

Part number	FC		x220 (7906)	x222 (7916)	x240 (8737, v1)	x240 (8737, v2)	x240 (7162, v2)	x240 M5 (9532 v3 & v4)	x240 M5 (9532) NEBS[a]	x440 (7917, v1)	x440 (7167, v2)	X6 (7903)	X6 (7196)
Ethernet adapters													
49Y7900	A10Y	EN2024 4-port 1Gb Ethernet Adapter	Y	N	Y	Y	Y	Y	N	Y	Y	Y[b]	Y[b]
88Y5920	A4K3	CN4022 2-port 10Gb Converged Adapter	Y	N	Y	Y	Y	Y	N	Y	N	Y	Y
00JY800	A5RP	CN4052 2-port 10Gb Virtual Fabric	N	N	N	N	Y	Y	N	N	Y	N	Y
00AG540	ATBT	CN4052S 2-port 10Gb Virtual Fabric	N	N	N	N	N	Y	N	N	Y	N	Y
01CV780	AU7X	CN4052S 2-port 10Gb VFA Advanced	N	N	N	N	N	Y	N	N	Y	N	Y
None[c]	None	EN4054 4-port 10Gb Ethernet Adapter	N	N	N	N	N	N	N	N	N	N	N
90Y3554[d]	A1R1	CN4054 10Gb Virtual Fabric Adapter	Y	N	Y	N	N	N	N	Y	N	N	N
00Y3306[d]	A4K2	CN4054R 10Gb Virtual Fabric Adapter	N	N	N	Y	Y	Y	Y	N	Y	Y[b]	Y[b]
00AG590	ATBS	CN4054S 4-port 10Gb Virtual Fabric	N	N	N	Y	Y	Y	N	N	Y	N	Y
01CV790	AU7Y	CN4054S 4-port 10Gb VFA Advanced	N	N	N	Y	Y	Y	N	N	Y	N	Y
None[c]	None	CN4058 8-port 10Gb Converged Adapter	N	N	N	N	Y	N	N	N	N	N	N
94Y5160	A4R6	CN4058S 8-port 10Gb Virtual Fabric	N	N	N	N	Y	Y	N	N	N	N	Y[b]
90Y3466	A1QY	EN4132 2-port 10 Gb Ethernet Adapter	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y
None[c]	None	EN4132 2-port 10Gb RoCE Adapter	N	N	N	N	N	N	N	N	N	N	N
00AG530	A5RN	EN4172 2-port 10Gb Ethernet Adapter	N	N	N	N	Y	Y	N	N	Y	N	Y
90Y3482	A3HK	EN6132 2-port 40Gb Ethernet Adapter	Y	N	Y	Y	Y	Y	N	Y	N	Y	Y
7ZT7A00502	AVCU	Mellanox ConnectX-3 40Gb 2-Port Eth	N	N	N	N	N	N	N	N	N	N	N
Features on Demand upgrades for Ethernet adapters (enables FCoE and iSCSI, one upgrade needed per adapter)													
00JY804	A5RV	CN4052 Virtual Fabric Adapter Upgrade (supports CN4052 and CN4052S)	N	N	N	N	Y	Y	N	N	Y	N	Y
90Y3558	A1R0	CN4054 Virtual Fabric Adapter Upgrade (supports CN4054 and CN4054R)	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y
00AG594	ATBU	CN4054S 4-port 10Gb Virtual Fabric Upg	N	N	N	Y	Y	Y	N	N	Y	N	Y
94Y5164	A4R9	CN4058S Virtual Fabric Adapter Upgrade	N	N	N	N	N	Y	N	N	N	N	Y
Fibre Channel adapters													
69Y1938	A1BM	FC3172 2-port 8Gb FC Adapter	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y
95Y2375	A2N5	FC3052 2-port 8Gb FC Adapter	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y
88Y6370[d]	A1BP	FC5022 2-port 16Gb FC Adapter	Y	N	Y	Y	N	Y	N	Y	N	Y	Y
95Y2386	A45R	FC5052 2-port 16Gb FC Adapter	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y
95Y2391	A45S	FC5054 4-port 16Gb FC Adapter	Y	N	Y	Y	Y	Y	Y	Y	Y	Y[b]	Y[b]
69Y1942	A1BQ	FC5172 2-port 16Gb FC Adapter	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
95Y2379[d]	A3HU	FC5024D 4-port 16Gb FC Adapter	N	Y	N	N	N	N	N	N	N	N	N

Part number	FC		x220 (7906)	x222 (7916)	x240 (8737, v1)	x240 (8737, v2)	x240 (7162, v2)	x240 M5 (9532 v3 & v4)	x240 M5 (9532) NEBS[a]	x440 (7917, v1)	x440 (7167, v2)	X6 (7903)	X6 (7196)
7ZT7A00521	AVCW	Emulex LPm16002B-L 16Gb 2-Port FC	N	N	N	N	N	N	N	N	N	N	N
7ZT7A00522	AVCX	Emulex LPm16004B-L 16Gb 4-Port FC	N	N	N	N	N	N	N	N	N	N	N
7ZT7A00520	AVCV	QLogic QML2692 16Gb 2-Port FC	N	N	N	N	N	N	N	N	N	N	N
InfiniBand adapters													
90Y3454	A1QZ	IB6132 2-port FDR InfiniBand Adapter	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y
None[c]	None	IB6132 2-port QDR InfiniBand Adapter	N	N	N	N	N	N	N	N	N	N	N
90Y3486[d]	A365	IB6132D 2-port FDR InfiniBand Adapter	N	Y	N	N	N	N	N	N	N	N	N
7ZT7A00508	AUKV	Mellanox ConnectX-3 FDR 2-Port IB	N	N	N	N	N	N	N	N	N	N	N
SAS													
90Y4390	A2XW	ServeRAID™ M5115 SAS/SATA[e]	Y	N	Y	Y	Y	N	N	Y[f]	Y	N	Y
00JX142	A5SE	ServeRAID M5215 with 2GB Flash	N	N	N	N	N	Y	Y	N	N	N	N
7M27A03918	AUYR	ThinkSystem RAID 530-4i 2 Drive Adapter Kit for SN550	N	N	N	N	N	N	N	N	N	N	N
7M17A03932	AVEC	ThinkSystem RAID 530-4i 4 Drive Adapter Kit for SN850	N	N	N	N	N	N	N	N	N	N	N
7M27A03917	AUYS	ThinkSystem RAID 930-4i-2GB 2 Drive Adapter Kit for SN550	N	N	N	N	N	N	N	N	N	N	N
7M17A03933	AVED	ThinkSystem RAID 930-4i-2GB 4 Drive Adapter Kit for SN850	N	N	N	N	N	N	N	N	N	N	N

a. The NEBS column indicates support when the compute node is installed in the Carrier-Grade Chassis
b. This dual-ASIC adapter is not supported in slots 3 and 4 of the X6 compute nodes
c. Supported in Power Systems compute nodes only. See Table 2-3.
d. Withdrawn from marketing
e. Various enablement kits and Features on Demand upgrades are available for the ServeRAID M5115. See the ServeRAID M5115 Product Guide, http://lenovopress.com/tips0884
f. For compatibility as listed here, ensure the x440 is running IMM2 firmware Build 40a or later

2.1.3 Adapters for Power Systems compute nodes

Table 2-3 lists the available I/O adapters and their compatibility with IBM Power Systems compute nodes.

Slot selection: Some I/O adapters supported by Power Systems compute nodes are restricted to only some of the available slots. See Table 2-4 on page 16 for specifics.

Table 2-3 I/O adapter compatibility matrix - IBM Power Systems compute nodes

Feature code	Description	p24L	p260 / p460	p270
Ethernet adapters				
1763	EN2024 4-port 1Gb Ethernet Adapter	Yes	Yes	Yes
1762	EN4054 4-port 10Gb Ethernet Adapter	Yes	Yes	Yes
EC24	CN4058 8-port 10Gb Converged Adapter	Yes	Yes	Yes
EC26	EN4132 2-port 10Gb RoCE Adapter	Yes	Yes	Yes
Fibre Channel adapters				
1764	FC3172 2-port 8Gb FC Adapter	Yes	Yes	Yes
EC23	FC5052 2-port 16Gb FC Adapter	Yes	Yes	Yes
EC2E	FC5054 4-port 16Gb FC Adapter	Yes	Yes	Yes
InfiniBand adapters				
1761	IB6132 2-port QDR InfiniBand Adapter	Yes	Yes	Yes

For Power Systems compute nodes, Table 2-4 shows which specific I/O expansion slots each of the supported adapters can be installed in to. **Yes** in the table means the adapter is supported in that I/O expansion slot.

Table 2-4 Slot locations supported by I/O expansion cards in Power Systems compute nodes

Feature code	Description	Slot 1	Slot 2	Slot 3 (p460)	Slot 4 (p460)
10 Gb Ethernet					
EC24	CN4058 8-port 10Gb Converged Adapter	Yes	Yes	Yes	Yes
EC26	EN4132 2-port 10Gb RoCE Adapter	No	Yes	Yes	Yes
1762	EN4054 4-port 10Gb Ethernet Adapter	Yes	Yes	Yes	Yes
1 Gb Ethernet					
1763	EN2024 4-port 1Gb Ethernet Adapter	Yes	Yes	Yes	Yes
InfiniBand					
1761	IB6132 2-port QDR InfiniBand Adapter	No	Yes	No	Yes
Fibre Channel					
1764	FC3172 2-port 8Gb FC Adapter	No	Yes	No	Yes
EC23	FC5052 2-port 16Gb FC Adapter	No	Yes	No	Yes
EC2E	FC5054 4-port 16Gb FC Adapter	No	Yes	No	Yes

2.2 Memory DIMM compatibility

This section covers memory DIMMs for both compute node families. It covers the following topics:

2.2.1 Memory for ThinkSystem compute nodes

Table 2-5 lists the memory DIMM options for the ThinkSystem compute nodes.

Table 2-5 Supported memory DIMMs - x86 compute nodes

Part number	Feature code	Description	SN550 (7X16)	SN850 (7X15)
Registered DIMMs (RDIMMs) - 2666 MHz				
7X77A01301	AUU1	ThinkSystem 8GB TruDDR4 2666 MHz (1Rx8 1.2V) RDIMM	Y	Y
7X77A01302	AUNB	ThinkSystem 16GB TruDDR4 2666 MHz (1Rx4 1.2V) RDIMM	Y	Y
7X77A01303	AUNC	ThinkSystem 16GB TruDDR4 2666 MHz (2Rx8 1.2V) RDIMM	Y	Y
7X77A01304	AUND	ThinkSystem 32GB TruDDR4 2666 MHz (2Rx4 1.2V) RDIMM	Y	Y
7X77A01307	AUNF	ThinkSystem 128GB TruDDR4 2666 MHz (8Rx4 1.2V) 3DS RDIMM	N	N
Registered DIMMs (LRDIMMs) - 2666 MHz				
7X77A01305	AUNE	ThinkSystem 64GB TruDDR4 2666 MHz (4Rx4 1.2V) LRDIMM	Y	Y

2.2.2 Memory for Flex System x86 compute nodes

Table 2-6 lists the memory DIMM options for the x86 compute nodes.

Table 2-6 Supported memory DIMMs - x86 compute nodes

Part number	FC	Description	x220 (7906)	x222 (7916)	x240 (8737, v1)	x240 (8737, v2)	x240 (7162, v2)	x240 M5 (9532, v3)	x240 M5 (9532, v4)	x440 (7917, v1)	x440 (7167, v2)	X6 (7903)	X6 (7196)
Unbuffered DIMM (UDIMM) modules													
49Y1403	A0QS	2GB (1x2GB, 1Rx8, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP UDIMM	Y	N	Y	N	N	N	N	N	N	N	N
49Y1404	8648	4GB (1x4GB, 2Rx8, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP UDIMM	Y	N	Y	N	N	N	N	Y	N	N	N
00D5012	A3QB	4GB (1x4GB, 2Rx8, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP UDIMM	N	N	N	Y	Y	N	N	N	N	N	N
00D5016	A3QC	8GB (1x8GB, 2Rx8, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP UDIMM	N	N	N	Y	Y	N	N	N	N	N	N

Part number	FC	Description	x220 (7906)	x222 (7916)	x240 (8737, v1)	x240 (8737, v2)	x240 (7162, v2)	x240 M5 (9532, v3)	x240 M5 (9532, v4)	x440 (7917, v1)	x440 (7167, v2)	X6 (7903)	X6 (7196)
Registered DIMMs (RDIMMs) - 1333 MHz and 1066 MHz													
49Y1405	8940	2GB (1x2GB, 1Rx8, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM	N	N	Y	N	N	N	N	N	N	N	N
49Y1406	8941	4GB (1x4GB, 1Rx4, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM	Y	Y	Y	N	N	N	N	Y	N	N	N
49Y1407	8942	4GB (1x4GB, 2Rx8, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM	Y	Y	Y	N	N	N	N	Y	N	N	N
49Y1397	8923	8GB (1x8GB, 2Rx4, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM	Y	Y	Y	N	N	N	N	Y	N	N	N
49Y1563	A1QT	16GB (1x16GB, 2Rx4, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM	Y	Y	Y	N	N	N	N	Y	N	N	N
49Y1400	8939	16GB (1x16GB, 4Rx4, 1.35V) PC3L-8500 CL7 ECC DDR3 1066MHz LP RDIMM	Y	N	Y	N	N	N	N	N	N	N	N
90Y3101	A1CP	32GB (1x32GB, 4Rx4, 1.35V) PC3L-8500 CL7 ECC DDR3 1066MHz LP RDIMM	N	N	N	N	N	N	N	N	N	N	N
Load Reduced DIMMs (LRDIMMs) - 1333 MHz													
49Y1567	A290	16GB (1x16GB, 4Rx4, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP LRDIMM	N	N	Y	N	N	N	N	Y	N	N	N
90Y3105	A291	32GB (1x32GB, 4Rx4, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP LRDIMM	Y	Y	Y	N	N	N	N	Y	N	N	N
46W0741[a]	A451	64GB (1x64GB, 8Rx4, 1.35V) PC3-10600 DDR3 1333MHz LP LRDIMM	N	N	N	N	N	N	N	N	N	Y	Y
Registered DIMMs (RDIMMs) - 1600 MHz													
49Y1559	A28Z	4GB (1x4GB, 1Rx4, 1.5V) PC3-12800 CL11 ECC DDR3 1600MHz LP RDIMM	Y	Y	Y	N	N	N	N	Y	N	N	N
90Y3178	A24L	4GB (1x4GB, 2Rx8, 1.5V) PC3-12800 CL11 ECC DDR3 1600MHz LP RDIMM	Y	Y	Y	N	N	N	N	N	N	N	N
00D5024	A3QE	4GB (1x4GB, 1Rx4, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP RDIMM	N	N	N	Y	Y	N	N	N	N	Y	Y
90Y3109	A292	8GB (1x8GB, 2Rx4, 1.5V) PC3-12800 CL11 ECC DDR3 1600MHz LP RDIMM	Y	Y	Y	N	N	N	N	Y	N	N	N
00D5044[a]	A3QK	8GB (1x8GB, 2Rx8, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP RDIMM	N	N	N	Y	Y	N	N	N	N	N	N

Part number	FC	Description	x220 (7906)	x222 (7916)	x240 (8737, v1)	x240 (8737, v2)	x240 (7162, v2)	x240 M5 (9532, v3)	x240 M5 (9532, v4)	x440 (7917, v1)	x440 (7167, v2)	X6 (7903)	X6 (7196)
00D5036	A3QH	8GB (1x8GB, 1Rx4, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP RDIMM	N	N	N	Y	Y	N	N	N	Y	Y	Y
00D4968[a]	A2U5	16GB (1x16GB, 2Rx4, 1.5V) PC3-12800 CL11 ECC DDR3 1600MHz LP RDIMM	Y	Y	Y	N	N	N	N	Y	N	N	N
46W0672	A3QM	16GB (1x16GB, 2Rx4, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP RDIMM	N	N	Y	Y	Y	N	N	Y	Y	Y	Y
Load Reduced DIMMs (LRDIMMs) - 1600 MHz													
46W0676	A3SR	32GB (1x32GB, 4Rx4, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP LRDIMM	N	N	N	N	N	N	N	N	N	Y	Y
Registered DIMMs (RDIMMs) - 1866 MHz													
00D5040[a]	A3QJ	8GB (1x8GB, 2Rx8, 1.5V) PC3-14900 CL13 ECC DDR3 1866MHz LP RDIMM	N	N	N	Y	Y	N	N	N	N	N	N
00D5048	A3QL	16GB (1x16GB, 2Rx4, 1.5V) PC3-14900 CL13 ECC DDR3 1866MHz LP RDIMM	N	N	N	Y	Y	N	N	N	N	N	N
00D5028	A3QF	4GB (1x4GB, 2Rx8, 1.5V) PC3-14900 CL13 ECC DDR3 1866MHz LP RDIMM	N	N	N	Y	Y	N	N	N	N	N	N
Load Reduced DIMMs (LRDIMMs) - 1866 MHz													
46W0761	A47K	32GB (1x32GB, 4Rx4, 1.5V) PC3-14900 CL13 ECC DDR3 1866MHz LP LRDIMM	N	N	N	Y	Y	N	N	N	Y	N	N
Registered DIMMs (RDIMMs) - 2133 MHz													
46W0784	A5B6	4GB TruDDR4™ Memory (1Rx8, 1.2V) PC4-17000 CL15 2133MHz LP RDIMM	N	N	N	N	N	Y	N	N	N	N	N
46W0788	A5B5	8GB TruDDR4 Memory (1Rx4, 1.2V) PC4-17000 CL15 2133MHz LP RDIMM	N	N	N	N	N	Y	N	N	N	N	N
46W0792	A5B8	8GB TruDDR4 Memory (2Rx8, 1.2V) PC4-17000 CL15 2133MHz LP RDIMM	N	N	N	N	N	Y	N	N	N	N	N
95Y4821	ASD9	16GB TruDDR4 Memory (2Rx4, 1.2V) PC4-17000 CL15 2133MHz LP RDIMM	N	N	N	N	N	Y	N	N	N	N	N
95Y4808	A5UJ	32GB TruDDR4 Memory (2Rx4, 1.2V) PC4-17000 CL15 2133MHz LP RDIMM	N	N	N	N	N	Y	N	N	N	N	N
Load-reduced DIMMs (LRDIMMs) - 2133 MHz													
46W0800	A5B9	32GB TruDDR4 Memory (4Rx4, 1.2V) PC417000 CL15 2133MHz LP LRDIMM	N	N	N	N	N	Y	N	N	N	N	N
95Y4812	A5UK	64GB TruDDR4 Memory (4Rx4,1.2V) PC4-17000 CL15 2133MHz LP LRDIMM	N	N	N	N	N	Y	N	N	N	N	N

Part number	FC	Description	x220 (7906)	x222 (7916)	x240 (8737, v1)	x240 (8737, v2)	x240 (7162, v2)	x240 M5 (9532, v3)	x240 M5 (9532, v4)	x440 (7917, v1)	x440 (7167, v2)	X6 (7903)	X6 (7196)
Registered DIMMs (RDIMMs) - 2400 MHz													
46W0821	ATC8	8GB TruDDR4 Memory (1Rx4, 1.2V) PC4-19200 CL17 2400MHz LP RDIMM	N	N	N	N	N	N	Y	N	N	N	N
46W0825	ATC9	8GB TruDDR4 Memory (2Rx8, 1.2V) PC4-19200 CL17 2400MHz LP RDIMM	N	N	N	N	N	N	Y	N	N	N	N
46W0829	ATCA	16GB TruDDR4 Memory (2Rx4, 1.2V) PC4-19200 CL17 2400MHz LP RDIMM	N	N	N	N	N	N	Y	N	N	N	N
01KN301	AVP0	16GB TruDDR4 Memory (2Rx8, 1.2V) PC4-19200 CL17 2400MHz LP RDIMM	N	N	N	N	N	N	Y	N	N	N	N
46W0833	ATCB	32GB TruDDR4 Memory (2Rx4, 1.2V) PC4-19200 CL17 2400MHz LP RDIMM	N	N	N	N	N	N	Y	N	N	N	N
Load-reduced DIMMs (LRDIMMs) - 2400 MHz													
46W0841	ATGG	64GB TruDDR4 Memory (4Rx4, 1.2V) PC4-19200 PC4 2400MHz LP LRDIMM	N	N	N	N	N	N	Y	N	N	N	N
Registered DIMMs (RDIMMs) - 2666 MHz													
7X77A01301	AUU1	ThinkSystem 8GB TruDDR4 2666 MHz (1Rx8 1.2V) RDIMM	N	N	N	N	N	N	N	N	N	N	N
7X77A01302	AUNB	ThinkSystem 16GB TruDDR4 2666 MHz (1Rx4 1.2V) RDIMM	N	N	N	N	N	N	N	N	N	N	N
7X77A01303	AUNC	ThinkSystem 16GB TruDDR4 2666 MHz (2Rx8 1.2V) RDIMM	N	N	N	N	N	N	N	N	N	N	N
7X77A01304	AUND	ThinkSystem 32GB TruDDR4 2666 MHz (2Rx4 1.2V) RDIMM	N	N	N	N	N	N	N	N	N	N	N
7X77A01307	AUNF	ThinkSystem 128GB TruDDR4 2666 MHz (8Rx4 1.2V) 3DS RDIMM	N	N	N	N	N	N	N	N	N	N	N
Registered DIMMs (LRDIMMs) - 2666 MHz													
7X77A01305	AUNE	ThinkSystem 64GB TruDDR4 2666 MHz (4Rx4 1.2V) LRDIMM	N	N	N	N	N	N	N	N	N	N	N

a. Withdrawn from marketing

2.2.3 Memory for Power Systems compute nodes

Table 2-7 lists the supported memory DIMMs for Power Systems compute nodes.

