Flex System Enterprise Chassis
Product Guide

Flex System is the next generation of blade technology with more performance and bandwidth and far more capability to consolidate and virtualize than previous systems. Flex System is anchored by the Flex System Enterprise Chassis which enables high-speed performance with integrated servers and networking. Furthermore, its flexible design can meet the needs of varying workloads with independently scalable IT resource pools for higher utilization and lower cost per workload.

The Flex System Enterprise Chassis is shown in Figure 1.

Figure 1. The Flex System Enterprise Chassis

Did you know?

In addition to the Flex System Enterprise Chassis, Lenovo also offers the Carrier-Grade Chassis for installations requiring tolerance to higher temperatures or for use in environments without filtered air. For information about the Carrier-Grade Chassis, see https://lenovopress.com/tips1285.

Key features

The Flex System Enterprise Chassis is a simple, integrated infrastructure platform that supports a mix of compute, storage, and networking resources to meet the demands of your applications. 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 screen. This flexible 14 node, 10U chassis is designed for a simple deployment now and to scale to meet your needs in the future.

Flexibility and efficiency

The 14 bays in the chassis allow the installation of compute or management nodes, with networking modules in the rear. A single chassis or a group of chassis can be fully customized to the specific needs of the computing environment. IT can meet the needs of the business using a single system across multiple operating environments.

The system monitors and manages power usage on all major chassis components so you have total control over power consumption. Available power supply options are AC and -48V DC. AC power options can be configurable in either a single or three-phase power domain. The chassis supports N+N or N+1 redundant power supplies and an entirely passive mid-plane to meet your reliability needs. The power supplies are 80 PLUS Platinum-certified indicating high energy efficiency. The chassis design also optimizes cooling with cooling zones within the chassis. The system manages the fan modules based on node configuration within the chassis. So, the system can increase the speed of certain fan modules to cool potential hot spots, and use lower speeds for other fan modules where appropriate.

Easily scalable with simple administration

Because the Flex System Enterprise Chassis is an all-in-one solution, it is designed for growth from a single chassis to many. Adding compute, storage, or networking capability is as simple as adding additional nodes or modules. The simple, highly integrated management system allows you to use the Chassis Management Modules integrated into each chassis to administer a single chassis, and the new Lenovo XClarity Administrator offers agent-free hardware management for compute nodes and networking.

Designed for multiple generations of technology

The Flex System Enterprise Chassis is designed to be the foundation of your IT infrastructure now and into the future. Compute performance requirements are always on the rise and networking demands continue to grow with rising bandwidth needs and a shrinking tolerance for latency. The chassis is designed to scale to meet the needs of your future workloads, offering the flexibility to support current and future innovations in compute, storage, and networking technology.

Locations of key components and connectors

The following figure shows the front of the Enterprise Chassis.