Table 2-7 Supported memory DIMMs - Power Systems compute nodes

Feature code	Description	p24L 7FL	p260 22X	p260 23A	p260 23X	p460 42X	p460 43X	p270 24X
EM04	2x 2 GB DDR3 RDIMM 1066 MHz	Yes	Yes	No	No	Yes	No	No
8196	2x 4 GB DDR3 RDIMM 1066 MHz	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8199	2x 8 GB DDR3 RDIMM 1066 MHz	Yes	Yes	No	No	Yes	No	No
EEMD	2x 8 GB DDR3 RDIMM 1066 MHz	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8145	2x 16 GB DDR3 RDIMM 1066 MHz	Yes	Yes	No	No	Yes	No	No
EEME	2x 16 GB DDR3 RDIMM 1066 MHz	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EEMF	2x 32 GB DDR3 RDIMM 1066 MHz	Yes	Yes	Yes	Yes	Yes	Yes	Yes

2.3 Memory-channel storage compatibility

Table 2-8 lists the support of the eXFlash DIMM memory-channel storage options.

Table 2-8 eXFlash DIMM support

Part number	Feature code	Description	x220 (7906)	x222 (7916)	x240 (8737, v1)	x240 (8737, v2)	x240 (7162, v2)	x240 M5 (9532)	x440 (7917, v1)	x440 (7167, v2)	X6 (7903)	X6 (7196)	SN550 (7X16)	SN850 (7X15)
00FE000	A4GX	eXFlash 200GB DDR3 Storage DIMM	N	N	N	N	N	N	N	N	N	Y	N	N
00FE005	A4GY	eXFlash 400GB DDR3 Storage DIMM	N	N	N	N	N	N	N	N	N	Y	N	N

2.4 Internal storage compatibility

This section covers supported internal storage for both compute node families. It covers the following topics:

For information about the use of the Storage Expansion Node (SEN), see 2.6.4, “Internal storage - Storage Expansion Node” on page 42.

2.4.1 Drives for ThinkSystem compute nodes

The following tables lists the 2.5-inch drives for ThinkSystem compute nodes:

- Table 2-9, 2.5-inch hot-swap 12 Gb SAS/SATA HDDs
- Table 2-10, 2.5-inch hot-swap 6 Gb SAS/SATA HDDs
- Table 2-11, 2.5-inch hot-swap 12 Gb SAS/SATA SSDs
- Table 2-12 on page 23, 2.5-inch hot-swap 6 Gb SAS/SATA SSDs
- Table 2-13 on page 23, 2.5-inch hot-swap NVMe SSDs

Support of G3HS drives: G3HS hot-swap drives are only used in Flex System compute nodes such as the x240 M5. Such drives are not supported in ThinkSystem compute nodes.

Table 2-9 2.5-inch hot-swap 12 Gb SAS HDDs

Part number	Feature code	Description	SN550 (7X16)	SN850 (7X15)
2.5-inch hot-swap HDDs - 12 Gb SAS 10K				
7XB7A00024	AULY	ThinkSystem 2.5" 300GB 10K SAS 12Gb Hot Swap 512n HDD	Y	Y
7XB7A00025	AULZ	ThinkSystem 2.5" 600GB 10K SAS 12Gb Hot Swap 512n HDD	Y	Y
7XB7A00026	AUM0	ThinkSystem 2.5" 900GB 10K SAS 12Gb Hot Swap 512n HDD	Y	Y
7XB7A00027	AUM1	ThinkSystem 2.5" 1.2TB 10K SAS 12Gb Hot Swap 512n HDD	Y	Y
7XB7A00028	AUM2	ThinkSystem 2.5" 1.8TB 10K SAS 12Gb Hot Swap 512e HDD	Y	Y
2.5-inch hot-swap HDDs - 12 Gb SAS 15K				
7XB7A00021	AULV	ThinkSystem 2.5" 300GB 15K SAS 12Gb Hot Swap 512n HDD	Y	Y
7XB7A00022	AULW	ThinkSystem 2.5" 600GB 15K SAS 12Gb Hot Swap 512n HDD	Y	Y
7XB7A00023	AULX	ThinkSystem 2.5" 900GB 15K SAS 12Gb Hot Swap 512e HDD	Y	Y
2.5-inch hot-swap HDDs - 12 Gb NL SAS				
7XB7A00034	AUM6	ThinkSystem 2.5" 1TB 7.2K SAS 12Gb Hot Swap 512n HDD	Y	Y
7XB7A00035	AUM7	ThinkSystem 2.5" 2TB 7.2K SAS 12Gb Hot Swap 512n HDD	Y	Y

Table 2-10 2.5-inch hot-swap 6 Gb SAS/SATA HDDs

Part number	Feature code	Description	SN550 (7X16)	SN850 (7X15)
2.5-inch hot-swap HDDs - 6 Gb NL SATA				
7XB7A00036	AUUE	ThinkSystem 2.5" 1TB 7.2K SATA 6Gb Hot Swap 512n HDD	Y	Y
7XB7A00037	AUUJ	ThinkSystem 2.5" 2TB 7.2K SATA 6Gb Hot Swap 512e HDD	Y	Y

Table 2-11 2.5-inch hot-swap 12 Gb SAS SSDs

Part number	Feature code	Description	SN550 (7X16)	SN850 (7X15)
2.5-inch hot-swap SSDs - 12 Gb SAS - Enterprise Capacity				
7N47A00121	AUMK	ThinkSystem 2.5" PM1633a 3.84TB Capacity SAS 12Gb Hot Swap SSD	Y	N

Part number	Feature code	Description	SN550 (7X16)	SN850 (7X15)
7N47A00122	AUML	ThinkSystem 2.5" PM1633a 7.68TB Capacity SAS 12Gb Hot Swap SSD	Y	N
2.5-inch hot-swap SSDs - 12 Gb SAS - Enterprise Performance (10+ DWPD)				
7N47A00124	AUMG	ThinkSystem 2.5" HUSMM32 400GB Performance SAS 12Gb HS SSD	Y	Y
7N47A00125	AUMH	ThinkSystem 2.5" HUSMM32 800GB Performance SAS 12Gb HS SSD	Y	N
2.5-inch hot-swap SSDs - 12 Gb SAS - Enterprise Mainstream (3-5 DWPD)				
7N47A00117	AUMC	ThinkSystem 2.5" PM1635a 400GB Mainstream SAS 12Gb HS SSD	Y	Y
7N47A00118	AUMD	ThinkSystem 2.5" PM1635a 800GB Mainstream SAS 12Gb HS SSD	Y	N

Table 2-12 2.5-inch hot-swap 6 Gb SAS/SATA SSDs

Part number	Feature code	Description	SN550 (7X16)	SN850 (7X15)
2.5-inch hot-swap SSDs - 6 Gb SATA - Enterprise Entry (<3 DWPD)				
7N47A00099	AUM8	ThinkSystem 2.5" Intel S3520 240GB Entry SATA 6Gb Hot Swap SSD	Y	Y
7N47A00100	AUUZ	ThinkSystem 2.5" Intel S3520 480GB Entry SATA 6Gb Hot Swap SSD	Y	Y
7N47A00101	AVCY	ThinkSystem 2.5" Intel S3520 960GB Entry SATA 6Gb Hot Swap SSD	Y	Y
7N47A00111	AUUQ	ThinkSystem 2.5" PM863a 240GB Entry SATA 6Gb Hot Swap SSD	Y	Y
7N47A00112	AUM9	ThinkSystem 2.5" PM863a 480GB Entry SATA 6Gb Hot Swap SSD	Y	Y
7N47A00113	AVCZ	ThinkSystem 2.5" PM863a 960GB Entry SATA 6Gb Hot Swap SSD	Y	Y

Table 2-13 2.5-inch U.2 NVMe SSDs

Part number	Feature code	Description	SN550 (7X16)	SN850 (7X15)
2.5-inch SSDs - NVMe - Enterprise Performance (10+ DWPD)				
7XB7A05923	AWG6	ThinkSystem U.2 PX04PMB 800GB Performance NVMe PCIe 3.0 x4 Hot Swap SSD	Y	Y
7XB7A05922	AWG7	ThinkSystem U.2 PX04PMB 1.6TB Performance NVMe PCIe 3.0 x4 Hot Swap SSD	Y	Y
2.5-inch SSDs - NVMe - Enterprise Mainstream (3-5 DWPD)				
7N47A00095	AUUY	ThinkSystem U.2 PX04PMB 960GB Mainstream NVMe PCIe 3.0 x4 Hot Swap SSD	Y	Y
7N47A00096	AUMF	ThinkSystem U.2 PX04PMB 1.92TB Mainstream NVMe PCIe 3.0 x4 Hot Swap SSD	Y	Y
2.5-inch SSDs - NVMe - Enterprise Entry (<3 DWPD)				
7N47A00984	AUV0	ThinkSystem U.2 PM963 1.92TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD	Y	Y
7N47A00985	AUUU	ThinkSystem U.2 PM963 3.84TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD	Y	Y

2.4.2 Drives for Flex System x86 compute nodes: 2.5-inch drives

The following tables lists the 2.5-inch drives for x86 compute nodes:

- Table 2-14, 2.5-inch hot-swap 12 Gb SAS/SATA HDDs
- Table 2-15 on page 25, 2.5-inch hot-swap 6 Gb SAS/SATA HDDs
- Table 2-16 on page 27, 2.5-inch hot-swap 12 Gb SAS/SATA SSDs
- Table 2-17 on page 27, 2.5-inch hot-swap 6 Gb SAS/SATA SSDs
- Table 2-18 on page 30, 2.5-inch hot-swap NVMe SSDs

Note: The support of drives in the Storage Expansion Node is described in 2.6.4, “Internal storage - Storage Expansion Node” on page 42.

Table 2-14 2.5-inch hot-swap 12 Gb SAS/SATA HDDs

Part number	FC	Description	x220 (7906)	x222 (7916)	x240 (8737, E5-2600)	x240 (8737, E5-2600 v2)	x240 (7162)	x240 M5 (9532, E5 v3)	x240 M5 (9532, E5 v4)	x440 (7917)	x440 (7167)	x280/x480/x880 X6 (7903)	x280/x480/x880 X6 (7196)
2.5-inch hot-swap HDDs - 12 Gb SAS 10K													
00WG685	AT89	300GB 10K 12Gbps SAS 2.5" G3HS HDD	N	N	N	N	N	Y	Y	N	N	N	Y
00WG690	AT8A	600GB 10K 12Gbps SAS 2.5" G3HS HDD	N	N	N	N	N	Y	Y	N	N	N	Y
00WG695	AT8B	900GB 10K 12Gbps SAS 2.5" G3HS HDD	N	N	N	N	N	Y	Y	N	N	N	Y
00WG700	AT8C	1.2TB 10K 12Gbps SAS 2.5" G3HS HDD	N	N	N	N	N	Y	Y	N	N	N	Y
00NA251[a]	ASBH	900GB 10K 12Gbps SAS 2.5" G3HS 512e HDD	N	N	N	N	N	Y	Y	N	N	Y	N
00NA241[a]	ASBF	600GB 10K 12Gbps SAS 2.5" G3HS 512e HDD	N	N	N	N	N	Y	Y	N	N	Y	N
00NA261[a]	ASBK	1.2TB 10K 12Gbps SAS 2.5" G3HS 512e HDD	N	N	N	N	N	Y	Y	N	N	Y	N
00NA271	ASBM	1.8TB 10K 12Gbps SAS 2.5" G3HS 512e HDD	N	N	N	N	N	Y	Y	N	N	Y	Y
2.5-inch hot-swap HDDs - 12 Gb SAS 15K													
00WG660	AT84	300GB 15K 12Gbps SAS 2.5" G3HS HDD	N	N	N	N	N	Y	Y	N	N	N	Y
00WG665	AT85	600GB 15K 12Gbps SAS 2.5" G3HS HDD	N	N	N	N	N	Y	Y	N	N	N	Y
00NA221[a]	ASBB	300GB 15K 12Gbps SAS 2.5" G3HS 512e HDD	N	N	N	N	N	Y	Y	N	N	Y	N
00NA231[a]	ASBD	600GB 15K 12Gbps SAS 2.5" G3HS 512e HDD	N	N	N	N	N	Y	Y	N	N	Y	N
01GV035	ASBD	900GB 15K 12Gbps SAS 2.5" G3HS 512e HDD	N	N	N	N	N	N	Y	N	N	N	N
2.5-inch hot-swap HDDs - 12 Gb NL SAS													
00NA491	AT7Z	1TB 7.2K 12Gbps NL SAS 2.5" G3HS HDD	N	N	N	N	N	Y	Y	N	N	N	Y
00NA496	AT80	2TB 7.2K 12Gbps NL SAS 2.5" G3HS 512e HDD	N	N	N	N	N	Y	Y	N	N	N	Y
2.5-inch hot-swap SED HDDs - 12 Gb SAS 10K													

Part number	FC	Description	x220 (7906)	x222 (7916)	x240 (8737, E5-2600)	x240 (8737, E5-2600 v2)	x240 (7162)	x240 M5 (9532, E5 v3)	x240 M5 (9532, E5 v4)	x440 (7917)	x440 (7167)	x280/x480/x880 X6 (7903)	x280/x480/x880 X6 (7196)
00WG705	AT8D	300GB 10K 12Gbps SAS 2.5" G3HS SED	N	N	N	N	N	Y	Y	N	N	N	Y
00WG710	AT8E	600GB 10K 12Gbps SAS 2.5" G3HS SED	N	N	N	N	N	Y	Y	N	N	N	Y
00NA291	ASBR	600GB 10K 12Gbps SAS 2.5" G3HS 512e SED	N	N	N	N	N	Y	Y	N	N	Y	N
00WG715	AT8F	900GB 10K 12Gbps SAS 2.5" G3HS SED	N	N	N	N	N	Y	Y	N	N	N	Y
00WG720	AT8G	1.2TB 10K 12Gbps SAS 2.5" G3HS SED	N	N	N	N	N	Y	Y	N	N	N	Y
00NA301[a]	ASBT	1.2TB 10K 12Gbps SAS 2.5" G3HS 512e SED	N	N	N	N	N	Y	Y	N	N	Y	N
00NA306[a]	ASBU	1.8TB 10K 12Gbps SAS 2.5" G3HS 512e SED	N	N	N	N	N	Y	Y	N	N	N	N

a. Withdrawn from marketing

Table 2-15 2.5-inch hot-swap 6 Gb SAS/SATA HDDs

Part number	FC	Description	x220 (7906)	x222 (7916)	x240 (8737, E5-2600)	x240 (8737, E5-2600 v2)	x240 (7162)	x240 M5 (9532, E5 v3)	x240 M5 (9532, E5 v4)	x440 (7917)	x440 (7167)	x280/x480/x880 X6 (7903)	x280/x480/x880 X6 (7196)
2.5-inch hot-swap HDDs - 6 Gb SAS 10K													
00AJ096[a]	A4TL	300GB 10K 6Gbps SAS 2.5" G3HS HDD	N	N	N	N	N	Y	Y	N	N	Y	Y
00AJ091[a]	A4TM	600GB 10K 6Gbps SAS 2.5" G3HS HDD	N	N	N	N	N	Y	Y	N	N	Y	Y
00AJ071[a]	A4TN	900GB 10K 6Gbps SAS 2.5" G3HS HDD	N	N	N	N	N	Y	Y	N	N	Y	Y
00AJ146[a]	A4TP	1.2TB 10K 6Gbps SAS 2.5" G3HS HDD	N	N	N	N	N	Y	Y	N	N	Y	Y
90Y8877	A2XC	300GB 10K 6Gbps SAS 2.5" SFF G2HS HDD	Y	N	Y	Y	Y	Y	Y	Y	Y	N	N
90Y8872	A2XD	600GB 10K 6Gbps SAS 2.5" SFF G2HS HDD	Y	N	Y	Y	Y	Y	Y	Y	Y	N	N
81Y9650[a]	A282	900GB 10K 6Gbps SAS 2.5" SFF HS HDD	Y	N	Y	Y	Y	Y	Y	Y	Y	N	N
00AD075	A48S	1.2TB 10K 6Gbps SAS 2.5" G2HS HDD	Y	N	Y	Y	Y	N	N	Y	Y	N	N
2.5-inch hot-swap HDDs - 6 Gb SAS 15K													
00AJ111[a]	A4TQ	146GB 15K 6Gbps SAS 2.5" G3HS HDD	N	N	N	N	N	Y	Y	N	N	Y	Y
00AJ081[a]	A4TR	300GB 15K 6Gbps SAS 2.5" G3HS HDD	N	N	N	N	N	Y	Y	N	N	Y	Y

Part number	FC	Description	x220 (7906)	x222 (7916)	x240 (8737, E5-2600)	x240 (8737, E5-2600 v2)	x240 (7162)	x240 M5 (9532, E5 v3)	x240 M5 (9532, E5 v4)	x440 (7917)	x440 (7167)	x280/x480/x880 X6 (7903)	x280/x480/x880 X6 (7196)
00AJ126[a]	A4TS	600GB 15K 6Gbps SAS 2.5" G3HS HDD	N	N	N	N	N	Y	Y	N	N	Y	Y
90Y8926[a]	A2XB	146GB 15K 6Gbps SAS 2.5" SFF G2HS HDD	Y	N	Y	Y	Y	N	N	Y	N	N	N
81Y9670	A283	300GB 15K 6Gbps SAS 2.5" G2HS HDD	Y	N	Y	Y	Y	N	N	Y	Y	N	N
00AJ300	A4VB	600GB 15K 6Gbps SAS 2.5" G2HS HDD	Y	N	Y	Y	Y	Y	Y	Y	Y	N	N
2.5-inch hot-swap HDDs - 6 Gb NL SAS													
00AJ121[a]	A4TT	500GB 7.2K 6Gbps NL SAS 2.5" G3HS HDD	N	N	N	N	N	Y	Y	N	N	Y	Y
00AJ086[a]	A4TU	1TB 7.2K 6Gbps NL SAS 2.5" G3HS HDD	N	N	N	N	N	Y	Y	N	N	Y	Y
90Y8953[a]	A2XE	500GB 7.2K 6Gbps NL SAS 2.5" SFF G2HS HDD	Y	N	Y	Y	Y	N	N	Y	Y	N	N
81Y9690	A1P3	1TB 7.2K 6Gbps NL SAS 2.5" SFF HS HDD	Y	N	Y	Y	Y	N	N	Y	N	N	N
2.5-inch hot-swap HDDs - 6 Gb NL SATA													
00AJ136[a]	A4TW	500GB 7.2K 6Gbps NL SATA 2.5" G3HS HDD	N	N	N	N	N	Y	Y	N	N	Y	Y
00AJ141	A4TX	1TB 7.2K 6Gbps NL SATA 2.5" G3HS HDD	N	N	N	N	N	Y	Y	N	N	Y	Y
00NA526	AT81	2TB 7.2K 6Gbps NL SATA 2.5" G3HS 512e HDD	N	N	N	N	N	Y	Y	N	N	N	Y
81Y9722[a]	A1NX	250GB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	Y	N	Y	Y	Y	Y	Y	Y	Y	N	N
81Y9726	A1NZ	500GB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	Y	N	Y	Y	Y	Y	Y	Y	Y	N	N
81Y9730	A1AV	1TB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	Y	N	Y	Y	Y	Y	Y	Y	Y	N	N
2.5-inch hot-swap SED HDDs - 6 Gb SAS 10K													
00AJ106[a]	A4TY	300GB 10K 6Gbps SAS 2.5" G3HS SED	N	N	N	N	N	Y	Y	N	N	Y	Y
90Y8913	A2XF	300GB 10K 6Gbps SAS 2.5" SFF G2HS SED	Y	N	Y	Y	Y	N	N	Y	Y	N	N
90Y8908	A3EF	600GB 10K 6Gbps SAS 2.5" SFF G2HS SED	Y	N	Y	Y	Y	N	N	Y	Y	N	N
81Y9662[a]	A3EG	900GB 10K 6Gbps SAS 2.5" SFF G2HS SED	Y	N	Y	Y	Y	N	N	Y	Y	N	N
00AD085[a]	A48T	1.2TB 10K 6Gbps SAS 2.5" G2HS SED	Y	N	Y	Y	Y	N	N	Y	Y	N	N

a. Withdrawn from marketing

Table 2-16 2.5-inch hot-swap 12 Gb SAS/SATA SSDs

Part number	FC	Description	x220 (7906)	x222 (7916)	x240 (8737, E5-2600)	x240 (8737, E5-2600 v2)	x240 (7162)	x240 M5 (9532, E5 v3)	x240 M5 (9532, E5 v4)	x440 (7917)	x440 (7167)	x280/x480/x880 X6 (7903)	x280/x480/x880 X6 (7196)
2.5-inch hot-swap SSDs - 12 Gb SAS - Enterprise Capacity													
01GR786	AVKV	PM1633a 3.84TB Enterprise Capacity 12Gb SAS G3HS 2.5" SSD	N	N	N	N	N	Y	Y	N	N	N	N
01GR771	AUEJ	PM1633a 7.68TB Enterprise Capacity 12Gb SAS G3HS 2.5" SSD	N	N	N	N	N	Y	Y	N	N	N	N
2.5-inch hot-swap SSDs - 12 Gb SAS - Enterprise Performance (10+ DWPD)													
00FN379	AS7C	200GB 12G SAS 2.5" MLC G3HS Enterprise SSD	N	N	N	N	N	Y	Y	N	N	Y	N
00FN389	AS7E	400GB 12G SAS 2.5" MLC G3HS Enterprise SSD	N	N	N	N	N	Y	Y	N	N	Y	N
00FN399	AS7G	800GB 12G SAS 2.5" MLC G3HS Enterprise SSD	N	N	N	N	N	Y	Y	N	N	Y	N
00FN409	AS7J	1.6TB 12G SAS 2.5" MLC G3HS Enterprise SSD	N	N	N	N	N	Y	Y	N	N	Y	N