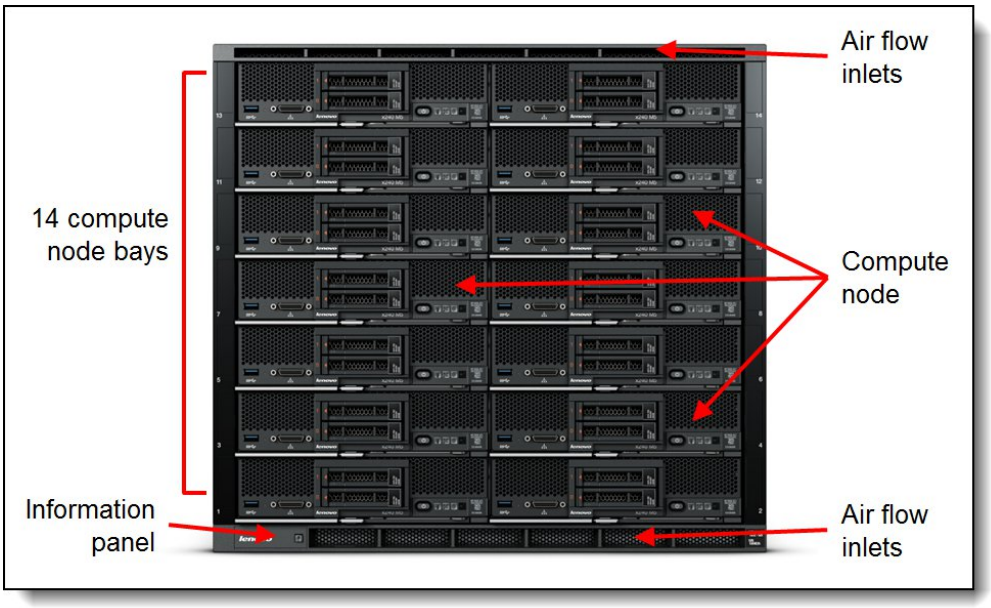

Figure 2. Front of the Flex System Enterprise Chassis

The following figure shows the rear of the Enterprise Chassis.

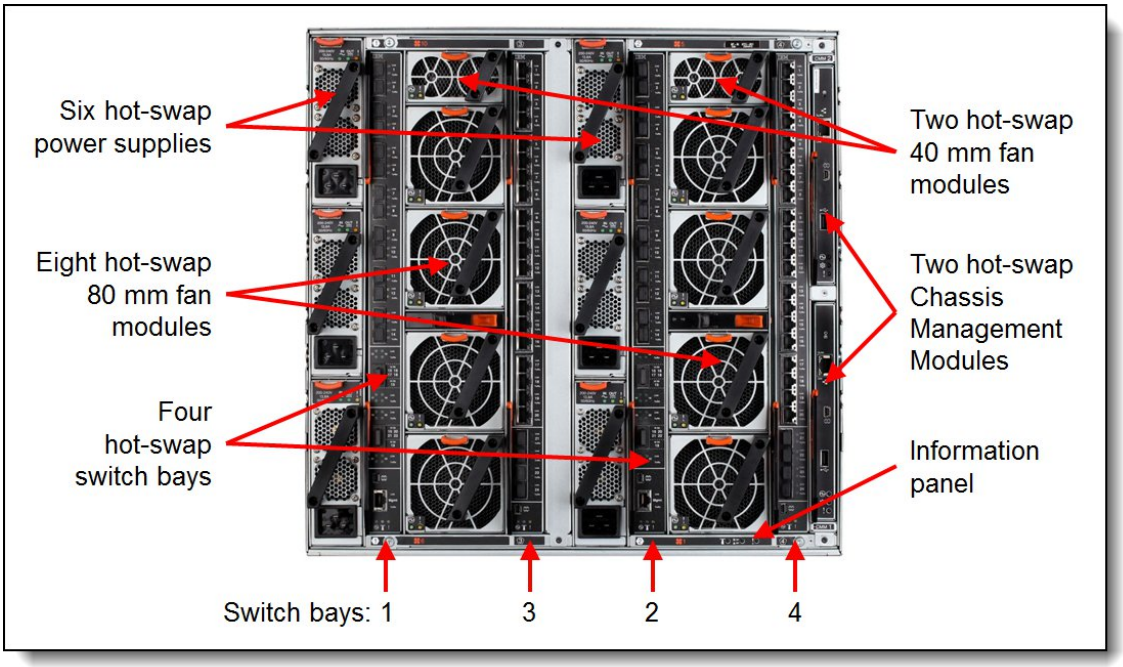

Figure 3. Rear of the Flex System Enterprise Chassis

Standard specifications

The following table lists the standard specifications.