Table 2-17 2.5-inch hot-swap 6 Gb SAS/SATA SSDs

Part number	FC	Description	x220 (7906)	x222 (7916)	x240 (8737, E5-2600)	x240 (8737, E5-2600 v2)	x240 (7162)	x240 M5 (9532, E5 v3)	x240 M5 (9532, E5 v4)	x440 (7917)	x440 (7167)	x280/x480/x880 X6 (7903)	x280/x480/x880 X6 (7196)
2.5-inch hot-swap SSDs - 6 Gb SAS - Enterprise Capacity													
00NA671	ASW6	3.84TB 6Gb SAS Enterprise Capacity G3HS MLC SSD	N	N	N	N	N	Y	Y	N	N	Y	N
2.5-inch hot-swap SSDs - 6 Gb SAS - Enterprise Performance (10+ DWPD)													
00AJ207	A4UA	200GB SAS 2.5" MLC G3HS Enterprise SSD	N	N	N	N	N	Y	Y	N	N	Y	Y
00AJ212	A4UB	400GB SAS 2.5" MLC G3HS Enterprise SSD	N	N	N	N	N	Y	Y	N	N	Y	Y
00AJ217	A4UC	800GB SAS 2.5" MLC G3HS Enterprise SSD	N	N	N	N	N	Y	Y	N	N	Y	Y
49Y6129	A3EW	200GB SAS 2.5" MLC HS Enterprise SSD	Y	N	Y	Y	Y	N	N	Y	Y	N	N
49Y6134	A3EY	400GB SAS 2.5" MLC HS Enterprise SSD	Y	N	Y	Y	Y	N	N	Y	Y	N	N
49Y6139	A3F0	800GB SAS 2.5" MLC HS Enterprise SSD	Y	N	Y	Y	Y	N	N	Y	Y	N	N

Part number	FC	Description	x220 (7906)	x222 (7916)	x240 (8737, E5-2600)	x240 (8737, E5-2600 v2)	x240 (7162)	x240 M5 (9532, E5 v3)	x240 M5 (9532, E5 v4)	x440 (7917)	x440 (7167)	x280/x480/x880 X6 (7903)	x280/x480/x880 X6 (7196)
49Y6195	A4GH	1.6TB SAS 2.5" MLC HS Enterprise SSD	Y	N	Y	Y	Y	N	N	Y	Y	N	N
00AJ222	A4UD	1.6TB SAS 2.5" MLC G3HS Enterprise SSD	N	N	N	N	N	Y	Y	N	N	Y	N
2.5-inch hot-swap SSDs - 6 Gb SATA - Enterprise Performance (10+ DWPD)													
00YC320	AT9C	Intel S3710 200GB Enterprise Performance SATA G3HS 2.5" SSD	N	N	N	N	N	Y	Y	N	N	N	Y
00YC325	AT9D	Intel S3710 400GB Enterprise Performance SATA G3HS 2.5" SSD	N	N	N	N	N	Y	Y	N	N	N	Y
00YC330	AT9E	Intel S3710 800GB Enterprise Performance SATA G3HS 2.5" SSD	N	N	N	N	N	Y	Y	N	N	N	Y
00AJ156[a]	A4U3	S3700 200GB SATA 2.5" MLC G3HS Enterprise SSD	N	N	N	N	N	Y	Y	N	N	Y	Y
00AJ161[a]	A4U4	S3700 400GB SATA 2.5" MLC G3HS Enterprise SSD	N	N	N	N	N	Y	Y	N	N	Y	Y
00AJ166[a]	A4U5	S3700 800GB SATA 2.5" MLC G3HS Enterprise SSD	N	N	N	N	N	Y	Y	N	N	Y	Y
41Y8331[a]	A4FL	S3700 200GB SATA 2.5" MLC HS Enterprise SSD	Y	N	Y	Y	Y	N	N	Y	Y	N	N
41Y8336[a]	A4FN	S3700 400GB SATA 2.5" MLC HS Enterprise SSD	Y	N	Y	Y	Y	N	N	Y	Y	N	N
41Y8341[a]	A4FQ	S3700 800GB SATA 2.5" MLC HS Enterprise SSD	Y	N	Y	Y	Y	N	N	Y	Y	N	N
2.5-inch hot-swap SSDs - 6 Gb SATA - Enterprise Mainstream (3-5 DWPD)													
00AJ395	A577	120GB SATA 2.5" MLC G3HS Enterprise Value SSD	N	N	N	N	N	Y	Y	N	N	Y	Y
00AJ400	A578	240GB SATA 2.5" MLC G3HS Enterprise Value SSD	N	N	N	N	N	Y	Y	N	N	Y	Y
00AJ405	A579	480GB SATA 2.5" MLC G3HS Enterprise Value SSD	N	N	N	N	N	Y	Y	N	N	Y	Y
00AJ410	A57A	800GB SATA 2.5" MLC G3HS Enterprise Value SSD	N	N	N	N	N	Y	Y	N	N	Y	Y
00AJ355	A56Z	120GB SATA 2.5" MLC HS Enterprise Value SSD	Y	N	Y	Y	Y	Y	Y	Y	Y	N	N
00AJ360	A570	240GB SATA 2.5" MLC HS Enterprise Value SSD	Y	N	Y	Y	Y	Y	Y	Y	Y	N	N
00AJ365	A571	480GB SATA 2.5" MLC HS Enterprise Value SSD	Y	N	Y	Y	Y	Y	Y	Y	Y	N	N
00AJ370	A572	800GB SATA 2.5" MLC HS Enterprise Value SSD	Y	N	Y	Y	Y	Y	Y	Y	Y	N	N
2.5-inch hot-swap SSDs - 6 Gb SATA - Enterprise Entry (<3 DWPD)													
01GR726	AUEM	Intel S3520 240GB Enterprise Entry SATA G3HS 2.5" SSD	N	N	N	N	N	Y	Y	N	N	N	Y
01GR731	AUEP	Intel S3520 480GB Enterprise Entry SATA G3HS 2.5" SSD	N	N	N	N	N	Y	Y	N	N	N	Y
01GR736	AUER	Intel S3520 960GB Enterprise Entry SATA G3HS 2.5" SSD	N	N	N	N	N	Y	Y	N	N	N	Y
01GR836	AVHP	PM863a 240GB Enterprise Entry SATA G3HS 2.5" SSD	N	N	N	N	N	Y	Y	N	N	N	N
01GR841	AVHQ	PM863a 480GB Enterprise Entry SATA G3HS 2.5" SSD	N	N	N	N	N	Y	Y	N	N	N	N

Part number	FC	Description	x220 (7906)	x222 (7916)	x240 (8737, E5-2600)	x240 (8737, E5-2600 v2)	x240 (7162)	x240 M5 (9532, E5 v3)	x240 M5 (9532, E5 v4)	x440 (7917)	x440 (7167)	x280/x480/x880 X6 (7903)	x280/x480/x880 X6 (7196)
01GR846	AVHR	PM863a 960GB Enterprise Entry SATA G3HS 2.5" SSD	N	N	N	N	N	Y	Y	N	N	N	N
01GR711	AUE7	1.92TB Enterprise Entry SATA G3HS 2.5" SSD (PM863a)	N	N	N	N	N	Y	Y	N	N	N	Y
00WG620[a]	AT93	Intel S3510 120GB Enterprise Entry SATA G3HS 2.5" SSD	N	N	Y	Y	N	Y	Y	N	N	N	Y
00WG625[a]	AT94	Intel S3510 240GB Enterprise Entry SATA G3HS 2.5" SSD	N	N	Y	Y	N	Y	Y	N	N	N	Y
00WG630	AT95	Intel S3510 480GB Enterprise Entry SATA G3HS 2.5" SSD	N	N	Y	Y	N	Y	Y	N	N	N	Y
00WG635	AT96	Intel S3510 800GB Enterprise Entry SATA G3HS 2.5" SSD	N	N	Y	Y	N	Y	Y	N	N	N	Y
00AJ171[a]	A4U6	S3500 120GB Enterprise Value SATA G3HS 2.5" SSD	N	N	N	N	N	Y	Y	N	N	N	N
00AJ176[a]	A4U7	S3500 240GB Enterprise Value SATA G3HS 2.5" SSD	N	N	N	N	N	Y	Y	N	N	N	N
00AJ181[a]	A4U8	S3500 480GB Enterprise Value SATA G3HS 2.5" SSD	N	N	N	N	N	Y	Y	N	N	N	N
00AJ186[a]	A4U9	S3500 800GB Enterprise Value SATA G3HS 2.5" SSD	N	N	N	N	N	Y	Y	N	N	N	N
00FN278[a]	A5U6	S3500 1.6TB SATA 2.5" MLC G3HS Enterprise Value SSD	N	N	N	N	N	N	N	N	N	Y	N
00AJ000[a]	A4KM	S3500 120GB SATA 2.5" MLC HS Enterprise Value SSD	Y	N	Y	Y	Y	N	N	Y	Y	N	N
00AJ005	A4KN	S3500 240GB SATA 2.5" MLC HS Enterprise Value SSD	Y	N	Y	Y	Y	N	N	Y	Y	N	N
00AJ010[a]	A4KP	S3500 480GB SATA 2.5" MLC HS Enterprise Value SSD	Y	N	Y	Y	Y	N	N	Y	Y	N	N
00AJ015	A4KQ	S3500 800GB SATA 2.5" MLC HS Enterprise Value SSD	Y	N	Y	Y	Y	N	N	Y	Y	N	N
00FN268[a]	A5U4	S3500 1.6TB SATA 2.5" MLC HS Enterprise Value SSD	N	N	Y	Y	Y	N	N	N	Y	N	N
00YC385	AT8R	120GB Enterprise Entry SATA G3HS 2.5" SSD	N	N	N	N	N	Y	Y	N	N	N	Y
00YC390	AT8S	240GB Enterprise Entry SATA G3HS 2.5" SSD	N	N	N	N	N	Y	Y	N	N	N	Y
00YC395	AT8T	480GB Enterprise Entry SATA G3HS 2.5" SSD	N	N	N	N	N	Y	Y	N	N	N	Y
00YC400	AT8U	960GB Enterprise Entry SATA G3HS 2.5" SSD	N	N	N	N	N	Y	Y	N	N	N	Y

a. Withdrawn from marketing

Table 2-18 2.5-inch hot-swap NVMe SSDs

Part number	FC	Description	x220 (7906)	x222 (7916)	x240 (8737, E5-2600)	x240 (8737, E5-2600 v2)	x240 (7162)	x240 M5 (9532, E5 v3)	x240 M5 (9532, E5 v4)	x440 (7917)	x440 (7167)	x280/x480/x880 X6 (7903)	x280/x480/x880 X6 (7196)
2.5-inch hot-swap SSDs - NVMe - Enterprise Performance (10+ DWPD)													
00YA818	AT7V	Intel P3700 400GB NVMe 2.5" G3HS Enterprise Performance PCIe SSD	N	N	N	N	N	Y	Y	N	N	N	N
00YA821	AT7W	Intel P3700 800GB NVMe 2.5" G3HS Enterprise Performance PCIe SSD	N	N	N	N	N	Y	Y	N	N	N	N
00YA824	AT7X	Intel P3700 1.6TB NVMe 2.5" G3HS Enterprise Performance PCIe SSD	N	N	N	N	N	Y	Y	N	N	N	N
00YA827	AT7Y	Intel P3700 2.0TB NVMe 2.5" G3HS Enterprise Performance PCIe SSD	N	N	N	N	N	Y	Y	N	N	N	N
2.5-inch hot-swap SSDs - NVMe - Enterprise Mainstream (3-5 DWPD)													
90Y3227	A5RW	Intel P3600 400GB NVMe 2.5" G3HS Enterprise Value PCIe SSD	N	N	N	N	N	Y	Y	N	N	N	N
90Y3230	A5RX	Intel P3600 800GB NVMe 2.5" G3HS Enterprise Value PCIe SSD	N	N	N	N	N	Y	Y	N	N	N	N
90Y3233	A5RY	Intel P3600 1.6TB NVMe 2.5" G3HS Enterprise Value PCIe SSD	N	N	N	N	N	Y	Y	N	N	N	N
90Y3236	A5RZ	Intel P3600 2.0TB NVMe 2.5" G3HS Enterprise Value PCIe SSD	N	N	N	N	N	Y	Y	N	N	N	N
00YK285	AVP2	1.92TB NVMe 2.5" Enterprise Mainstream PCIe SSD	N	N	N	N	N	Y	Y	N	N	N	N
00YK284	AVP1	960GB NVMe 2.5" Enterprise Mainstream PCIe SSD	N	N	N	N	N	Y	Y	N	N	N	N

2.4.3 Drives for Flex System x86 compute nodes: 1.8-inch drives

The x86 compute nodes support 1.8-inch solid-state drives as listed in Table 2-19.

Table 2-19 1.8-inch SSDs

Part number	FC	Description	x220 (7906)	x222 (7916)	x240 (8737, E5-2600)	x240 (8737, E5-2600 v2)	x240 (7162)	x240 M5 (9532, E5 v3)	x240 M5 (9532, E5 v4)	x440 (7917)	x440 (7167)	x280/x480/x880 X6 (7903)	x280/x480/x880 X6 (7196)
1.8-inch hot-swap SSDs - 6 Gb SATA - Enterprise Performance (10+ DWPD)													

Part number	FC	Description	x220 (7906)	x222 (7916)	x240 (8737, E5-2600)	x240 (8737, E5-2600 v2)	x240 (7162)	x240 M5 (9532, E5 v3)	x240 M5 (9532, E5 v4)	x440 (7917)	x440 (7167)	x280/x480/x880 X6 (7903)	x280/x480/x880 X6 (7196)
41Y8366[a]	A4FS	S3700 200GB SATA 1.8" MLC Enterprise SSD	Y	N	N	Y	N	Y	Y	Y	Y	N	Y
41Y8371[a]	A4FT	S3700 400GB SATA 1.8" MLC Enterprise SSD	Y	N	N	Y	N	Y	Y	Y	Y	N	Y
1.8-inch hot-swap SSDs - 6 Gb SATA - Enterprise Mainstream (3-5 DWPD)													
00AJ335[a]	A56V	120GB SATA 1.8" MLC Enterprise Value SSD	N	Y	Y	Y	N	Y	Y	N	Y	N	N
00AJ340	A56W	240GB SATA 1.8" MLC Enterprise Value SSD	N	Y	Y	Y	N	Y	Y	N	Y	N	N
00AJ345[a]	A56X	480GB SATA 1.8" MLC Enterprise Value SSD	N	Y	Y	Y	N	Y	Y	N	Y	N	N
00AJ350[a]	A56Y	800GB SATA 1.8" MLC Enterprise Value SSD	N	Y	Y	Y	N	Y	Y	N	Y	N	N
1.8-inch hot-swap SSDs - 6 Gb SATA - Enterprise Entry (<3 DWPD)													
00AJ040[a]	A4KV	S3500 80GB SATA 1.8" MLC Enterprise Value SSD	Y	Y	N	Y	N	Y	Y	Y	Y	N	Y
00AJ050[a]	A4KX	S3500 400GB SATA 1.8" MLC Enterprise Value SSD	Y	Y	N	Y	N	Y	Y	Y	Y	N	Y
00AJ455[a]	A58U	S3500 800GB SATA 1.8" MLC Enterprise Value SSD	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y

a. Withdrawn from marketing

2.4.4 ServeRAID M5115 support

The x880 / x480 / x280 X6 compute nodes support 1.8-inch drives using the onboard disk controller by simply replacing the backplane.

The x220, x240 and x440 support 1.8-inch drives with the addition of the ServeRAID M5115 RAID controller plus the appropriate enablement kits. For details about configurations, see the Lenovo Press Product Guide *ServeRAID M5115 SAS/SATA Controller for IBM Flex System*, available at http://lenovopress.com/tips0884.

Tip: The ServeRAID M5115 RAID controller is installed in I/O expansion slot 1 but can be installed along with the Compute Node Fabric Connector (aka periscope connector) used to connect the onboard Ethernet controller to the chassis midplane.

Table 2-20 on page 32 lists the supported enablement kits and Features on Demand upgrades.

Table 2-20 ServeRAID M5115 compatibility

Part number / Feature code	Description	x220 (7906)	x222 (7916)	x240 (8737, v1)	x240 (8737, v2)	x240 (7162, v2)	x240 M5 (9532)	x440 (7917, v1)	x440 (7167, v2)	X6 (7903)	X6 (7196)
90Y4390 / A2XW	ServeRAID M5115 SAS/SATA Controller	Y	N	Y	Y	Y	N	Y	Y	N	Y
Hardware enablement kits - Flex System x220 Compute Node											
90Y4424 / A35L[a]	ServeRAID M5100 Enablement Kit for x220	Y	N	N	N	N	N	N	N	N	N
90Y4425 / A35M[a]	ServeRAID M5100 Flex System Flash Kit for x220	Y[a]	N	N	N	N	N	N	N	N	N
90Y4426 / A35N[a]	ServeRAID M5100 SSD Expansion Kit for x220	Y	N	N	N	N	N	N	N	N	N
Hardware enablement kits - Flex System x240 Compute Node											
90Y4342 / A2XX[a]	ServeRAID M5100 Enablement Kit for x240	N	N	Y	Y	Y	N	N	N	N	N
47C8808 / A47D[a]	ServeRAID M5100 Flex System Flash Kit v2 for x240	N	N	Y	Y	Y	N	N	N	N	N
90Y4391 / A2XZ[a]	ServeRAID M5100 SSD Expansion Kit for x240	N	N	Y[b]	Y[b]	Y[b]	N	N	N	N	N
Hardware enablement kits - Flex System x440 Compute Node											
46C9030 / A3DS	ServeRAID M5100 Enablement Kit for x440	N	N	N	N	N	N	Y	Y	N	N
47C8809 / A47E[a]	ServeRAID M5100 Flex System Flash Kit v2 for x440	N	N	N	N	N	N	Y	Y	N	N
46C9032 / A3DU[a]	ServeRAID M5100 SSD Expansion Kit for x440	N	N	N	N	N	N	Y	Y	N	N
Hardware enablement kits - Flex System X6											
44T1178 / A4DC	ServeRAID M5100 Flex System Flash Kit for X6	N	N	N	N	N	N	N	N	N	Y
Feature on-demand licenses (for all three compute nodes)											
90Y4410 / A2Y1[a]	ServeRAID M5100 RAID 6 Upgrade	Y	N	Y	Y	Y	N	Y	Y	N	Y
90Y4412 / A2Y2	ServeRAID M5100 Performance Upgrade	Y	N	Y	Y	Y	N	Y	Y	N	Y
90Y4447 / A36G[a]	ServeRAID M5100 SSD Caching Enabler	Y	N	Y	Y	Y	N	Y	Y	N	N

a. Withdrawn from marketing

b. If the ServeRAID M5100 Series SSD Expansion Kit (90Y4391) is installed, the x240 USB Enablement Kit (49Y8119) can't also be installed. Both the x240 USB Enablement Kit and the SSD Expansion Kit both include special air baffles that can't be installed at the same time.

2.4.5 Drives for Power Systems compute nodes

Local storage options for Power Systems compute nodes are shown in Table 2-21. None of the available drives are hot-swappable. The local drives (HDD or SDD) are mounted to the top cover of the system. If you use local drives, you must order the appropriate cover with connections for your wanted drive type as listed in Table 2-22. The maximum number of drives that can be installed in any Power Systems compute node is two. SSD and HDD drives cannot be mixed.

Table 2-21 Local storage options for Power Systems compute nodes

e-config feature	Description	p24L 7FL	p260 22X	p260 23A	p260 23X	p460 42X	p460 43X	p270 24X
2.5 inch SAS HDDs								
8274	300 GB 10K RPM non-hot-swap 6 Gbps SAS	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8276	600 GB 10K RPM non-hot-swap 6 Gbps SAS	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8311	900 GB 10K RPM non-hot-swap 6 Gbps SAS	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1.8 inch SSDs								
8207	177 GB SATA non-hot-swap SSD	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 2-22 lists the top cover options. You must select the cover feature that matches the drives you want to install: 2.5-inch drives, 1.8-inch drives, or no drives.

Table 2-22 Top cover options for Power Systems compute nodes

Feature code	Description	p24L All	p260 All	p270 All	p460 All
Cover features for systems with 2.5-inch drives					
7069	Top cover with 2.5-inch HDD connectors for the p24L, p260, p270	Yes	Yes	Yes	No
7066	Top cover with 2.5-inch HDD connectors for the p460	No	No	No	Yes
Cover features for systems with 1.8-inch drives					
7068	Top cover with 1.8-inch SSD connectors for the p24L, p260, p270	Yes	Yes	Yes	No
7065	Top Cover with 1.8-inch SSD connectors for p460	No	No	No	Yes
No drives					
7067	Top cover for no drives on the p24L, p260, p270	Yes	Yes	Yes	No
7005	Top cover for no drives on the p460	No	No	No	Yes

2.5 M.2 Adapters, SD Media Adapters, USB Hypervisors

ThinkSystem compute nodes support M.2 drives installed in an M.2 adapter. M.2 drives can support booting an operating system, and can be pre-loaded from the factory with VMware ESXi.

All Flex System x86 compute nodes, with the exception of the x240 M5, support a USB flash drive (USB Memory Key) option preinstalled with VMware ESXi or VMware vSphere. The x240 M5 instead supports VMware vSphere installed on SD cards using the SD Media Adapter for System x.

The VMware vSphere hypervisor with Lenovo customizations can be downloaded from the following web pages:

- VMware ESXi custom images for ESXi 6.5

  https://my.vmware.com/web/vmware/info/slug/datacenter_cloud_infrastructure/vmware_vsphere/6_5#custom_iso

- VMware ESXi custom images for ESXi 6.0

  https://my.vmware.com/web/vmware/info/slug/datacenter_cloud_infrastructure/vmware_vsphere/6_0#custom_iso

- VMware ESXi custom images for ESXi 5.5

  https://my.vmware.com/web/vmware/info/slug/datacenter_cloud_infrastructure/vmware_vsphere/5_5#custom_iso

- VMware ESXi custom images for ESXi 5.1

  https://my.vmware.com/web/vmware/info/slug/datacenter_cloud_infrastructure/vmware_vsphere/5_1#custom_iso

2.5.1 M.2 cards

ThinkSystem compute nodes support M.2 drives as follows:

- The Dual M.2 Adapter supports two M.2 drives in a RAID-1 redundant configuration
- The Single M.2 Adapter supports one M.2 drive

Table 2-23 M.2 adapter and M.2 drive support

Part number	Feature code	Description	SN550 (7X16)	SN850 (7X15)
7Y37A01092	AUMU	ThinkSystem M.2 Enablement Kit (Single M.2 Adapter supporting one M.2 card)	N	Y
7Y37A01093	AUMV	ThinkSystem M.2 with Mirroring Enablement Kit (Dual M.2 Adapter supporting two M.2 cards)	Y	Y
7N47A00129	AUUL	ThinkSystem M.2 CV1 32GB SATA 6Gbps Non-Hot Swap SSD	Y	Y
7N47A00130	AUUV	ThinkSystem M.2 CV3 128GB SATA 6Gbps Non-Hot Swap SSD	Y	Y

2.5.2 USB memory key options

On the x240 the USB memory keys plug into the USB ports on the optional x240 USB Enablement Kit. On other compute nodes, the USB memory keys plug directly into USB ports on the system board.

x240 M5: This section does not apply to the x240 M5. The x240 M5 instead offers hypervisor support via SD Cards. See 2.5.3, “SD Media Adapter options” on page 36.

There are two types of USB keys, preloaded keys or blank keys. Blank keys allow you to download a Lenovo customized version of ESXi and load it onto the key. The x86 compute nodes (including each of the servers in the x222) support one or two keys installed, but only certain combinations:

Supported combinations:

- One preload key
- One blank key
- One preload key and one blank key
- Two blank keys

Unsupported combinations:

- Two preload keys

Installing two preloaded keys will prevent ESXi from booting as described in http://kb.vmware.com/kb/1035107. Having two keys installed provides a backup boot device. Both devices are listed in the boot menu, which allows you to boot from either device or to set one as a backup in case the first one gets corrupted.

Table 2-24 lists the ordering information for the VMware hypervisor options.

ThinkSystem compute nodes: ThinkSystem compute nodes do not support USB hypervisor keys

Table 2-24 USB Memory Key for VMware hypervisors

Part number	Feature code	Description	x220	x222	x240 (E5-2600)	x240 (E5-2600 v2)	x240 M5 (v3 & v4)	x440 (E5-4600)	x440 (E5-4600 v2)	X6 (7903)	X6 (7196)
49Y8119	A3A3[a]	x240 USB Enablement Kit	N	N	Y[b]	Y[b]	N	N	N	N	N
41Y8300	A2VC	USB Memory Key for VMware ESXi 5.0	Y	N	Y	Y	N	Y	Y	Y	N
41Y8307	A383	USB Memory Key for VMware ESXi 5.0 Update1	Y	Y	Y	Y	N	Y	Y	Y	N
41Y8311	A2R3	USB Memory Key for VMware ESXi 5.1	Y	Y	Y	Y	N	Y	Y	Y	N
41Y8382	A4WZ	USB Memory Key for VMware ESXi 5.1 Update 1	Y	Y	Y	Y	N	Y	Y	N	N
41Y8385	A584	USB Memory Key for VMware ESXi 5.5	N	Y	Y	Y	N	Y	Y	Y	N
00WH150	ATZG	USB Memory Key for VMware ESXi 5.5 Update 3B	N	N	N	N	N	N	N	N	Y

Part number	Feature code	Description	x220	x222	x240 (E5-2600)	x240 (E5-2600 v2)	x240 M5 (v3 & v4)	x440 (E5-4600)	x440 (E5-4600 v2)	X6 (7903)	X6 (7196)
00WH138	ATRL	USB Memory Key 4G for VMware ESXi 6.0 Update 1A	N	N	N	N	N	N	N	N	Y
00WH151	ATZH	USB Memory Key for VMware ESXi 6.0 Update 2	N	N	N	N	N	N	N	N	Y
CTO only	AVNW	USB Memory Key for VMware ESXi 6.5	N	N	N	N	N	N	N	N	Y
41Y8298	A2G0	Blank USB Memory Key for ESXi Downloads	Y	Y	Y	Y	N	Y	Y	Y	Y
00WH140	ATRM	Blank USB Memory Key 4G SLC for VMware ESXi Downloads	N	N	N	N	N	N	N	N	Y

a. Replaces feature code A33M which is withdrawn from marketing

b. If the x240 USB Enablement Kit (49Y8119) is installed, the ServeRAID M5100 Series SSD Expansion Kit (90Y4391) cannot also be installed. Both the x240 USB Enablement Kit and the SSD Expansion Kit both include special air baffles that cannot be installed at the same time.

You can use the Blank USB Memory Key, 41Y8298, to use any available Lenovo customized version of the VMware hypervisor.

2.5.3 SD Media Adapter options

The x240 M5 (E5-2600 v3 and v4 processors) supports the VMware vSphere (ESXi) hypervisor on one or two SD cards with the optional SD Media Adapter for System x. With two SD cards, the SD Media Adapter supports RAID-1. The SD Media Adapter is installed in a dedicated slot under I/O Adapter slot 1.

Table 2-25 shows the available options. The table also indicates whether the option includes the SD Media RAID Adapter and how many SD cards are included.

ThinkSystem compute nodes: ThinkSystem compute nodes do not support SD Media Adapter options.

Table 2-25 Virtualization options for the x240 M5

Part number	Feat. code	Description	Includes Adapter	Includes Media
00ML706	A5TJ	SD Media Adapter for Systems x (Option 00ML706 includes 2 blank 32GB SD cards)	Yes	Yes (2)[a]
00ML700	AS2V	Blank 32GB SD Media for System x	No	Yes (1)
None[b]	AS4B	RAID Adapter for SD Media w/ VMware ESXi 5.1 U2 (2 SD Media, RAIDed)	Yes	Yes (2)
None[b]	ASCG	RAID Adapter for SD Media w/ VMware ESXi 5.1 U2 (1 SD Media)	Yes	Yes (1)
None[b]	AS4C	RAID Adapter for SD Media w/ VMware ESXi 5.5 U2 (2 SD Media, RAIDed)	Yes	Yes (2)
None[b]	ASCH	RAID Adapter for SD Media w/ VMware ESXi 5.5 U2 (1 SD Media)	Yes	Yes (1)

Part number	Feat. code	Description	Includes Adapter	Includes Media
None[b]	ATZJ	RAID Adapter for SD Media w/ VMware ESXi 5.5 U3A (2 SD Media, RAIDed)	Yes	Yes (2)
None[b]	ATSA	RAID Adapter for SD Media w/ VMware ESXi 6.0 U1A (1 SD Media)	Yes	Yes (1)
None	AVNX	Adapter for SD Media w/ VMware ESXi 6.5 (1 SD Media)	Yes	Yes (1)
None	AVNY	Adapter for SD Media w/ VMware ESXi 6.5 (2 SD Media, RAIDed)	Yes	Yes (2)

a. Option 00ML706 includes two 32GB SD cards; however, for CTO orders, feature code A5TJ does not include SD media and the 32GB cards and VMware vSphere preload must be selected separately.
b. CTO only.

2.5.4 Power Systems compute nodes

Power Systems compute nodes do not support VMware ESXi installed on a USB Memory Key. Power Systems compute nodes support IBM PowerVM as standard.

These servers do support virtual servers, also known as logical partitions or LPARs. The maximum number of virtual servers is 10 times or 20 times the number of cores in the compute node depending on the server:

- p24L: Up to 160 virtual servers (10 x 16 cores)
- p260: Up to 160 virtual servers (10 x 16 cores)
- p460: Up to 320 virtual servers (10 x 32 cores)
- p270: Up to 480 virtual servers (20 x 24 cores)

2.6 Expansion node compatibility

This section describes the components that are compatible with the PCIe Expansion Node (PEN) and the Storage Expansion Node (SEN).

2.6.1 Compute nodes

Table 2-26 lists the expansion nodes and their compatibility with compute nodes.

Power Systems compute nodes: The expansion nodes are not supported with any Power Systems compute nodes.

Table 2-26 I/O adapter compatibility matrix - compute nodes

Part number	Feature code	Description	x220 (7906)	x222 (7916)	x240 (8737, E5-2600)	x240 (8737, E5-2600 v2)	x240 (7162)	x240 M5 (9532, v3 & v4)	x240 M5 NEBS[a]	x440 (7917)	x440 (7167)	x880/x480/x280 X6 (7903)	x280/x480/x880 X6 (7196)	SN550 (7X16)	SN850 (7X15)
81Y8983	A1BV	PCIe Expansion Node	Y[b]	N	Y[b]	Y[b]	Y[b]	Y[bc]	N	N	N	N	N	N	N
68Y8588[d]	A3JF	Storage Expansion Node	Y[b]	N	Y	Y[b]	Y[b]	Y[b]	N	N	N	N	N	N	N

a. The NEBS column indicates support when the compute node is installed in the Carrier-Grade Chassis (v3 processors only)
b. The x220, x240, and x240 M5 require the second processor be installed to support expansion nodes
c. NVIDIA adapters are only supported in the PCIe Expansion Node attached to an x240 M5 when the server has 1 TB or less of memory installed
d. Withdrawn from marketing

2.6.2 Flex System I/O adapters - PCIe Expansion Node

The PCIe Expansion Node supports the adapters listed in Table 2-27 on page 39.

Storage Expansion Node: The Storage Expansion Node does not include connectors for additional I/O adapters.

Table 2-27 I/O adapter compatibility matrix - expansion nodes

Part number	Feature code	I/O adapters	Supported in PCIe Expansion Node
Converged Network adapters			
88Y5920	A4K3	CN4022 2-port 10Gb Converged Adapter	Yes
00JY800	A5RP	CN4052 2-port 10Gb Virtual Fabric	Yes
00AG540	ATBT	CN4052S 2-port 10Gb Virtual Fabric Adapter	Yes[b]
00JY804	A5RV	CN4052 Virtual Fabric Adapter SW Upgrade (FoD)[a]	Yes
90Y3554[c]	A1R1	CN4054 10Gb Virtual Fabric Adapter	Yes[b]
00Y3306[c]	A4K2	CN4054R 10Gb Virtual Fabric Adapter	Yes[b]
00AG590	ATBS	CN4054S 4-port 10Gb Virtual Fabric Adapter	Yes[b]
90Y3558	A1R0	CN4054 Virtual Fabric Adapter SW Upgrade (FoD)[a]	Yes
None	None	CN4058 8-port 10Gb Converged Adapter	No
94Y5160	A4R6	CN4058S 8-port 10Gb Virtual Fabric	Yes
94Y5164	A4R9	CN4058S Virtual Fabric Adapter SW Upgrade (FoD)[a]	Yes
Ethernet adapters			
49Y7900	A10Y	EN2024 4-port 1Gb Ethernet Adapter	Yes
None[c]	None	EN4054 4-port 10Gb Ethernet Adapter	No
90Y3466	A1QY	EN4132 2-port 10 Gb Ethernet Adapter	Yes[b]
None	None	EN4132 2-port 10Gb RoCE Adapter	No
00AG530	A5RN	EN4172 2-port 10Gb Ethernet Adapter	Yes
90Y3482	A3HK	EN6132 2-port 40Gb Ethernet Adapter	No
7ZT7A00502	AVCU	ThinkSystem Mellanox ConnectX-3 Mezz 40Gb 2-Port Ethernet Adapter	No
Fibre Channel adapters			
69Y1938	A1BM	FC3172 2-port 8Gb FC Adapter	Yes
95Y2375	A2N5	FC3052 2-port 8Gb FC Adapter	Yes
88Y6370[c]	A1BP	FC5022 2-port 16Gb FC Adapter	Yes
95Y2379[c]	A3HU	FC5024D 4-port 16Gb FC Adapter	No
95Y2386	A45R	FC5052 2-port 16Gb FC Adapter	Yes
95Y2391	A45S	FC5054 4-port 16Gb FC Adapter	Yes
69Y1942	A1BQ	FC5172 2-port 16Gb FC Adapter	Yes
7ZT7A00521	AVCW	ThinkSystem Emulex LPm16002B-L Mezz 16Gb 2-Port Fibre Channel Adapter	No
7ZT7A00522	AVCX	ThinkSystem Emulex LPm16004B-L Mezz 16Gb 4-Port Fibre Channel Adapter	No

Part number	Feature code	I/O adapters	Supported in PCIe Expansion Node
7ZT7A00520	AVCV	ThinkSystem QLogic QML2692 Mezz 16Gb 2-Port Fibre Channel Adapter	No
InfiniBand adapters			
90Y3454	A1QZ	IB6132 2-port FDR InfiniBand Adapter	Yes
None	None	IB6132 2-port QDR InfiniBand Adapter	No
90Y3486[c]	A365	IB6132D 2-port FDR InfiniBand Adapter	No
7ZT7A00508	AUKV	ThinkSystem Mellanox ConnectX-3 Mezz FDR 2-Port InfiniBand Adapter	No
SAS			
90Y4390	A2XW	ServeRAID M5115 SAS/SATA Controller	No

a. Features on Demand (software) upgrade to enable FCoE and iSCSI on the related adapter. One upgrade needed per adapter.
b. Operates at PCIe 2.0 speeds when installed in the PCIe Expansion Node. For best performance install adapter directly on Compute Node.
c. Withdrawn from marketing

2.6.3 PCIe I/O adapters - PCIe Expansion Node

The PCIe Expansion Node supports for up to four standard PCIe 2.0 adapters:

- Two PCIe 2.0 x16 slots that support full-length, full-height adapters (1x, 2x, 4x, 8x, and 16x adapters supported)
- Two PCIe 2.0 x8 slots that support low-profile adapters (1x, 2x, 4x, and 8x adapters supported)

Storage Expansion Node: The Storage Expansion Node does not include connectors for PCIe I/O adapters.

Table 2-28 on page 41 lists the supported adapters. Some adapters must be installed in one of the full-height slots as noted. Some adapters, such as the NVIDIA Tesla M2090, are double-slot adapters, meaning that another adapter cannot be installed in the other full-height slot. The low-profile slots and Flex System I/O expansion slots can still be used, however.

NVIDIA GPUs: NVIDIA adapters are only supported in servers with 1 TB or less of system memory. This restriction is particularly relevant with the x240 M5 which supports up to 1.5 TB of memory.

Table 2-28 Supported adapter cards

Part number	Feature code	Description	Max supp	x220 (7906)	x240 (8737, E5 v1)	x240 (8737, E5 v2)	x240 (7162)	x240 M5 (9532, E5 v3)	x240 M5 (9532, E5 v4)
Flash Storage Adapters									
00YA800	AT7N	io3 1.25TB Enterprise Mainstream Flash Adapter	4	N	N	N	N	Y	Y
00YA803	AT7P	io3 1.6TB Enterprise Mainstream Flash Adapter	4	N	N	N	N	Y	Y
00YA806	AT7Q	io3 3.2TB Enterprise Mainstream Flash Adapter	4	N	N	N	N	Y	Y
00YA809	AT7R	io3 6.4TB Enterprise Mainstream Flash Adapter	2	N	N	N	N	Y	Y
00YA812	AT7L	Intel P3700 1.6TB NVMe Enterprise Performance Flash Adapter	4	N	N	N	N	Y	Y
00YA815	AT7M	Intel P3700 2.0TB NVMe Enterprise Performance Flash Adapter	4	N	N	N	N	Y	Y
00AE983[a]	ARYK	1250GB Enterprise Value io3 Flash Adapter	4	N	Y	Y	Y	Y	Y
00AE986[a]	ARYL	1600GB Enterprise Value io3 Flash Adapter	4	N	Y	Y	Y	Y	Y
00AE989[a]	ARYM	3200GB Enterprise Value io3 Flash Adapter	4	N	Y	Y	Y	Y	Y
00AE992[a]	ARYN	6400GB Enterprise Value io3 Flash Adapter	2	N	Y	Y	Y	Y	Y
00AE995	ARYP	1000GB Enterprise io3 Flash Adapter	4	N	Y	Y	Y	Y	Y
00AE998	ARYQ	1300GB Enterprise io3 Flash Adapter	4	N	Y	Y	Y	Y	Y
00JY001	ARYR	2600GB Enterprise io3 Flash Adapter	4	N	Y	Y	Y	Y	Y
00JY004	ARYS	5200GB Enterprise io3 Flash Adapter	2	N	Y	Y	Y	Y	Y
46C9078[a]	A3J3	365GB High IOPS MLC Mono Adapter (LP adapter)	4	Y	Y	Y	Y	Y	Y
46C9081[a]	A3J4	785GB High IOPS MLC Mono Adapter (LP adapter)	4	Y	Y	Y	Y	Y	Y
90Y4377[a]	A3DY	1.2TB High IOPS MLC Mono Adapter (LP adapter)	2	Y	Y	Y	Y	Y	Y
90Y4397[a]	A3DZ	2.4TB High IOPS MLC Duo Adapter (FH adapter)	2	Y	Y	Y	Y	Y	Y
GPUs									
47C2122[a]	A4F4	Intel Xeon Phi 5110P for PCIe Expansion Node	1[b]	Y	Y	Y	Y	Y	Y
94Y5960[a]	A1R4	NVIDIA Tesla M2090 (full-height adapter)	1[bc]	Y	Y	Y	Y	Y	Y
47C2119[a]	A4F3	NVIDIA Tesla K20 for PCIe Expansion Node	1[bc]	Y	Y	Y	Y	Y	Y
47C2120[a]	A4F1	NVIDIA GRID K1 for PCIe Expansion Node	1[bc]	Y	Y	Y	Y	Y	Y
47C2121[a]	A4F2	NVIDIA GRID K2 for PCIe Expansion Node	1[bc]	Y	Y	Y	Y	Y	Y
47C2137	A5HD	NVIDIA Tesla K40 for PCIe Expansion Node	1[bc]	Y	Y	Y	Y	Y	Y
7C57A02891	AX8L	NVIDIA Tesla M10 GPU, PCIe (passive)	1[c]	N	N	N	N	N	Y

a. Withdrawn from marketing

b. If this adapter is installed in the Expansion Node, then another adapter cannot be installed in the other full-height slot. The low-profile slots and Flex System I/O expansion slots can still be used
c. NVIDIA adapters supported only in servers with 1 TB or less memory installed

Consult the ServerProven® site for the current list of adapter cards that are supported in the Expansion Node:

http://www.lenovo.com/us/en/serverproven/flexsystem.shtml

Note: Although the design of Expansion Node allows for a much greater set of standard PCIe adapter cards, the preceding table lists the adapters that are specifically supported. If the PCI Express adapter that you require is not on the ServerProven web site, use the ServerProven Opportunity Request for Evaluation (SPORE) process to confirm compatibility in the desired configuration.