Table 1. Standard specifications

Components	Specification
Machine type	8721
Firmware	Chassis with first generation Chassis Management Module (68Y7030): IBM-signed firmware Chassis with Chassis Management Module 2 (00FJ669): Lenovo-signed firmware
Form factor	10U rack-mounted unit.
Maximum number of compute nodes	14 half-wide (single bay), seven full-wide (two bays), three double-height full-wide (four bays) or one quadruple-height full-wide (8 bays). Mixing is supported.
Chassis per 42U rack	Four.
Nodes per 42U rack	56 half-wide, or 28 full-wide.
Management	Chassis Management Modules 2 (CMM2) modules provide chassis management. One or two CMM2s standard, depending on the model and the use of two provides redundancy. Earlier models of the Enterprise Chassis use the first generation CMM. The CMM2 interfaces with the integrated management module (IMM2) integrated in each compute node in the chassis. Optional Lenovo XClarity Administrator for hardware resource management with integrators to VMware vCenter and Microsoft System Center, including virtualization, networking, and storage management. Chassis with first generation CMM can be upgraded to CMM2 however CMM and CMM2 cannot be mixed.
I/O architecture	Up to eight lanes of I/O to an I/O adapter card, with each lane capable of up to 16 Gbps bandwidth. Up to 16 lanes of I/O to a half-wide node with two adapters. A wide variety of networking solutions, including Ethernet, Fibre Channel, Fibre Channel over Ethernet (FCoE), and InfiniBand.
Power supplies	Up to six power supplies that can provide N+N or N+1 redundant power. AC power supplies are 80 PLUS Platinum certified and provide over 94% efficiency at 50% load and 20% load. Each power supply contains two independently powered 40 mm cooling fan modules. Power supply options are 2500W AC and 2500W -48V DC power supplies. All installed power supplies must be identical.
Fan modules	Ten fan modules (eight 80 mm fan modules and two 40 mm fan modules); Four 80 mm and two 40 mm fan modules standard.
Dimensions	Height: 440 mm (17.3 in) Width: 447 mm (17.6 in) Depth: 800 mm (31.5 in) (measured from front bezel to rear of chassis), 840 mm (33.1 in) (measured from node latch handle to the power supply handle)
Weight	Minimum configuration: 96.62 kg (213 lb) Maximum configuration: 220.45 kg (486 lb)
Sound level	7.5 bels (declared)
Temperature	Operating air temperature 5°C to 40°C
Electrical power	AC Input power: 200 - 240 V ac (nominal), 50 or 60 Hz -48 V DC Input power: -48V to -60 V dc (nominal) Minimum configuration: 0.51 kVA (two power supplies) Maximum configuration: 13 kVA (six power supplies)
Power consumption	12,900 watts maximum

The following table lists what each standard model, Express model and TopSeller model includes. In addition, each model ships with:

- One C19 to C20 two-meter power cable for each power supply
- One Rack Mount Kit

Models

The following table lists the specifications of the standard Enterprise Chassis models.

Table 2. Models

Model	Node bays	CMM* (2 max)	I/O bays (used / max)	I/O modules included	Power supplies (6 max)	40mm fans (2 max)	80mm fan (8 max)	Console breakout cable
Standard models								
8721-ALx	14	1x CMM2	0 / 4	None	2x 2500W	2	4	1
8721-DLx	14	1x CMM2	0 / 4	None	2x 2500W -48V DC	2	4	1
Standard models - Europe, Middle East, Africa (EMEA) only								
8721-B1x	14	2x CMM2	2 / 4	2x EN4023†	2x 2500W	2	4	1
8721-B2x	14	2x CMM2	4 / 4	2x EN4023 2x FC5022‡	2x 2500W	2	4	1
TopSeller models – North America								
8721-E3U	14	2x CMM2	2 / 4	2x SI4093#	6x 2500W	2	8	1
8721-E4U	14	2x CMM2	2 / 4	2x CN4093#	6x 2500W	2	8	1
8721-E5U	14	1x CMM2	0 / 4	None	2x 2500W	2	4	1
TopSeller models – Latin America & Brazil								
8721-E3U	14	2x CMM2	2 / 4	2x SI4093#	6x 2500W	2	8	1
8721-E4U	14	2x CMM2	2 / 4	2x CN4093#	6x 2500W	2	8	1