2.6.4 Internal storage - Storage Expansion Node

The Storage Expansion Node adds 12 drive bays to the attached compute node. The expansion node supports 2.5-inch drives, either HDDs or SSDs.

PCIe Expansion Node: The PCIe Expansion Node does not support any drives.

Table 2-29 and Table 2-30 on page 43 show the hard disk drives and solid state drives supported within the Storage Expansion Node. Drive support is dependent on the compute node that is attached to the expansion node.

Both SSD and HDD can be installed inside the unit at the same time, although as per best practice it is recommended that logical drives are created of similar type of disks. ie for a RAID-1 pair, choose identical drive types, SSD or HDD.

Table 2-29 HDD support in the Storage Expansion Node

Part number	Feature code	Description	x220 (7906)	x240 (8737, E5-2600)	x240 (8737, E5-2600 v2)	x240 (7162)	x240 M5 (9532)
2.5-inch hot-swap HDDs - 6 Gb SAS 10K							
90Y8877	A2XC	300GB 10K 6Gbps SAS 2.5" SFF G2HS HDD	Y	Y	Y	Y	Y
90Y8872	A2XD	600GB 10K 6Gbps SAS 2.5" SFF G2HS HDD	Y	Y	Y	Y	Y
81Y9650[a]	A282	900GB 10K 6Gbps SAS 2.5" SFF HS HDD	Y	Y	Y	Y	Y
00AD075	A48S	1.2TB 10K 6Gbps SAS 2.5" G2HS HDD	Y	Y	N	Y	N
2.5-inch hot-swap HDDs - 6 Gb SAS 15K							
00AJ300	A4VB	600GB 15K 6Gbps SAS 2.5" G2HS HDD	Y	Y	Y	Y	Y
2.5-inch hot-swap HDDs - 6 Gb NL SATA							
81Y9722[a]	A1NX	250GB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	Y	Y	Y	Y	Y

Part number	Feature code	Description	x220 (7906)	x240 (8737, E5-2600)	x240 (8737, E5-2600 v2)	x240 (7162)	x240 M5 (9532)
81Y9726	A1NZ	500GB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	Y	Y	Y	Y	Y
81Y9730	A1AV	1TB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	Y	Y	Y	Y	Y
2.5-inch hot-swap SED HDDs - 6 Gb SAS 10K							
00AD085[a]	A48T	1.2TB 10K 6Gbps SAS 2.5" G2HS SED	Y	Y	Y	Y	N

a. Withdrawn from marketing

Table 2-30 SSD support in the Storage Expansion Node

Part number	Feature code	Description	x220 (7906)	x240 (8737, E5-2600)	x240 (8737, E5-2600 v2)	x240 (7162)	x240 M5 (9532)
2.5-inch hot-swap SSDs - 6 Gb SAS - Enterprise Performance (10+ DWPD)							
49Y6129	A3EW	200GB SAS 2.5" MLC HS Enterprise SSD	Y	N	N	Y	N
49Y6134	A3EY	400GB SAS 2.5" MLC HS Enterprise SSD	Y	N	N	Y	N
49Y6139	A3F0	800GB SAS 2.5" MLC HS Enterprise SSD	Y	N	N	Y	N
49Y6195	A4GH	1.6TB SAS 2.5" MLC HS Enterprise SSD	Y	Y	Y	Y	N
2.5-inch hot-swap SSDs - 6 Gb SATA - Enterprise Performance (10+ DWPD)							
41Y8331[a]	A4FL	S3700 200GB SATA 2.5" MLC HS Enterprise SSD	Y	Y	Y	Y	N
41Y8336[a]	A4FN	S3700 400GB SATA 2.5" MLC HS Enterprise SSD	Y	Y	Y	Y	N
41Y8341[a]	A4FQ	S3700 800GB SATA 2.5" MLC HS Enterprise SSD	Y	Y	Y	Y	N
2.5-inch hot-swap SSDs - 6 Gb SATA - Enterprise Mainstream (3-5 DWPD)							
00AJ355	A56Z	120GB SATA 2.5" MLC HS Enterprise Value SSD	Y	Y	Y	Y	Y
00AJ360	A570	240GB SATA 2.5" MLC HS Enterprise Value SSD	Y	Y	Y	Y	Y
00AJ365	A571	480GB SATA 2.5" MLC HS Enterprise Value SSD	Y	Y	Y	Y	Y
00AJ370	A572	800GB SATA 2.5" MLC HS Enterprise Value SSD	Y	Y	Y	Y	Y
2.5-inch hot-swap SSDs - 6 Gb SATA - Enterprise Entry (<3 DWPD)							
00AJ000[a]	A4KM	S3500 120GB SATA 2.5" MLC HS Enterprise Value SSD	Y	Y	Y	Y	N

Part number	Feature code	Description	x220 (7906)	x240 (8737, E5-2600)	x240 (8737, E5-2600 v2)	x240 (7162)	x240 M5 (9532)
00AJ005	A4KN	S3500 240GB SATA 2.5" MLC HS Enterprise Value SSD	Y	Y	Y	Y	N
00AJ010[a]	A4KP	S3500 480GB SATA 2.5" MLC HS Enterprise Value SSD	Y	Y	Y	Y	N
00AJ015	A4KQ	S3500 800GB SATA 2.5" MLC HS Enterprise Value SSD	Y	Y	Y	Y	N
00FN268[a]	A5U4	S3500 1.6TB SATA 2.5" MLC HS Enterprise Value SSD	Y	N	N	N	N

a. Withdrawn from marketing

2.6.5 RAID upgrades - Storage Expansion Node

The Storage Expansion Node supports the RAID upgrades listed in Table 2-31.

PCIe Expansion Node: The PCIe Expansion Node does not support any of these upgrades.

The use of any of the Features on Demand upgrade requires that either the 1 GB cache (81Y4559) or 512 MB cache (81Y4487) be configured.

Table 2-31 FOD options available for the Storage Expansion Node

System x part number	Feature code[a]	Description
Hardware upgrades		
81Y4559	A1WY	ServeRAID M5100 Series 1GB Flash/RAID 5 Upgrade for System x
81Y4487	A1J4	ServeRAID M5100 Series 512MB Flash/RAID 5 Upgrade for System x
Features on Demand upgrades (license only)		
90Y4410[bc]	A2Y1	ServeRAID M5100 Series RAID 6 Upgrade for Flex System
90Y4447[bc]	A36G	ServeRAID M5100 Series SSD Caching Enabler for Flex System
90Y4412[b]	A2Y2	ServeRAID M5100 Series Performance Accelerator for Flex System

a. This column lists the feature codes for all x86 compute nodes for both XCC (x-config) and AAS (e-config), except for x240 model 7863-10X (AAS). None of these features are orderable with 7863-10X.
b. Requires either the 1 GB cache (81Y4559) or 512 MB cache (81Y4487).
c. Withdrawn from marketing

2.7 External USB device support

Use this information to determine which USB devices are supported for use with these Power Systems compute nodes:

- Flex System p260 Compute Node
- Flex System p270 Compute Node
- Flex System p460 Compute Node
- Flex System p24L Compute Node

In this section:

2.7.1 Supported USB devices

Table 2-32 shows the USB devices supported for direct attach to Power Systems compute nodes.

Table 2-32 USB devices supported for direct attach to Power Systems compute nodes

Feature code	Description	AIX and VIOS	Linux	VIOS clients: AIX and Linux	VIOS clients: IBM i
1104	RDX USB external dock	Yes[a,b]	Yes	No[b]	No
EU04	RDX USB external dock	Yes[a,b]	Yes	No[b]	No
1106	160 GB RDX removable disk drive	Yes[a,b]	Yes	No[b]	No
1107	500 GB RDX removable disk drive	Yes[a,b]	Yes	No[b]	No
EU01	1 TB RDX removable disk drive	Yes[a,b]	Yes	No[b]	No
EU08	320 GB RDX removable disk drive	Yes[a,b]	Yes	No[b]	No
EU15	1.5 TB RDX removable disk drive	Yes[a,b]	Yes	No[b]	No

a. The AIX operating system supports the mksysb (system backup/restore) operations by using any of the USB removable media types. The AIX operating system does not support using a USB device as a target for an AIX operating system installation. The AIX operating system and VIOS only support writing to DVD-RAM media, but can read all optical media formats through the read interface of the device driver.

b. Only USB tape drives and USB DVD-RAM drives can be virtual devices in a client partition. For all other USB devices, the USB controller must be assigned to a partition for the partition to have access to the USB device.

Table 2-33 lists the USB devices supported for use in the IBM 7226 Multimedia Storage Enclosure Model 1U3 (7226-1U3).

Table 2-33 USB devices supported for use in the IBM 7226 Multimedia Storage Enclosure Model 1U3 (7226-1U3)

Feature code	Description	AIX and VIOS	Linux	VIOS clients: AIX and Linux	VIOS clients: IBM i
1103	RDX USB internal dock	Yes[a,b]	Yes	No[b]	No
EU03	RDX USB internal dock	Yes[a,b]	Yes	No[b]	No
EU16	DAT160 USB tape drive	Yes[a]	Yes	Yes[b]	Yes
5762	SATA Slimline USB DVD-RAM drive	Yes[a]	Yes	Yes[b]	Yes
5757	IDE Slimline USB DVD-RAM drive	Yes[a]	Yes	Yes[b]	Yes

a. The AIX operating system supports the mksysb (system backup/restore) operations by using any of the USB removable media types. The AIX operating system does not support using a USB device as a target for an AIX operating system installation. The AIX operating system and VIOS only support writing to DVD-RAM media, but can read all optical media formats through the read interface of the device driver.
b. Only USB tape drives and USB DVD-RAM drives can be virtual devices in a client partition. For all other USB devices, the USB controller must be assigned to a partition for the partition to have access to the USB device.

2.7.2 Supported OEM USB devices

Table 2-34 lists the OEM USB device types can attach to the Power Systems compute nodes. Due to the large number of manufacturers of these devices, not every device can be guaranteed support.

External power: OEM USB DVD-RAM, tape, and RDX drives must use an external power supply.

Table 2-34 OEM USB devices that can attach to the Power Systems compute nodes

Description	AIX and VIOS	Linux	VIOS clients: AIX and Linux	VIOS clients: IBM i
USB flash drive	Yes[a,b,c]	Yes	No[b]	No
USB DVD-RAM drive with non-USB power source	Yes[a]	Yes	Yes[b]	Yes
USB tape drive with non-USB power source	Yes[a]	Yes	Yes[b]	No
USB RDX device with non-USB power source	Yes[a,b]	Yes	No[b]	No

a. The AIX operating system supports the mksysb (system backup/restore) operations by using any of the USB removable media types. The AIX operating system does not support using a USB device as a target for an AIX operating system installation. The AIX operating system and VIOS only support writing to DVD-RAM media, but can read all optical media formats through the read interface of the device driver.
b. Only USB tape drives and USB DVD-RAM drives can be virtual devices in a client partition. For all other USB devices, the USB controller must be assigned to a partition for the partition to have access to the USB device.
c. Boot from a USB flash drive can only be used for AIX standalone diagnostics or mksysb (system restore). Booting or installing AIX based media from a USB flash drive is not supported.

3

Network interoperability

This chapter describes the network subsystem compatibility.

3.1 Switch to adapter interoperability

In this section, we describe switch to adapter interoperability for Ethernet and InfiniBand switches.

3.1.1 Ethernet switches and adapters

Table 3-1 lists Ethernet switch to card compatibility.

Switch upgrades: To maximize the usable port count on the adapters, the switches may need additional license upgrades. See 3.3, “Network switch upgrades” on page 57 for details.

Table 3-1 Ethernet switch to card compatibility

Switch description **Part number / feature codes**[b] **Adapter description** **Part number / Feature code (XCC) / Feature code (AAS)**[b]	**CN4093 10Gb Switch 00D5823 / A3HH / ESW2**[a]	**Lenovo CN4093 10Gb Switch 00FM510 / ASUT / None**	**EN4093R 10Gb Switch 95Y3309 / A3J6 / ESW7**[a]	**Lenovo EN4093R 10Gb Switch 00FM514 / ASUU / None**	**EN4093 10Gb Switch 49Y4270 / A0TB / 3593**[a]	**Lenovo SI4091 10Gb SIM 00FE327 / ARZM / None**	**SI4093 10Gb SIM 95Y3313 / A45T / ESWA**	**Lenovo SI4093 10Gb SIM 00FM518 / ASUV / None**	**EN2092 1Gb Switch 49Y4294 / A0TF / 3598**	**EN4091 10Gb Pass-thru 88Y6043 / A1QV / 3700**	**Cisco Nexus B22 Extender 94Y5350 / ESWB / ESWB**	**EN4023 10Gb Switch 94Y5212 / ESWD / ESWD**	**EN6131 40Gb Switch 90Y9346 / A3HJ / ESW6**
1 Gb Ethernet adapters													
x220 Onboard 1Gb	Y[c]	Y[c]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
EN2024 4-port 1Gb Ethernet 49Y7900 / A10Y / 1763	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y[d]	Y[d]	Y	N
10 Gb Ethernet adapters													
x222 Onboard 10Gb	Y[f]	Y[f]	Y[f]	Y[f]	Y[f]	Y[f]	Y[f]	Y[e]	Y[f]	N	N	Y	N
x240 Onboard 10Gb	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
x440 Onboard 10Gb	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
X6 Onboard 10Gb	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SN550 Onboard 10Gb	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SN850 Onboard 10Gb	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
CN4022 2-port 10Gb Converged 88Y5920 / A4K3 / A4K3	Y	Y	Y	Y	Y	Y	Y	Y	Y[g]	Y	Y	Y	Y
CN4052 2-port 10Gb VF Adapter 00JY800 / A5RP / None	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
CN4052S 2-port 10Gb VF Adapter 00AG540 / ATBT / None 01CV780 / AU7X / None	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
CN4054 10Gb VF Adapter 90Y3554 / A1R1 / 1759[a]	Y	Y	Y	Y	Y	Y[d]	Y	Y	Y	Y[d]	Y[d]	Y	Y

Switch description Part number / feature codes[b] Adapter description Part number / Feature code (XCC) / Feature code (AAS)[b]	CN4093 10Gb Switch 00D5823 / A3HH / ESW2[a]	Lenovo CN4093 10Gb Switch 00FM510 / ASUT / None	EN4093R 10Gb Switch 95Y3309 / A3J6 / ESW7[a]	Lenovo EN4093R 10Gb Switch 00FM514 / ASUU / None	EN4093 10Gb Switch 49Y4270 / A0TB / 3593[a]	Lenovo SI4091 10Gb SIM 00FE327 / ARZM / None	SI4093 10Gb SIM 95Y3313 / A45T / ESWA	Lenovo SI4093 10Gb SIM 00FM518 / ASUV / None	EN2092 1Gb Switch 49Y4294 / A0TF / 3598	EN4091 10Gb Pass-thru 88Y6043 / A1QV / 3700	Cisco Nexus B22 Extender 94Y5350 / ESWB / ESWB	EN4023 10Gb Switch 94Y5212 / ESWD / ESWD	EN6131 40Gb Switch 90Y9346 / A3HJ / ESW6
CN4054R 10Gb VF Adapter 00Y3306 / A4K2 / A4K2[a]	Y	Y	Y	Y	Y	Y[d]	Y	Y	Y	Y[d]	Y[d]	Y	Y
CN4054S 4-port 10Gb VF Adapter 00AG590 / ATBS / None 01CV790 / AU7Y / None	Y	Y	Y	Y	Y	Y[d]	Y	Y	Y	Y[d]	Y[d]	Y	Y
EN4054 4-port 10Gb Ethernet None / None / 1762	Y	N	Y	N	Y	N	Y	N	Y	Y[d]	Y[d]	Y	Y
CN4058 8-port 10Gb Converged None / None / EC24	Y[h]	N	Y[h]	N	Y[h]	N	Y[h]	N	Y[i]	Y[d]	Y[d]	Y	N
CN4058S 8-port 10Gb VF Adapter 94Y5160 / A4R6 / None	Y[h]	Y	Y[h]	Y	Y[h]	N	Y[h]	Y	Y[i]	Y[d]	Y[d]	Y	N
EN4132 2-port 10 Gb Ethernet 90Y3466 / A1QY / EC2D	N	N	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y
EN4132 2-port 10Gb RoCE None / None / EC26	N	N	Y	N	Y	N	Y	N	N	Y	Y	Y	Y
EN4172 2-port 10Gb Ethernet 00AG530 / A5RN / None	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40 Gb Ethernet adapters													
EN6132 2-port 40Gb Ethernet 90Y3482 / A3HK / A3HK	N	N	N	N	N	N	N	N	N	N	N	N	Y
ThinkSystem Mellanox ConnectX-3 Mezz 40Gb 2-Port Ethernet, 7ZT7A00502, AVCU	N	N	N	N	N	N	N	N	N	N	N	N	Y

a. Withdrawn from marketing

b. The first feature code listed is for configurations ordered through System x sales channels (XCC using x-config). The second feature code is for configurations ordered through the IBM Power Systems channel (AAS using e-config)

c. 1 Gb is supported on the CN4093's two external 10 Gb SFP+ ports only. The 12 external Omni Ports™ do not support 1 GbE speeds.

d. Only two of the ports of this adapter are connected when used with the EN4091 10Gb Pass-thru or Cisco B22 Extender or SI4091 10Gb Switch.

e. Upgrade 1 or flexible port mapping required to enable enough internal switch ports to connect to both servers in the x222

f. Upgrade 1 or flexible port mapping required to enable enough internal switch ports to connect to both servers in the x222

g. CN4022 support of the EN2092 switch requires Flex System code base 1.3.2 (announced May 13, 2014)

h. Only six of the eight ports of the CN4058 and CN4058S adapters are connected with the CN4093, EN4093, EN4093R, and SI4093 switches

i. Only four of the eight ports of CN4058 and CN4058S adapters are connected with the EN2092 switch.

3.1.2 InfiniBand switches and adapters

Table 3-2 lists InfiniBand switch to card compatibility.

Table 3-2 InfiniBand switch to card compatibility

Part number	Feature codes (XCC / AAS)[a]		IB6131 InfiniBand Switch
		Part number	**90Y3450**
		Feature code[a]	**A1EK / 3699**
90Y3454	A1QZ / EC2C	IB6132 2-port FDR InfiniBand Adapter	Yes[b]
None	None / 1761	IB6132 2-port QDR InfiniBand Adapter	Yes
90Y3486	A365 / A365	IB6132D 2-port FDR InfiniBand Adapter	Yes[b]
7ZT7A00508	AUKV	ThinkSystem Mellanox ConnectX-3 Mezz FDR 2-Port InfiniBand Adapter	Yes[b]

a. The first feature code listed is for configurations ordered through System x sales channels (XCC using x-config). The second feature code is for configurations ordered through the IBM Power Systems channel (AAS using e-config)
b. To operate at FDR speeds, the IB6131 switch will need the FDR upgrade, as described in 3.3, “Network switch upgrades” on page 57

3.2 Switch to transceiver / cable interoperability

This section specifies the transceivers and direct-attach copper (DAC) cables supported by the Ethernet and InfiniBand modules.

- 3.2.1, “Transceivers for Ethernet switches” on page 50
- 3.2.2, “Transceivers for InfiniBand switches” on page 56

Tip: FC5022 16Gb SAN Scalable Switch is covered in 4.2, “Transceivers for Fibre Channel switches” on page 67.

3.2.1 Transceivers for Ethernet switches

Support for transceivers and cables for Ethernet switch modules is shown in Table 3-3 on page 51.

Carrier-Grade Chassis and the CN4093: When the CN4093 is installed in the Carrier-Grade Chassis, the only 10 Gb transceivers that are supported are

- 10GBASE-SR SFP+ Transceiver (85°C), 00VX183
- 10GBASE-SR SFP+ Transceiver (85°C), 00NU537

No other 10 Gb transceivers are supported with this combination of switch and chassis, however 1 Gb transceivers and 10 Gb DAC cables are supported as listed in Table 3-3.