* CMM1 = first generation Chassis Management Module (68Y7030), CMM2 = Chassis Management Module 2 (00FJ669)
† Model B1x includes two Flex System EN4023 10Gb Scalable Switches, 94Y5212 and two Flex System EN4023 10Gb Scalable Switch (FoD 3) upgrades, 47C9993. The FoD 3 upgrade enables FCoE on all active ports of the switches.
‡ Model B2x includes two Flex System EN4023 10Gb Scalable Switches, 94Y5212 and two Lenovo Flex System FC5022 24-port 16Gb SAN Scalable Switch, 00Y3324.
# Models E3U and E4U include two Flex System Fabric SI4093 System Interconnect Modules, 00FM518 or two Flex System Fabric CN4093 10Gb Converged Scalable Switches, 00FM510, respectively.

Supported compute nodes

The following table lists the compute nodes that are supported in the Flex System Enterprise Chassis. The table also lists the maximum number installable.

Table 3. Supported compute nodes and maximum quantities

Description	Machine type	Firmware code base	Supported in chassis		
			8721 with CMM1 (IBM signed)	8721 with CMM2 (Lenovo signed)	Maximum per chassis*
Lenovo x86 servers					
Flex System x220	7906	IBM signed	Supported	Supported	14
Flex System x222	7916	IBM signed	Supported	Supported	14
Flex System x240	7162	Lenovo signed	No	Supported	14
Flex System x240	8737	IBM signed	Supported	Supported	14
Flex System x240 M5 (E5-2600 v3)	9532	Lenovo signed	Supported	Supported	14
Flex System x240 M5 (E5-2600 v4)	9532	Lenovo signed	No	Supported	14
Flex System x440	7917	IBM signed	Supported	Supported	7
Flex System x440	7167	Lenovo signed	Supported	Supported	7
Flex System x280 X6	7196	Lenovo signed	No	Supported	7
Flex System x480 X6	7196	Lenovo signed	Supported	Supported	7
Flex System x880 X6	7196	Lenovo signed	Supported	Supported	7
Flex System x280 X6	7903	IBM signed	Supported	Supported	7
Flex System x480 X6	7903	IBM signed	Supported	Supported	7
Flex System x880 X6	7903	IBM signed	Supported	Supported	7
Flex System Manager	8731-A1x	IBM signed	Supported	Supported	1**
IBM Power Systems servers					
Flex System p24L	1457	IBM signed	Supported	No	14
Flex System p260	7895-22X	IBM signed	Supported	No	14
Flex System p270	7954-24X	IBM signed	Supported	No	14
Flex System p460	7895-42X	IBM signed	Supported	No	7

* The maximum number of compute nodes supported depends on a number of factors. See below.
** A single Flex System Manager appliance can manage up to 16 chassis

The actual number of compute nodes systems that can be powered on in a chassis depends on these factors:

- The TDP power rating for the processors that are installed in the compute nodes (x86 servers)
- The number of power supplies installed in the chassis
- The capacity of the power supplies installed in the chassis (2100 W or 2500 W)
- The power redundancy policy used in the chassis (N+1 or N+N)

For the x480 X6 or x880 X6, if two compute nodes are scaled together, then a maximum of 3 scaled complexes can be installed. For the x880 X6, if four compute nodes are scaled together, then a maximum of 1 scaled x880 X6 complexes can be installed. Other bays can be filled with other compute nodes.

The table in the Power Supplies section provides guidelines about what number of compute nodes can be powered on in the Enterprise Chassis, based on the type and number of power supplies installed.

See ServerProven® for the latest information about the supported servers:
http://www.lenovo.com/us/en/serverproven/flexsystem.shtml

Supported I/O modules

The Flex System Enterprise Chassis has four high-speed switch bays that are capable of supporting a variety of I/O architectures.

The switches are installed in switch bays in the rear of the Flex System Enterprise Chassis as shown in the following figure. Switches are normally installed in pairs (bays 1 & 2, and bays 3 & 4), because I/O adapter cards installed in the compute nodes route to two switch bays for performance and redundancy.

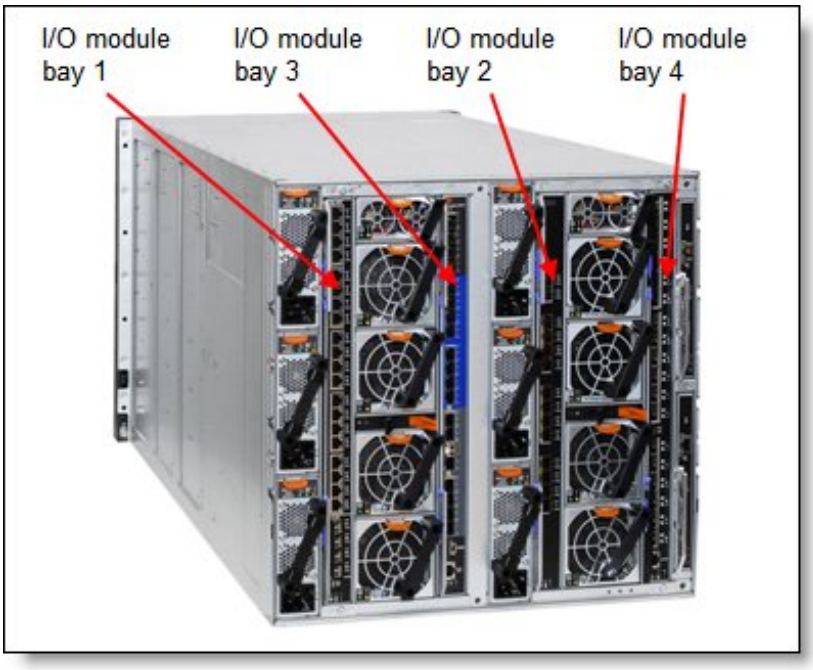

Figure 4. Location of the switch bays in the Flex System Enterprise Chassis

The following table lists the switches that are available for the chassis.

Table 4. I/O modules and upgrades

Description	Part number	Firmware code base	Supported in chassis	
			8721 with CMM (IBM signed)	8721 with CMM2 (Lenovo signed)
Ethernet modules				
EN4093R 10Gb Scalable Switch	00FM514	Lenovo*	No	Supported
CN4093 10Gb Converged Scalable Switch	00FM510	Lenovo*	No	Supported
SI4091 10Gb System Interconnect Module	00FE327	Lenovo*	No	Supported
SI4093 System Interconnect Module	00FM518	Lenovo*	No	Supported
EN2092 1Gb Ethernet Scalable Switch	49Y4294	IBM*	Supported	Supported
EN4091 10Gb Ethernet Pass-thru	88Y6043	IBM*	Supported	Supported
EN4093 10Gb Scalable Switch	49Y4270	IBM*	Supported	Supported
EN4093R 10Gb Scalable Switch	95Y3309	IBM*	Supported	Supported
CN4093 10Gb Converged Scalable Switch	00D5823	IBM*	Supported	Supported
SI4093 System Interconnect Module	95Y3313	IBM*	Supported	Supported
Cisco Nexus B22 Fabric Extender	94Y5350	Vendor	Supported	Supported
EN4023 10Gb Scalable Switch	94Y5212	Vendor	Supported	Supported
EN6131 40Gb Ethernet Switch	90Y9346	Vendor	Supported	Supported
Fibre Channel switches				
FC5022 16Gb SAN Scalable Switch	88Y6374	Vendor	Supported	Supported
FC5022 24-port 16Gb SAN Scalable Switch	00Y3324	Vendor	Supported	Supported
FC5022 24-port 16Gb ESB SAN Scalable Switch	90Y9356	Vendor	Supported	Supported
FC3171 8Gb SAN Switch	69Y1930	Vendor	Supported	Supported
FC3171 8Gb SAN Pass-thru	69Y1934	Vendor	Supported	Supported
InfiniBand switches				
IB6131 InfiniBand Switch (QDR/FDR)	90Y3450	Vendor	Supported	Supported