Table 3-3 Modules and cables supported in Ethernet I/O modules

Switch description Part number / feature codes[a] Adapter description Part number / Feature code (XCC) / Feature code (AAS)[a]	CN4093 10Gb Switch 00D5823 / A3HH / ESW2[b]	Lenovo CN4093 10Gb Switch 00FM510 / ASUT / None	EN4093R 10Gb Switch 95Y3309 / A3J6 / ESW7[b]	Lenovo EN4093R 10Gb Switch 00FM514 / ASUU / None	EN4093 10Gb Switch 49Y4270 / A0TB / 3593[b]	Lenovo SI4091 10Gb SIM 00FE327 / ARZM / None	SI4093 10Gb SIM 95Y3313 / A45T / ESWA	Lenovo SI4093 10Gb SIM 00FM518 / ASUV / None	EN2092 1Gb Switch 49Y4294 / A0TF / 3598	EN4091 10Gb Pass-thru 88Y6043 / A1QV / 3700	Cisco Nexus B22 Extender 94Y5350 / ESWB / ESWB	EN4023 10Gb Switch 94Y5212 / ESWD / ESWD	EN6131 40Gb Switch 90Y9346 / A3HJ / ESW6
SFP transceivers - 1 Gbps													
SFP SX Transceiver (1000Base-SX) 81Y1622 / 3269 / EB2A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N
SFP RJ45 Transceiver (1000Base-T) 81Y1618 / 3268 / EB29[b]	Y	N	Y	N	Y	N	Y	N	Y	Y	N	N	N
SFP LX Transceiver (1000Base-LX) 90Y9424 / A1PN / ECB8	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N
SFP 1000Base-T (RJ-45) Transceiver[c] 00FE333 / A5DL / EB29	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N
SFP+ transceivers - 10 Gbps													
Lenovo Dual Rate 1/10Gb SX/SR SFP+ Transceiver / 00MY034 / ATTJ	N	Y	N	Y	N	Y	N	Y	N	N	N	N	N
SFP+ SR Transceiver (10GBase-SR) 46C3447 / 5053 / EB28	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N
10 GBase-SR SFP+ (MMFiber) 44W4408 / 4942 / 3282[b]	Y	N	Y	N	Y	N	Y	N	Y	Y	N	N	N
10GBASE-SR SFP+ Transceiver (85°C) 00NU537 / AT2Q / None	N	Y[d]	N	N	N	N	N	N	N	N	N	N	N
Lenovo 10GBASE-SR SFP+ Transceiver (85°C) 00VX183 / AT45	N	Y[d]	N	N	N	N	N	N	N	N	N	N	N
SFP+ LR Transceiver (10GBase-LR) 90Y9412 / A1PM / ECB9	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N
Lenovo 10GBASE-ER SFP+ Transceiver 90Y9415 / A1PP / None	N	N	N	N	N	Y	N	N	N	N	N	N	N
SFP+ LR Transceiver 00D6180 / A3NZ / ECB9	N	N	N	N	N	N	N	N	N	N	N	Y	N
Brocade VDX SFP+ LR Transceiver 95Y0540 / A3AB / EB37	N	N	N	N	N	N	N	N	N	N	N	Y	N
Brocade 10Gb SFP+ SR Optical Transceiver 49Y4216 / 0069 / EB3C	N	N	N	N	N	N	N	N	N	N	N	Y	N

Switch description Part number / feature codes[a] Adapter description Part number / Feature code (XCC) / Feature code (AAS)[a]	CN4093 10Gb Switch 00D5823 / A3HH / ESW2[b]	Lenovo CN4093 10Gb Switch 00FM510 / ASUT / None	EN4093R 10Gb Switch 95Y3309 / A3J6 / ESW7[b]	Lenovo EN4093R 10Gb Switch 00FM514 / ASUU / None	EN4093 10Gb Switch 49Y4270 / A0TB / 3593[b]	Lenovo SI4091 10Gb SIM 00FE327 / ARZM / None	SI4093 10Gb SIM 95Y3313 / A45T / ESWA	Lenovo SI4093 10Gb SIM 00FM518 / ASUV / None	EN2092 1Gb Switch 49Y4294 / A0TF / 3598	EN4091 10Gb Pass-thru 88Y6043 / A1QV / 3700	Cisco Nexus B22 Extender 94Y5350 / ESWB / ESWB	EN4023 10Gb Switch 94Y5212 / ESWD / ESWD	EN6131 40Gb Switch 90Y9346 / A3HJ / ESW6
Optical cables for 1 GbE SX SFP and 10 GbE SR SFP+ transceivers													
Lenovo 0.5m LC-LC OM3 MMF Cable 00MN499 / ASR5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N
Lenovo 1m LC-LC OM3 MMF Cable 00MN502 / ASR6	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N
Lenovo 3m LC-LC OM3 MMF Cable 00MN505 / ASR7	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N
Lenovo 5m LC-LC OM3 MMF Cable 00MN508 / ASR8	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N
Lenovo 10m LC-LC OM3 MMF Cable 00MN511 / ASR9	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N
Lenovo 15m LC-LC OM3 MMF Cable 00MN514 / ASRA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N
Lenovo 25m LC-LC OM3 MMF Cable 00MN517 / ASRB	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N
Lenovo 30m LC-LC OM3 MMF Cable 00MN520 / ASRC	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N
Lenovo 1m LC-LC OM2 MMF Cable 88Y6851 / A1DS / None[b]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N
Lenovo 5m LC-LC OM2 MMF Cable 88Y6854 / A1DT[b]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N
Lenovo 25m LC-LC OM2 MMF Cable 88Y6857 / A1DU[b]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N
8 Gb Fibre Channel SFP+ transceivers													
8 Gb SFP+ SW Optical Transceiver 44X1964 / 5075 / 3286	Y	Y	N	N	N	N	N	N	N	N	N	N	N
Lenovo 8Gb SFP+ LW Optical Transceiver 00FM472 / ASCK / None	Y	Y	N	N	N	N	N	N	N	N	N	N	N
SFP+ direct-attach copper (DAC) cables													
0.5m Lenovo Passive DAC SFP+ Cable 00D6288 / A3RG / None	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N

Switch description Part number / feature codes[a] Adapter description Part number / Feature code (XCC) / Feature code (AAS)[a]	CN4093 10Gb Switch 00D5823 / A3HH / ESW2[b]	Lenovo CN4093 10Gb Switch 00FM510 / ASUT / None	EN4093R 10Gb Switch 95Y3309 / A3J6 / ESW7[b]	Lenovo EN4093R 10Gb Switch 00FM514 / ASUU / None	EN4093 10Gb Switch 49Y4270 / A0TB / 3593[b]	Lenovo SI4091 10Gb SIM 00FE327 / ARZM / None	SI4093 10Gb SIM 95Y3313 / A45T / ESWA	Lenovo SI4093 10Gb SIM 00FM518 / ASUV / None	EN2092 1Gb Switch 49Y4294 / A0TF / 3598	EN4091 10Gb Pass-thru 88Y6043 / A1QV / 3700	Cisco Nexus B22 Extender 94Y5350 / ESWB / ESWB	EN4023 10Gb Switch 94Y5212 / ESWD / ESWD	EN6131 40Gb Switch 90Y9346 / A3HJ / ESW6
1m Passive DAC SFP+ Cable 90Y9427 / A1PH / ECB4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y[e]	Y	N	N
1.5m Passive DAC SFP+ Cable 00AY764 / A51N / None	Y	Y	Y	Y	N	Y	Y	Y	Y	N	N	N	N
2m Passive DAC SFP+ Cable 00AY765 / A51P / None	Y	Y	Y	Y	N	Y	Y	Y	Y	N	N	N	N
3m Passive DAC SFP+ Cable 90Y9430 / A1PJ / ECB5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y[e]	Y	N	N
5m Passive DAC SFP+ Cable 90Y9433 / A1PK / ECB6	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y[e]	Y	N	N
7m Passive DAC SFP+ Cable 00D6151 / A3RH / ECBH	Y	Y	Y	Y	N	Y	Y	Y	Y	N	N	N	N
1m Active DAC SFP+ Cable 95Y0323 / A25A / None	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
3m Active DAC SFP+ Cable 95Y0326 / A25B / None	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
5m Active DAC SFP+ Cable 95Y0329 / A25C / None	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
1m 10 GbE Twinax Act Copper SFP+ DAC (active) 81Y8295 / A18M / EN01	N	N	N	N	N	N	N	N	N	Y	N	Y	N
3m 10 GE Twinax Act Copper SFP+ DAC (active) 81Y8296 / A18N / EN02	N	N	N	N	N	N	N	N	N	Y	N	Y	N
5m 10 GE Twinax Act Copper SFP+ DAC (active) 81Y8297 / A18P / EN03	N	N	N	N	N	N	N	N	N	Y	N	Y	N
QSFP+ passive copper breakout cables - 40 GbE to 4x10 GbE													
1m Passive QSFP+ to SFP+ Breakout DAC Cable 49Y7886 / A1DL / EB24	Y	Y	Y	Y	Y	N	Y	Y	N	N	Y	N	N
3m Passive QSFP+ to SFP+ Breakout DAC Cable 49Y7887 / A1DM / EB25	Y	Y	Y	Y	Y	N	Y	Y	N	N	Y	N	N

Switch description Part number / feature codes[a] Adapter description Part number / Feature code (XCC) / Feature code (AAS)[a]	CN4093 10Gb Switch 00D5823 / A3HH / ESW2[b]	Lenovo CN4093 10Gb Switch 00FM510 / ASUT / None	EN4093R 10Gb Switch 95Y3309 / A3J6 / ESW7[b]	Lenovo EN4093R 10Gb Switch 00FM514 / ASUU / None	EN4093 10Gb Switch 49Y4270 / A0TB / 3593[b]	Lenovo SI4091 10Gb SIM 00FE327 / ARZM / None	SI4093 10Gb SIM 95Y3313 / A45T / ESWA	Lenovo SI4093 10Gb SIM 00FM518 / ASUV / None	EN2092 1Gb Switch 49Y4294 / A0TF / 3598	EN4091 10Gb Pass-thru 88Y6043 / A1QV / 3700	Cisco Nexus B22 Extender 94Y5350 / ESWB / ESWB	EN4023 10Gb Switch 94Y5212 / ESWD / ESWD	EN6131 40Gb Switch 90Y9346 / A3HJ / ESW6
5m Passive QSFP+ to SFP+ Breakout DAC Cable 49Y7888 / A1DN / EB26	Y	Y	Y	Y	Y	N	Y	Y	N	N	Y	N	N
QSFP+ active optical breakout cables - 40 GbE to 4x10 GbE													
1M QSFP+ to 4xSFP+ Active Optical Cable 00YL667 / ATZ8 / None	Y	Y	Y	Y	N	N	Y	Y	N	N	N	N	N
3M QSFP+ to 4xSFP+ Active Optical Cable 00YL670 / ATZ9 / None	Y	Y	Y	Y	N	N	Y	Y	N	N	N	N	N
5M QSFP+ to 4xSFP+ Active Optical Cable 00YL673 / ATZA / None	Y	Y	Y	Y	N	N	Y	Y	N	N	N	N	N
QSFP+ direct-attach copper (DAC) cables - 40 GbE													
1m QSFP+ to QSFP+ Cable 49Y7890 / A1DP / EB2B	Y	Y	Y	Y	Y	N	Y	Y	N	N	N	Y	N
3m QSFP+ to QSFP+ Cable 49Y7891 / A1DQ / EB2H	Y	Y	Y	Y	Y	N	Y	Y	N	N	N	Y	Y
5m QSFP+-to-QSFP+ Cable 00D5810 / A2X8 / ECBN	Y	Y	Y	Y	N	N	Y	N	N	N	N	N	Y
7m QSFP+-to-QSFP+ Cable 00D5813 / A2X9 / ECBP	Y	Y	Y	Y	N	N	Y	N	N	N	N	N	Y
3m FDR InfiniBand Cable (passive) 90Y3470 / A227 / ECB1	N	N	N	N	N	N	N	N	N	N	N	N	Y
QSFP+ transceiver and cables - 40 GbE													
40GBase QSFP+ Bi-Directional Transceiver / 00YL631 / ATYW	N	Y	N	Y	N	N	N	Y	N	N	N	N	N
QSFP+ SR Transceiver 49Y7884 / A1DR / EB27	Y	Y	Y	Y	Y	N	Y	Y	N	N	N	Y	Y
QSFP+ 40GBASE-iSR4 Transceiver 00D9865 / ASTM / None	Y	Y	Y	Y	Y	N	Y	Y	N	N	N	N	N
QSFP+ 40GBASE-eSR4 Transceiver 00FE325 / A5U9 / None	Y	Y	Y	Y	Y	N	Y	Y	N	N	N	N	N
QSFP+ 40GBASE-LR4 Transceiver 00D6222 / A3NY / None	Y	Y	Y	Y	Y	N	Y	Y	N	N	N	N	N

Switch description Part number / feature codes[a] Adapter description Part number / Feature code (XCC) / Feature code (AAS)[a]	CN4093 10Gb Switch 00D5823 / A3HH / ESW2[b]	Lenovo CN4093 10Gb Switch 00FM510 / ASUT / None	EN4093R 10Gb Switch 95Y3309 / A3J6 / ESW7[b]	Lenovo EN4093R 10Gb Switch 00FM514 / ASUU / None	EN4093 10Gb Switch 49Y4270 / A0TB / 3593[b]	Lenovo SI4091 10Gb SIM 00FE327 / ARZM / None	SI4093 10Gb SIM 95Y3313 / A45T / ESWA	Lenovo SI4093 10Gb SIM 00FM518 / ASUV / None	EN2092 1Gb Switch 49Y4294 / A0TF / 3598	EN4091 10Gb Pass-thru 88Y6043 / A1QV / 3700	Cisco Nexus B22 Extender 94Y5350 / ESWB / ESWB	EN4023 10Gb Switch 94Y5212 / ESWD / ESWD	EN6131 40Gb Switch 90Y9346 / A3HJ / ESW6
10m QSFP+ MTP Optical cable 90Y3519 / A1MM / EB2J	Y	Y	Y	Y	Y	N	Y	Y	N	N	N	Y	Y
30m QSFP+ MTP Optical cable 90Y3521 / A1MN / EB2K	Y	Y	Y	Y	Y	N	Y	Y	N	N	N	Y	Y
Lenovo 10m QSFP+ MPO-MPO OM3 MMF Cable 00VX003 / AT2U (replaces 90Y3519)	Y	Y	Y	Y	Y	N	Y	Y	N	N	N	Y	Y
Lenovo 30m QSFP+ MPO-MPO OM3 MMF Cable 00VX005 / AT2V (replaces 90Y3521)	Y	Y	Y	Y	Y	N	Y	Y	N	N	N	Y	Y
Optical breakout cables for 40 GbE QSFP+ iSR/eSR transceivers													
Lenovo 1m MTP-4xLC OM3 MMF Breakout DAC Cable 00FM412 / A5UA / None	Y	Y	Y	Y	Y	N	Y	Y	N	N	N	N	N
Lenovo 3m MTP-4xLC OM3 MMF Breakout DAC Cable 00FM413 / A5UB / None	Y	Y	Y	Y	Y	N	Y	Y	N	N	N	N	N
Lenovo 5m MTP-4xLC OM3 MMF Breakout DAC Cable 00FM414 / A5UC / None	Y	Y	Y	Y	Y	N	Y	Y	N	N	N	N	N
SFP+ transceivers - Fibre Channel (supported in Flex Ports)													
Brocade 8 Gb &SFP+ SW Optical Transceiver 88Y6416 / A2B9	N	N	N	N	N	N	N	N	N	N	N	Y	N
Brocade 16Gb FC SFP+ Transceiver Module 88Y6393 / A22R	N	N	N	N	N	N	N	N	N	N	N	Y	N

a. The first feature code listed is for configurations ordered through System x sales channels (XCC using x-config). The second feature code is for configurations ordered through the IBM Power Systems channel (AAS using e-config)
b. Withdrawn from marketing
c. This transceiver does not support 10/100 Mbps
d. The 10GBASE-SR SFP+ Transceiver (85°C) is only supported in the CN4093 switch when installed in the Carrier-Grade Chassis.
e. The EN4091 10Gb Pass-Thru supports Passive DAC cables as of firmware 2.0.2.0

3.2.2 Transceivers for InfiniBand switches

Support for transceivers and cables for InfiniBand switch modules is shown in Table 3-4.

Compliant cables: The IB6131 switch supports all cables compliant to the InfiniBand Architecture specification.

Table 3-4 Modules and cables supported in InfiniBand I/O modules

Part number	Feature codes[a]		IB6131 InfiniBand Switch
		Part number	90Y3450
		Feature codes[a]	A1EK / 3699
Direct attach copper (DAC) cables - InfiniBand			
90Y3470	A227 / ECB1	3m FDR InfiniBand Cable (passive)	Yes
49Y9980	3866 / 3249	IB QDR 3m QSFP Cable Option (passive)	Yes
Optical cables - InfiniBand			
00KF007	ARYC / None	3m Mellanox Active IB FDR Optical Fiber Cable	Yes
00KF008	ARYD / None	5m Mellanox Active IB FDR Optical Fiber Cable	Yes
00KF009	ARYE / None	10m Mellanox Active IB FDR Optical Fiber Cable	Yes
00KF010	ARYF / None	15m Mellanox Active IB FDR Optical Fiber Cable	Yes
00KF011	ARYG / None	20m Mellanox Active IB FDR Optical Fiber Cable	Yes
00KF012	ARYH / None	30m Mellanox Active IB FDR Optical Fiber Cable	Yes

a. The first feature code listed is for configurations ordered through System x sales channels (XCC using x-config). The second feature code is for configurations ordered through the IBM Power Systems channel (AAS using e-config)

3.3 Network switch upgrades

Various Flex System switches can be upgraded via software licenses to enable additional ports or features.

Switches covered in this section:

Tip: FC5022 16Gb SAN Scalable Switch is covered in 4.3, “Fibre Channel switch upgrades” on page 68.

3.3.1 Flex System EN4023 10Gb Scalable Switch

The EN4023 10Gb Scalable Switch comes standard with 24 ports licenses. These licenses can be applied to any internal or external 10 Gb port. The 40 Gb uplinks are not enabled in the base switch.

Port upgrades are as follows:

- 94Y5158 (Upgrade 1) can be applied on the base switch or on top of Upgrade 2 to enable 16 additional 10 GbE ports (internal and external). The upgrade also enables two 40 Gb uplinks with QSFP+ connectors.
- 94Y5159 (Upgrade 2) can be applied on the base switch or on top of Upgrade 1 to enable 16 additional 10 GbE ports (internal and external).

In addition or separately, Update 3 enables FCoE on all ports and Flex Ports on the external ports. The upgrade can be applied on the base switch or on top of the FoD Upgrade 1 or 2 or both.

Table 3-5 lists the upgrades. These are Features on Demand (FoD) upgrades.

Table 3-5 EN4023 10Gb Scalable Switch port upgrades

Part number	Feature code (XCC / AAS)[a]	Description	Ports enabled
94Y5158	ESWE / ESWE	Flex System EN4023 10Gb Scalable Switch (FoD 1)	Adds 16 port licenses Enables 2 40Gb uplinks
94Y5159	ESWF / ESWF	Flex System EN4023 10Gb Scalable Switch (FoD 2)	Adds 16 port licenses
47C9993	ESWG / ESWG	Flex System EN4023 10Gb Scalable Switch (FoD 3)	Enables FCoE

a. The first feature code listed is for configurations ordered through Lenovo System x sales channels. The second feature code is for configurations ordered through the IBM Power Systems channel

For information on these upgrades, see the Lenovo Press Product Guide on the EN4023 10Gb Scalable Switch:

http://lenovopress.com/tips1070

3.3.2 Flex System Fabric CN4093 10Gb Converged Scalable Switch

The CN4093 switch is initially licensed for fourteen 10 GbE internal ports, two external 10 GbE SFP+ ports, and six external Omni Ports enabled. The switch supports Features on Demand license upgrades to activate additional ports.

These upgrades apply to:

- Lenovo Flex System Fabric CN4093 10Gb Converged Scalable Switch, 00FM510
- Flex System Fabric CN4093 10Gb Converged Scalable Switch, 00D5823

Table 3-6 CN4093 10Gb Converged Scalable Switch part numbers

Part number	Feature code (XCC / AAS)[a]	Description
Switch module		
00D5823[b]	A3HH / ESW2	Flex System Fabric CN4093 10Gb Converged Scalable Switch
Features on Demand upgrades to add port activations		
00D5845	A3HL / ESU1	Flex System Fabric CN4093 Converged Scalable Switch (Upgrade 1)
00D5847	A3HM / ESU2	Flex System Fabric CN4093 Converged Scalable Switch (Upgrade 2)

a. The first feature code listed is for configurations ordered through Lenovo System x sales channels. The second feature code is for configurations ordered through the IBM Power Systems channel
b. Withdrawn from marketing

Upgrade 1 and Upgrade 2 can be applied on the switch independently from each other or in combination for full feature capability.

For information on these upgrades and flexible port mapping, see the Lenovo Press Product Guide on the CN4093 10Gb Converged Scalable Switch:

http://lenovopress.com/tips0910

3.3.3 Flex System Fabric EN4093 & EN4093R 10Gb Scalable Switch

The EN4093 and EN4093R are initially licensed with fourteen 10 Gb internal ports enabled and ten 10 Gb external uplink ports enabled. The switch supports Features on Demand license upgrades to activate additional ports.

These upgrades apply to:

- Lenovo Flex System Fabric EN4093R 10Gb Scalable Switch, 00FM514
- Flex System Fabric EN4093R 10Gb Scalable Switch, 95Y3309
- Flex System Fabric EN4093 10Gb Scalable Switch, 49Y4270

Table 3-7 EN4093 and EN4093R 10Gb Scalable Switch part numbers

Part number	Feature code (XCC / AAS)[a]	Product description
Switch modules		
49Y4270[b]	A0TB / 3593[b]	Flex System Fabric EN4093 10Gb Scalable Switch
95Y3309[b]	A3J6 / ESW7[b]	Flex System Fabric EN4093R 10Gb Scalable Switch
Features on Demand upgrades to add port activations		
49Y4798	A1EL / 3596	Flex System Fabric EN4093 10Gb Scalable Switch (Upgrade 1)
88Y6037	A1EM / 3597	Flex System Fabric EN4093 10Gb Scalable Switch (Upgrade 2) (requires Upgrade 1)

a. The first feature code listed is for configurations ordered through Lenovo System x sales channels. The second feature code is for configurations ordered through the IBM Power Systems channel
b. Withdrawn from marketing

Note: The Flex System Fabric EN4093 10Gb Scalable Switch, 49Y4270, is now withdrawn from marketing. The replacement is the Flex System Fabric EN4093R 10Gb Scalable Switch.

Upgrade 1 must be applied before Upgrade 2 can be applied. These are Features on Demand license upgrades.

For information on these upgrades and flexible port mapping, see the Lenovo Press Product Guide on the EN4093R 10Gb Scalable Switch:

http://lenovopress.com/tips0864

3.3.4 Flex System Fabric SI4093 System Interconnect Module

The SI4093 is initially licensed with fourteen 10 Gb internal ports enabled and ten 10 Gb external uplink ports enabled. The module supports Features on Demand license upgrades to activate additional ports.

These upgrades apply to:

- Lenovo Flex System Fabric SI4093 10Gb System Interconnect Module, 00FM518
- Flex System Fabric SI4093 10Gb System Interconnect Module, 95Y3313

Table 3-8 Flex System Fabric SI4093 System Interconnect Module part numbers

Part number	Feature code (XCC / AAS)[a]	Product description
Interconnect module		
95Y3313	A45T / ESWA	Flex System Fabric SI4093 System Interconnect Module
Features on Demand upgrades to add port activations		
95Y3318	A45U / ESW8	Flex System Fabric SI4093 System Interconnect Module (Upgrade 1)

Part number	Feature code (XCC / AAS)[a]	Product description
95Y3320	A45V / ESW9	Flex System Fabric SI4093 System Interconnect Module (Upgrade 2) (requires Upgrade 1)

a. The first feature code listed is for configurations ordered through Lenovo System x sales channels. The second feature code is for configurations ordered through the IBM Power Systems channel

Upgrade 1 must be applied before Upgrade 2 can be applied. These are Features on Demand license upgrades.

For information on these upgrades and flexible port mapping, see the Lenovo Press Product Guide on the SI4093 System Interconnect Module:

http://lenovopress.com/tips1045

3.3.5 Flex System EN2092 1Gb Ethernet Scalable Switch

The EN2092 comes standard with 14 internal and 10 external Gigabit Ethernet ports enabled. The module supports Features on Demand license upgrades to activate additional ports.

Table 3-9 Flex System EN2092 1Gb Ethernet Scalable Switch part numbers and port upgrades

Part number	Feature code (XCC / AAS)[a]	Product description
49Y4294	A0TF / 3598	Flex System EN2092 1Gb Ethernet Scalable Switch ► 14 internal 1 Gb ports ► 10 external 1 Gb ports
90Y3562	A1QW / 3594	Flex System EN2092 1Gb Ethernet Scalable Switch (Upgrade 1) ► Adds 14 internal 1 Gb ports ► Adds 10 external 1 Gb ports
49Y4298	A1EN / 3599	Flex System EN2092 1Gb Ethernet Scalable Switch (10 Gb Uplinks) ► Adds 4 external 10 Gb uplinks

a. The first feature code listed is for configurations ordered through Lenovo System x sales channels. The second feature code is for configurations ordered through the IBM Power Systems channel

Upgrade 1 and the 10 Gb Uplinks upgrade can be applied in either order.

For information on these upgrades and flexible port mapping, see the Lenovo Press Product Guide on the EN2092 1Gb Ethernet Scalable Switch:

http://lenovopress.com/tips0861

3.3.6 Flex System IB6131 InfiniBand Switch

The Flex System IB6131 InfiniBand Switch is a 32 port InfiniBand switch. It has 18 FDR/QDR (56/40 Gbps) external ports and 14 FDR/QDR (56/40 Gbps) internal ports for connections to nodes.

This switch ships standard with quad data rate (QDR) and can be upgraded to fourteen data rate (FDR) with an Features on Demand license upgrade. Ordering information is listed in Table 3-10 on page 61.

Table 3-10 Flex System IB6131 InfiniBand Switch Part Number and upgrade option

Part number	Feature codes (XCC / AAS)[a]	Product Name
90Y3450	A1EK / 3699	Flex System IB6131 InfiniBand Switch ► 18 external QDR ports ► 14 QDR internal ports
90Y3462	A1QX / ESW1	Flex System IB6131 InfiniBand Switch (FDR Upgrade) ► Upgrades all ports to FDR speeds

a. The first feature code listed is for configurations ordered through Lenovo System x sales channels. The second feature code is for configurations ordered through the IBM Power Systems channel

3.4 vNIC and UFP support

Table 3-11 lists vNIC™ (virtual NIC) and UFP (Unified Fabric Port) support by combinations of switch, adapter, and operating system.

In the table, we use the following abbreviations for the vNIC modes:

- VFM = Virtual Fabric Mode (also known as vNIC1)
- SIM = Switch Independent Mode (also known as vNIC2)
- UFP = Unified Fabric Port

10 GbE adapters only: Only 10 Gb Ethernet adapters support vNIC and UFP. 1 GbE adapter do not support these features.

Table 3-11 Supported vNIC modes

Flex System I/O module	**EN4093 10Gb Scalable Switch EN4093R 10Gb Switch CN4093 10Gb Converged**			**SI4093**	**EN4091 10Gb Ethernet Pass-thru**		
Top-of-rack switch	**None**			**None**	**RackSwitch™ G8124E RackSwitch G8264**		
Operating system	Windows	Linux[ab]	VMware[c]	Any	Windows	Linux[ab]	VMware[c]
10Gb onboard LOM (x240 and x440)	VFM SIM UFP	VFM SIM UFP	VFM SIM UFP	SIM UFP	VFM SIM UFP	VFM SIM UFP	VFM SIM UFP
10Gb onboard LOM (x222)	VFM SIM UFP	VFM SIM UFP	VFM SIM UFP	SIM UFP	The x222 does not support the EN4091 10Gb Ethernet Pass-thru		
10Gb onboard LOM (X6 7196)	VFM SIM UFP	VFM SIM UFP	VFM SIM UFP	SIM UFP	VFM SIM UFP	VFM SIM UFP	VFM SIM UFP
10Gb onboard LOM (SN550 & SN850)	The onboard LOMM does not support vNIC nor UFP.						
CN4022 2-port 10Gb Converged Adapter, 88Y5920	SIM UFP	SIM UFP	SIM UFP	SIM UFP	SIM UFP	SIM UFP	SIM UFP
CN4052 2-port 10Gb Virtual Fabric Adapter, 00JY800	VFM SIM UFP	VFM SIM UFP	VFM SIM UFP	SIM UFP	VFM SIM UFP	VFM SIM UFP	VFM SIM UFP
CN4052S 2-port 10Gb Virtual Fabric Adapter, 00AG540 and 01CV780	VFM SIM UFP	VFM SIM UFP	VFM SIM UFP	SIM UFP	VFM SIM UFP	VFM SIM UFP	VFM SIM UFP
CN4054 10Gb Virtual Fabric Adapter 90Y3554 (AAS feature 1759)	VFM SIM UFP	VFM SIM UFP	VFM SIM UFP	SIM UFP	VFM SIM UFP	VFM SIM UFP	VFM SIM UFP
CN4054R 10Gb Virtual Fabric Adapter 00Y3306 (feature A4K2)	VFM SIM UFP	VFM SIM UFP	VFM SIM UFP	SIM UFP	VFM SIM UFP	VFM SIM UFP	VFM SIM UFP
CN4054S 4-port 10Gb Virtual Fabric Adapter, 00AG590 and 01CV790	VFM SIM UFP	VFM SIM UFP	VFM SIM UFP	SIM UFP	VFM SIM UFP	VFM SIM UFP	VFM SIM UFP

Flex System I/O module	EN4093 10Gb Scalable Switch EN4093R 10Gb Switch CN4093 10Gb Converged			SI4093	EN4091 10Gb Ethernet Pass-thru		
Top-of-rack switch	**None**			**None**	**RackSwitch™ G8124E RackSwitch G8264**		
Operating system	Windows	Linux[ab]	VMware[c]	Any	Windows	Linux[ab]	VMware[c]
CN4058S 8-port 10Gb Virtual Fabric Adapter, 94Y5160	VFM SIM UFP	VFM SIM UFP	VFM SIM UFP	SIM UFP	VFM SIM UFP	VFM SIM UFP	VFM SIM UFP
EN4172 2-port 10Gb Ethernet Adapter, 00AG530	SIM UFP	SIM UFP	SIM UFP	SIM UFP	SIM UFP	SIM UFP	SIM UFP
EN4054 4-port 10Gb Ethernet Adapter (AAS feature 1762)	The EN4054 4-port 10Gb Ethernet Adapter does not support vNIC nor UFP.						
EN4132 2-port 10Gb Ethernet Adapter 90Y3466 (AAS #EC2D)	The EN4132 2-port 10Gb Ethernet Adapter does not support vNIC nor UFP.						
CN4058 8-port 10Gb Converged Adapter, (AAS feature EC24)	The CN4058 8-port 10Gb Converged Adapter does not support vNIC nor UFP.						
EN4132 2-port 10Gb RoCE Adapter, (AAS feature EC26)	The EN4132 2-port 10Gb RoCE Adapter does not support vNIC nor UFP.						

a. Linux kernels with Xen are not supported with either Virtual Fabric Mode nor Switch Independent Mode. For support information, see RETAIN Tip H205800 at http://ibm.com/support/entry/portal/docdisplay?lndocid=migr-5090480.
b. The combination of Switch Independent Mode and iBoot is not supported for legacy booting with Linux.
c. The combination of Switch Independent Mode with VMware ESX 4.1 and storage protocols (FCoE and iSCSI) is not supported.

3.5 Network boot support (x86)

Table 3-12 shows the support for network boot protocols by Ethernet adapters supported in the x86 compute nodes.

Table 3-12 Support for network boot

Adapter description	Wake On LAN support	x86 BIOS expansion ROM PXE support	x86 UEFI firmware driver PXE support	x86 iSCSI SAN boot support	x86 FCoE network boot support
1 Gb Ethernet adapters					
x220 Onboard 1Gb	Yes	Yes	Yes	No	No
EN2024 4-port 1Gb Ethernet Adapter, 49Y7900	Yes	Yes	Yes	No	No
10 Gb Ethernet adapters					
x222 Onboard 10Gb	Yes	Yes	Yes	Yes	Yes
x240 Onboard 10Gb	Yes	Yes	Yes	Yes	Yes
x440 Onboard 10Gb	Yes	Yes	Yes	Yes	Yes
CN4022 2-port 10Gb Converged Adapter, 88Y5920	Yes	Yes	Yes	Yes	Yes
CN4052 2-port 10Gb Virtual Fabric Adapter, 00JY800	Yes	Yes	Yes	Yes	Yes
CN4054 10Gb Virtual Fabric Adapter, 90Y3554	Yes	Yes	Yes	Yes	Yes
CN4054R 10Gb Virtual Fabric Adapter, 00Y3306	Yes	Yes	Yes	Yes	Yes
CN4058S 8-port 10Gb Virtual Fabric Adapter, 94Y5160	Yes	Yes	Yes	Yes	Yes
EN4132 2-port 10 Gb Ethernet Adapter, 90Y3466	Yes	Yes	Yes	No	No
EN4172 2-port 10Gb Ethernet Adapter, 00AG530	Yes	No	Yes	No	No
40 Gb Ethernet adapters					
EN6132 2-port 40Gb Ethernet Adapter, 90Y3482	Yes	Yes	Yes	No	No
ThinkSystem Mellanox ConnectX-3 Mezz 40Gb 2-Port Ethernet Adapter, 7ZT7A00502	Yes	Yes	Yes	No	No

4

Storage interoperability

This chapter describes storage subsystem compatibility.

Topics in this chapter are:

Tip: Use these tables only as a starting point. Configuration support must be verified through the IBM System Storage Interoperation Center (SSIC) found at the following website:

http://ibm.com/systems/support/storage/ssic/interoperability.wss

The tables in this chapter and in SSIC are used primarily to document Fibre Channel SAN and FCoE-attached block storage interoperability and iSCSI storage when a hardware iSCSI initiator host adapters are used.

4.1 Fibre Channel switch to adapter compatibility

Table 4-1 lists Fibre Channel switch to card compatibility.

Table 4-1 Fibre Channel switch to card compatibility

Part number	Feature codes (XCC / AAS)[a]	Part number	FC5022 16Gb 12-port	FC5022 16Gb 24-port	FC5022 16Gb 24-port ESB	FC3171 8Gb switch	FC3171 8Gb Pass-thru
		Part number	**88Y6374**	**00Y3324**	**90Y9356**	**69Y1930**	**69Y1934**
		Feature codes[a]	**A1EH / 3770**	**A3DP / ESW5**	**A2RQ / 3771**	**A0TD / 3595**	**A0TJ / 3591**
69Y1938	A1BM / 1764	FC3172 2-port 8Gb FC Adapter	Yes	Yes	Yes	Yes	Yes
95Y2375	A2N5 / EC25	FC3052 2-port 8Gb FC Adapter	Yes	Yes	Yes	Yes	Yes
88Y6370	A1BP / EC2B	FC5022 2-port 16Gb FC Adapter	Yes	Yes	Yes	No	No
95Y2386	A45R / EC23	FC5052 2-port 16Gb FC Adapter	Yes	Yes	Yes	No	No
95Y2391	A45S / EC2E	FC5054 4-port 16Gb FC Adapter	Yes	Yes	Yes	No	No
69Y1942	A1BQ / A1BQ	FC5172 2-port 16Gb FC Adapter	Yes	Yes	Yes	Yes	Yes
95Y2379	A3HU / A3HU	FC5024D 4-port 16Gb FC Adapter	Yes	Yes	Yes	No	No
7ZT7A00521	AVCW	ThinkSystem Emulex LPm16002B-L Mezz 16Gb 2-Port FC Adapter	Yes	Yes	Yes	No	No
7ZT7A00522	AVCX	ThinkSystem Emulex LPm16004B-L Mezz 16Gb 4-Port FC Adapter	Yes	Yes	Yes	No	No
7ZT7A00520	AVCV	ThinkSystem QLogic QML2692 Mezz 16Gb 2-Port Fibre Channel Adapter	Yes	Yes	Yes	Yes	Yes

a. The first feature code listed is for configurations ordered through System x sales channels (XCC using x-config). The second feature code is for configurations ordered through the IBM Power Systems channel (AAS using e-config)

4.2 Transceivers for Fibre Channel switches

Support for transceivers and cables for Fibre Channel switch modules is shown in Table 4-2.

Table 4-2 Modules and cables supported in Fibre Channel I/O modules

Part number	Feature code		FC5022 16Gb 12-port	FC5022 16Gb 24-port	FC5022 16Gb 24-port ESB	FC3171 8Gb switch	FC3171 8Gb Pass-thru
		Part number	**88Y6374**	**00Y3324**	**90Y9356**	**69Y1930**	**69Y1934**
		Feature code	**A1EH**	**A3DP**	**A2RQ**	**A0TD**	**A0TJ**
16 Gb transceivers							
88Y6393	A22R	Brocade 16 Gb SFP+ Optical Transceiver	Yes	Yes	Yes	No	No
98Y2178[a]	None	SFP+ Transceiver 16 Gbps 10 km LW	Yes	Yes	Yes	No	No
98Y2179[a]	None	SFP+ Transceiver 16 Gbps 10 km LW 8-Pack	Yes	Yes	Yes	No	No
00MY768	ASK2	Brocade 16GB 10KM LW SFP Transceiver	Yes	Yes	Yes	No	No
00MY770	ASK3	Brocade 16GB 25KM ELW SFP Transceiver	Yes	Yes	Yes	No	No
8 Gb transceivers							
88Y6416	A2B9	Brocade 8 Gb SFP+ SW Optical Transceiver	Yes	Yes	Yes	No	No
44X1964	5075	8 Gb SFP+ SW Optical Transceiver	No	No	No	Yes	Yes
45W1216[a]	None	SFP Transceiver 8 Gbps 10 km LW	Yes	Yes	Yes	No	No
45W1218[a]	None	SFP Transceiver 8 Gbps 10 km LW 8-Pack	Yes	Yes	Yes	No	No
45W2283[a]	None	SFP Transceiver 8 Gbps 25 km ELW	Yes	Yes	Yes	No	No
00MY764	ASK0	Brocade 8GB 10KM LW SFP Transceiver	Yes	Yes	Yes	No	No
00MY766	ASK1	Brocade 8GB 25KM ELW SFP Transceiver	Yes	Yes	Yes	No	No
4 Gb transceivers							
39R6475	4804	4 Gb SFP Transceiver Option	No	No	No	Yes	Yes
Optical cables for 8 Gb and 16 Gb FC SW SFP+ transceivers							
00MN498	ASR5	Lenovo 0.5m LC-LC OM3 MMF Cable	Yes	Yes	Yes	No	No

Part number	Feature code		FC5022 16Gb 12-port	FC5022 16Gb 24-port	FC5022 16Gb 24-port ESB	FC3171 8Gb switch	FC3171 8Gb Pass-thru
		Part number	88Y6374	00Y3324	90Y9356	69Y1930	69Y1934
		Feature code	A1EH	A3DP	A2RQ	A0TD	A0TJ
00MN502	ASR6	Lenovo 1m LC-LC OM3 MMF Cable	Yes	Yes	Yes	No	No
00MN505	ASR7	Lenovo 3m LC-LC OM3 MMF Cable	Yes	Yes	Yes	No	No
00MN508	ASR8	Lenovo 5m LC-LC OM3 MMF Cable	Yes	Yes	Yes	No	No
00MN511	ASR9	Lenovo 10m LC-LC OM3 MMF Cable	Yes	Yes	Yes	No	No
00MN514	ASRA	Lenovo 15m LC-LC OM3 MMF Cable	Yes	Yes	Yes	No	No
00MN517	ASRB	Lenovo 25m LC-LC OM3 MMF Cable	Yes	Yes	Yes	No	No
00MN520	ASRC	Lenovo 30m LC-LC OM3 MMF Cable	Yes	Yes	Yes	No	No

a. Withdrawn from marketing

4.3 Fibre Channel switch upgrades

Table 4-3 lists the available port and feature upgrades for the FC5022 16Gb SAN Scalable Switches. These upgrades are all Features on Demand license upgrades.

Table 4-3 FC5022 switch upgrades

Part number	Feature codes (XCC / AAS)[a]	Description	24-port 16 Gb ESB switch	24-port 16 Gb SAN switch	16 Gb SAN switch
			90Y9356	00Y3324	88Y6374
88Y6382	A1EP / 3772	FC5022 16Gb SAN Scalable Switch (Upgrade 1)	No	No	Yes
88Y6386	A1EQ / 3773	FC5022 16Gb SAN Scalable Switch (Upgrade 2)	Yes	Yes	Yes
00Y3320[b]	A3HN / ESW3	FC5022 16Gb Fabric Watch Upgrade	No	Yes	Yes
00Y3322	A3HP / ESW4	FC5022 16Gb ISL/Trunking Upgrade	No	Yes	Yes

a. The first feature code listed is for configurations ordered through Lenovo System x sales channels. The second feature code is for configurations ordered through the IBM Power Systems channel

b. Withdrawn from marketing

Table 4-4 shows the total number of active ports on the switch after applying compatible port upgrades.

Table 4-4 Total port counts after applying upgrades

	Total number of active ports		
	24-port 16 Gb ESB SAN switch	**24-port 16 Gb SAN switch**	**16 Gb SAN switch**
Ports on Demand upgrade	**90Y9356**	**00Y3324**	**88Y6374**
Included with base switch	24	24	12
Upgrade 1, 88Y6382 (adds 12 ports)	Not supported	Not supported	24
Upgrade 2, 88Y6386 (adds 24 ports)	48	48	48

For information on these upgrades, see the Lenovo Press Product Guide on the FC5022 16Gb SAN Scalable Switches:

http://lenovopress.com/tips0870

4.4 Storage target support

For compatiblity information about Lenovo storage targets, see compatibility matrixes listed in the following URL:

https://lenovopress.com/lp0584-lenovo-storage-interoperability-links

For compatiblity information about IBM storage targets, see the IBM System Storage Interoperation Center (SSIC) web site:

http://ibm.com/systems/support/storage/ssic/interoperability.wss

5

Software compatibility

This chapter describes aspects of software compatibility.

Topics in this chapter are:

Unless it is otherwise specified, updates or service packs equal to or higher within the same operating system release family and version of the operating system are also supported. However, support for newer major versions are not supported unless specifically identified.

For customers interested in deploying operating systems not listed here, Lenovo can provide customers with server hardware only warranty support. For operating system and software support, customers must contact the operating system vendor or community. Customers must obtain the operating system and OS software support directly from the operating system vendor or community. For more information, see “Additional OS Information” on the ServerProven web page.

5.1 Operating system support

In this section:

5.1.1 x86 compute nodes

For these systems, see the Operating System Interoperability Guide, available from:

http://lenovopress.com/osig

5.1.2 Power Systems compute nodes

Table 5-1 lists the operating systems supported by the Power Systems compute nodes.

Table 5-1 Operating system support - Power Systems compute nodes

Model	p24L 1457-7FL	p260 7895-22X	p260 7895-23X	p260 7895-23A	p270 7954-24X	p460 7895-42X	p460 7895-43X
IBM AIX 7.1	No	Yes	Yes	Yes	Yes	Yes	Yes
IBM AIX 6.1	No	Yes	Yes	Yes	Yes	Yes	Yes
IBM AIX 5.3	No	Yes	Yes	Yes	Yes	Yes	Yes
IBM i 7.1[a]	No	Yes	Yes	Yes	Yes	Yes	Yes
IBM i 6.1[a]	No	Yes[b]	Yes[b]	Yes[b]	Yes[b]	Yes[b]	Yes[b]
IBM VIOS 2.2.1	Yes	Yes	No	No	No	Yes	No
IBM VIOS 2.2.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RHEL 5 for IBM POWER	Yes (U7)	Yes (U7)	Yes (U9)	No	No	Yes (U7)	No
RHEL 6 for IBM POWER	Yes (U2)	Yes (U2)	Yes (U3)	Yes (U4)	Yes (U4)	Yes (U2)	Yes (U4)
SLES 11 for IBM POWER[c]	Yes (SP2)	Yes (SP2)	Yes (SP2)	Yes (SP2)	Yes (SP2)	Yes (SP2)	Yes (SP2)

a. IBM i requires VIOS. IBM i is not supported natively
b. IBM i 6.1 is supported but cannot be ordered preinstalled from IBM Manufacturing.
c. With current maintenance updates available from SUSE to enable all planned functionality.

Specific technology levels, service pack, and APAR levels are as follows:

- For the p260 (model 22X), and p460:
  - IBM i 6.1 with i 6.1.1 machine code, or later; Requires VIOS
  - IBM i 7.1 TR4, or later; Requires VIOS
  - VIOS 2.2.1.4, or later
  - AIX V7.1 with the 7100-01 Technology Level with Service Pack 3 with APAR IV14284
  - AIX V7.1 with the 7100-01 Technology Level with Service Pack 4, or later
  - AIX V7.1 with the 7100-00 Technology Level with Service Pack 6, or later
  - AIX V6.1 with the 6100-07 Technology Level, with Service Pack 3 with APAR IV14283
  - AIX V6.1 with the 6100-07 Technology Level, with Service Pack 4, or later
  - AIX V6.1 with the 6100-06 Technology Level with Service Pack 8, or later
  - AIX V5.3 with the 5300-12 Technology Level with Service Pack 6, or later. An IBM AIX 5L V5.3 Service Extension is also required.
- For the p260 (model 23X):
  - IBM i 6.1 with i 6.1.1 machine code, or later; Requires VIOS
  - IBM i 7.1 TR5, or later; Requires VIOS
  - VIOS 2.2.2.1 or later
  - VIOS 2.2.1.5 or later
  - AIX V7.1 with the 7100-02 Technology Level or later
  - AIX V7.1 with the 7100-01 Technology Level with Service Pack 7 or later
  - AIX V6.1 with the 6100-08 Technology Level or later
  - AIX V6.1 with the 6100-07 Technology Level, with Service Pack 7, or later
  - AIX V6.1 with the 6100-06 Technology Level with Service Pack 11, or later
  - AIX V5.3 with the 5300-12 Technology Level with Service Pack 7, or later. An IBM AIX 5L V5.3 Service Extension is required.

- For p260 (P7+) 7895-23A, p270 (P7+) 7954-24X, p460 (P7+) 7895-43X:
  - VIOS 2.2.2.3 or later
  - IBM i 6.1 with i 6.1.1 machine code, or later; Requires VIOS
  - IBM i 7.1 TR6 or later; Requires VIOS
  - AIX V7.1 with the 7100-02 Technology Level with Service Pack 3 or later
  - AIX V6.1 with the 6100-08 Technology Level with Service Pack 3 or later
  - AIX V5.3 Technology Level Support offering with the Service Extension

5.2 Lenovo XClarity Administrator

Lenovo XClarity Administrator supports the Flex System compute nodes and I/O modules as managed endpoints that are listed in Table 5-2.

Where devices are supported but with some functions limited, the limits are as follows:

- Compute nodes: Servers with IBM-signed firmware have limited support and the following functions are not available:
  - Processor and memory usage data
  - RAID-link configuration (configuration management using patterns)
- I/O Modules: I/O modules with IBM-signed firmware have limited support, and the following functions are not available:
  - Aggregated event and audit logs
  - Network configuration
- Enterprise Chassis: For full function, the Flex System Enterprise Chassis requires one or two Chassis Management Module II (CMM2) components installed, part number 00FJ669. The CMM2 has Lenovo signed firmware. A chassis containing the first generation CMM with IBM-signed firmware has limited support and the following functions are not available:
  - Network configuration
  - Aggregated event and audit logs on the I/O Modules

  Note: It is not possible for an IBM-signed first generation CMM and a Lenovo-signed CMM2 to be installed within a chassis at the same time. The firmware on a CMM1 cannot be upgraded to make a CMM2, as they contain different hardware.
- V7000 Storage Node: Lenovo XClarity Administrator provides limited support for Flex System V7000 Storage Nodes, including displaying status and detailed information, powering on and off, virtually reseating the canisters, and launching the management module.

Table 5-2 Lenovo XClarity support

Product	Firmware signing	Lenovo XClarity support (see notes above)
Flex System chassis		
Enterprise Chassis with CMM (first generation)	IBM signed	Support with some functions limited
Enterprise Chassis with CMM2	Lenovo signed	Support with full function
Flex System nodes		
x220 (7906)	IBM signed	Support with some functions limited
x222 (7916)	IBM signed	Support with some functions limited

Product	Firmware signing	Lenovo XClarity support (see notes above)
x240 (7162)	Lenovo signed	Support with full function
x240 (8737, E5-2600)	IBM signed	Support with some functions limited
x240 (8737, E5-2600 v2)	IBM signed	Support with some functions limited
x240 (7863)	IBM signed	Support with some functions limited
x240 (8956)	IBM signed	Support with some functions limited
x240 M5 (9532)	Lenovo signed	Support with full function
x440 (7917)	IBM signed	Support with some functions limited
x440 (7167)	Lenovo signed	Support with full function
x280 / x480 / x880 X6 (7903)	IBM signed	Support with some functions limited
x280 / x480 / x880 X6 (7196)	Lenovo signed	Support with full function
SN550 (7X16)	Lenovo signed	Support with full function
SN850 (7X16)	Lenovo signed	Support with full function
V7000 Storage Node	IBM signed	Support with some functions limited
Power Systems compute nodes	IBM signed	Not supported[a]
Flex System I/O modules		
CN4093 10Gb Converged Scalable Switch (00FM510)	Lenovo signed	Support with full function
CN4093 10Gb Converged Scalable Switch (00D5823)	IBM signed	Support with some functions limited
EN2092 1Gb Ethernet Scalable Switch (49Y4294)	IBM signed	Support with some functions limited
EN4091 10Gb Ethernet Pass-thru (88Y6043)	IBM signed	Support with some functions limited
EN4093 10Gb Scalable Switch (49Y4270)	IBM signed	Support with some functions limited
EN4093R 10Gb Scalable Switch (00FM514)	Lenovo signed	Support with full function
EN4093R 10Gb Scalable Switch (95Y3309)	IBM signed	Support with some functions limited
SI4091 System Interconnect Module (00FE327)	Lenovo signed	Support with full function
SI4093 System Interconnect Module (00FM518)	Lenovo signed	Support with full function
SI4093 System Interconnect Module (95Y3313)	IBM signed	Support with some functions limited
Cisco Nexus B22 Extender (94Y5350)	Vendor signed	Not supported[a]
EN4023 10Gb Scalable Switch (94Y5212)	Vendor signed	Not supported[a]
EN6131 40Gb Switch (90Y9346)	Vendor signed	Support with full function

a. These switches are not manageable from within Lenovo XClarity Administrator, but they are recognized as present within the chassis.

For further support information, see the following Flex System Information Center page:

http://flexsystem.lenovofiles.com/help/index.jsp?topic=/com.lenovo.lxca.doc/plan_supportedhw.html

5.3 IBM Fabric Manager

ThinkSystem compute nodes: The ThinkSystem compute nodes do not support IBM Fabric Manager.

IBM Fabric Manager is a solution that you can use to quickly replace and recover compute nodes in your environment. It accomplishes this task by assigning Ethernet MAC, Fibre Channel WWN, and SAS WWN addresses so that any compute nodes plugged into those bays take on the assigned addresses. This configuration enables the Ethernet and Fibre Channel infrastructure to be configured once and before any compute nodes are connected to the chassis.

The operating systems that Fabric Manager supports are listed in the Flex System Information Center at the following website:

http://flexsystem.lenovofiles.com/help/index.jsp?topic=%2Fcom.ibm.acc.iofm.doc%2Fdw1li_supported_os.html

Table 5-3 lists which Chassis and Chassis Management Module combinations are supported with IBM Fabric Manager.

Table 5-3 CMM support with IBM Fabric Manager

Chassis Management Module	CMM firmware	IBM Fabric Manager support
Lenovo ordering system (x-config, SSCT)		
Enterprise Chassis (8721) with CMM (68Y7030)	IBM-signed firmware	Supported
Enterprise Chassis (8721) with CMM2 (00FJ669)	Lenovo-signed firmware	Not supported
Carrier-Grade Chassis (7385) with CMM2 (00FJ669)	Lenovo-signed firmware	Not supported
IBM ordering system (e-config, AAS)		
Enterprise Chassis (7893-92X) with CMM (fc 3592)	IBM-signed firmware	Supported
Enterprise Chassis (7893-92X) with CMM2 (00FJ669[a])	Lenovo-signed firmware	Not supported

a. CMM2 must be ordered from Lenovo; not orderable via the IBM AAS ordering system

The next two tables lists the adapters that support Fabric Manager and the compute nodes that they can be installed in:

- Table 5-4 lists support for x86-based compute nodes
- Table 5-5 on page 76 lists support for Power Systems compute nodes

Table 5-4 IBM Fabric Manager support - adapters and x86 compute nodes

Part number	Description	x220 (7906) IBM signed	x222 (7916) IBM signed	x240 (8737, v1) IBM signed	x240 (8737, v2) IBM signed	x240 (7162) Lenovo signed	x240 M5 (9532) Lenovo signed	x440 (7917) IBM signed	x440 (7167) Lenovo signed	x280 x480 x880[a] IBM signed
Ethernet expansion cards										
88Y5920	CN4022 2-port 10Gb Converged	Yes	N/A[b]	Yes	Yes	No	No	Yes	No	Yes

Part number	Description	x220 (7906) IBM signed	x222 (7916) IBM signed	x240 (8737, v1) IBM signed	x240 (8737, v2) IBM signed	x240 (7162) Lenovo signed	x240 M5 (9532) Lenovo signed	x440 (7917) IBM signed	x440 (7167) Lenovo signed	x280 x480 x880[a] IBM signed
00JY800	CN4052 2-port 10Gb Virtual Fabric	No	N/A[b]	No	No	No	No	No	No	No
90Y3554	CN4054 10Gb Virtual Fabric	Yes	N/A[b]	Yes	No	No	No	Yes	No	No
00Y3306	CN4054R 10Gb Virtual Fabric	No	N/A[b]	No	Yes	No	No	No	No	Yes
94Y5160	CN4058S 8-port 10Gb Virtual Fabric	No	N/A[b]	No	No	No	No	No	No	No
49Y7900	EN2024 4-port 1Gb Ethernet	Yes	N/A[b]	Yes	Yes	No	No	Yes	No	Yes
90Y3466	EN4132 2-port 10Gb Ethernet	Yes	N/A[b]	Yes	Yes	No	No	Yes	No	Yes
00AG530	EN4172 2-port 10Gb Ethernet	No	N/A[b]	No	No	No	No	No	No	No
90Y3482	EN6132 2-port 40Gb Ethernet	Yes	N/A[b]	Yes	Yes	No	No	Yes	No	Yes
Fibre Channel expansion cards										
95Y2375	FC3052 2-port 8Gb FC Adapter	Yes	N/A[b]	Yes	Yes	No	No	Yes	No	Yes
69Y1938	FC3172 2-port 8Gb FC Adapter	Yes	N/A[b]	Yes	Yes	No	No	Yes	No	Yes
88Y6370	FC5022 2-port 16Gb FC Adapter	Yes	N/A[b]	Yes	Yes	No	No	Yes	No	Yes
95Y2379	FC5024D 4-port 16Gb FC Adapter	N/A[b]	Yes	N/A[b]	N/A[b]	N/A[b]	N/A[b]	N/A[b]	N/A[b]	N/A[b]
95Y2386	FC5052 2-port 16Gb FC Adapter	Yes	N/A[b]	Yes	Yes	No	No	Yes	No	Yes
95Y2391	FC5054 4-port 16Gb FC Adapter	Yes	N/A[b]	Yes	Yes	No	No	Yes	No	Yes
69Y1942	FC5172 2-port 16Gb FC Adapter	Yes	N/A[b]	Yes	Yes	No	No	Yes	No	Yes
InfiniBand expansion cards										
90Y3454	IB6132 2-port FDR InfiniBand	No	N/A[b]	No	No	No	No	No	No	No
90Y3486	IB6132D 2-port FDR InfiniBand	N/A[b]	No	N/A[b]	N/A[b]	N/A[b]	N/A[b]	N/A[b]	N/A[b]	N/A[b]

a. X6 compute nodes: Single node only, no partitioning, no failover support, dual ASIC cards only supported in mezz slot 1 and slot 2

b. Not applicable. This combination of adapter and compute node is not supported.

Table 5-5 IBM Fabric Manager support - adapters in Power Systems compute nodes

Feature code	Description	p24L	p260	p270	p460
Ethernet expansion cards					
1762	EN4054 4-port 10Gb Ethernet Adapter	Yes	Yes	Yes	Yes
1763	EN2024 4-port 1Gb Ethernet Adapter	Yes	Yes	Yes	Yes
EC24	CN4058 8-port 10Gb Converged Adapter	Yes	Yes	Yes	Yes
EC26	EN4132 2-port 10Gb RoCE Adapter	Yes	Yes	Yes	Yes
Fibre Channel expansion cards					
1764	FC3172 2-port 8Gb FC Adapter	Yes	Yes	Yes	Yes

Feature code	Description	p24L	p260	p270	p460
EC23	FC5052 2-port 16Gb FC Adapter	Yes	Yes	Yes	Yes
EC2E	FC5054 4-port 16Gb FC Adapter	Yes	Yes	Yes	Yes
InfiniBand expansion cards					
1761	IB6132 2-port QDR InfiniBand Adapter	No	No	No	No

Table 5-6 lists the supported switches.

Table 5-6 IBM Fabric Manager support - switches

Description	Firmware codebase	Part number	Feature codes	Support IBM Fabric Manager
Ethernet switches				
CN4093 10Gb Converged Scalable Switch	IBM signed	00D5823	A3HH / ESW2	Yes - VLAN failover[a]
CN4093 10Gb Converged Scalable Switch	Lenovo signed	00FM510	ASUT / None	No
EN4093R 10Gb Scalable Switch	IBM signed	95Y3309	A3J6 / ESW7	Yes - VLAN failover[a]
EN4093R 10Gb Scalable Switch	Lenovo signed	00FM514	ASUU / None	No
EN4093 10Gb Scalable Switch[b]	IBM signed	49Y4270	A0TB / 3593	Yes - VLAN failover[a]
EN2092 1Gb Ethernet Switch	IBM signed	49Y4294	A0TF / 3598	Yes - VLAN failover[a]
EN4023 10Gb Scalable Switch	Vendor signed	94Y5212	ESWD / ESWD	No
EN4091 10Gb Ethernet Pass-thru	IBM signed	88Y6043	A1QV / 3700	Yes[c]
SI4091 System Interconnect Module	Lenovo signed	00FE327	ARZM / None	No
SI4093 System Interconnect Module	IBM signed	95Y3313	A45T / ESWA	Yes - VLAN failover[a]
SI4093 System Interconnect Module	Lenovo signed	00FM518	ASUV / None	No
Cisco Nexus B22 Fabric Extender	Vendor signed	94Y5350	ESWB / ESWB	Yes[c]
EN6131 40Gb Ethernet Switch	Vendor signed	90Y9346	A3HJ / ESW6	Yes - VLAN failover[a]
Fibre Channel switches				
FC5022 16Gb SAN Scalable Switch	Vendor signed	88Y6374	A1EH / 3770	Yes[c]
FC5022 16Gb 24-port SAN Scalable Switch	Vendor signed	00Y3324	A3DP / ESW5	Yes[c]
FC5022 16Gb ESB Switch	Vendor signed	90Y9356	A2RQ / 3771	Yes[c]
FC3171 8Gb SAN Switch	Vendor signed	69Y1930	A0TD / 3595	Yes[c]
FC3171 8Gb SAN Pass-thru	Vendor signed	69Y1934	A0TJ / 3591	Yes[c]
InfiniBand switches				
IB6131 InfiniBand Switch	Vendor signed	90Y3450	A1EK / 3699	No

a. VLAN failover (port based or untagged only) is supported
b. Withdrawn from marketing
c. IBM Fabric Manager is transparent to the Cisco B22, pass-thru module, and Fibre Channel switch modules. There is no dependency between Fabric Manager and these modules.

IBM Fabric Manager V4.1 is supported on the following operating systems (see 5.1, “Operating system support” on page 71 for operating systems supported by each server):

- Microsoft Windows 7 (client only)
- Microsoft Windows Server 2003 and 2003 R2
- Microsoft Windows Server 2008 and 2008 R2
- Microsoft Windows Server 2012
- Red Hat Enterprise Linux 5
- Red Hat Enterprise Linux 6
- SUSE Linux Enterprise Server 10
- SUSE Linux Enterprise Server 11

IBM Fabric Manager V4.1 is supported on the following web browsers:

- Internet Explorer 8, 9, 10
- Firefox 17 ESR, 24 ESR, 31 ESR

IBM Fabric Manager V4.1 is supported on Java Runtime Edition 1.7.

Abbreviations and acronyms

APAR	Authorized Problem Analysis Reports
DAC	dual address cycle
DIMM	dual inline memory module
ECC	error checking and correcting
ESB	Enterprise Switch Bundle
FC	Fibre Channel
FDR	fourteen data rate
GB	gigabyte
HDD	hard disk drive
HH	half-high
HPC	high performance computing
HS	hot swap
I/O	input/output
IB	InfiniBand
IBM	International Business Machines
IT	information technology
ITSO	International Technical Support Organization
LOM	LAN on motherboard
LP	low profile
LR	long range
LRDIMM	load-reduced DIMM
MAC	media access control
MDS	Multilayer Director Switch
MLC	multilevel cell
MTP	Multi-fiber Termination Push-on
N/A	not applicable
NL	nearline
NPIV	N_Port ID Virtualization
OS	operating system
pNIC	physical network interface controller
QDR	quad data rate
QSFP	Quad Small Form-factor Pluggable
RAID	redundant array of independent disks
RDIMM	registered DIMM
RETAIN	Remote Electronic Technical Assistance Information Network
RHEL	Red Hat Enterprise Linux
RPM	revolutions per minute
RSS	receive-side scaling
SAN	storage area network
SAS	Serial Attached SCSI
SATA	Serial ATA
SDD	Subsystem Device Driver
SED	self-encrypting drive
SFF	Small Form Factor
SFP	small form-factor pluggable
SIM	switch independent mode
SLES	SUSE Linux Enterprise Server
SR	short range
SSD	solid-state drive
SSIC	System Storage Interoperation Center
SVC	SAN Volume Controller
TOR	top of rack
UDIMM	unbuffered DIMM
UFP	Unified Fabric Port
USB	universal serial bus
VIOS	Virtual I/O Server
VFM	virtual fabric mode
vNIC	virtual network interface controller
WWN	worldwide name

Related publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this paper.

Lenovo Press publications

The following Lenovo Press publications provide additional information about the topic in this document.

- *Flex System Products and Technology*, SG24-8255
- *Flex System Networking in an Enterprise Data Center*, REDP-4834
- NIC Virtualization in Flex System Fabric Solutions, SG24-8223
- *xREF: System x Reference*, REDP-XREF

Lenovo Press Product Guides are also available for the following Flex System components:

- Chassis and compute nodes
- Switches and pass-through modules
- Adapter cards

You can find these publications and more at the Lenovo Press web site:

http://lenovopress.com

Other publications and online resources

These publications and websites are also relevant as further information sources:

- Flex System product home

  http://shop.lenovo.com/us/en/systems/servers/blades/flex-system/
- Flex System Information Center:

  http://flexsystem.lenovofiles.com/help/index.jsp
- ServerProven hardware compatibility page for Flex System:

  http://www.lenovo.com/us/en/serverproven/flexsystem.shtml
- *Flex System Enterprise Chassis Power Guide*, found at:

  https://support.lenovo.com/documents/LNVO-POWINF
- Power Configurator

  https://support.lenovo.com/documents/LNVO-PWRCONF
- Lenovo Hardware Configurator:

  http://lesc.lenovo.com/products/hardware/configurator/bhui/launchNI.wss
- IBM System Storage Interoperation Center:

  http://www.ibm.com/systems/support/storage/ssic

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