* For these switches, IBM signed switch firmware is up to Version 7.x and Lenovo signed switch firmware is Version 8.x onwards

I/O architecture

Each half-wide compute node (such as the Flex System x240 Compute Node) has two adapter slots, and each full-wide compute node (such as the Flex System x440 Compute Node) has four adapter slots. The adapter slots in each compute node route through the chassis midplane to the switch bays. The architecture supports up to eight ports per adapter although currently only two-port and four-port adapters are available.

The following figure shows how two-port adapters are connected to switches installed in the chassis.

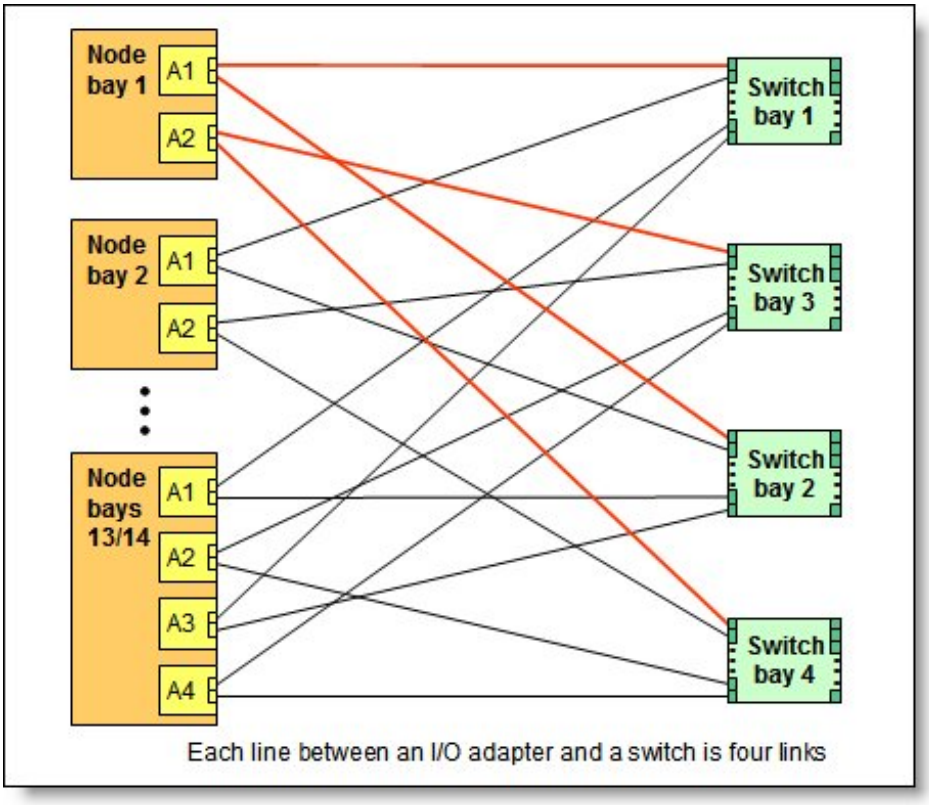

Figure 5. Logical layout of the interconnects between two-port I/O adapters and I/O modules

A four-port adapter doubles the connections between each adapter and switch pair (for example, a four-port adapter in A1 in each compute node routes two connections to switch 1 and two connections to switch 2).

The following figure shows how four-port adapters are connected to switches that are installed in the chassis.

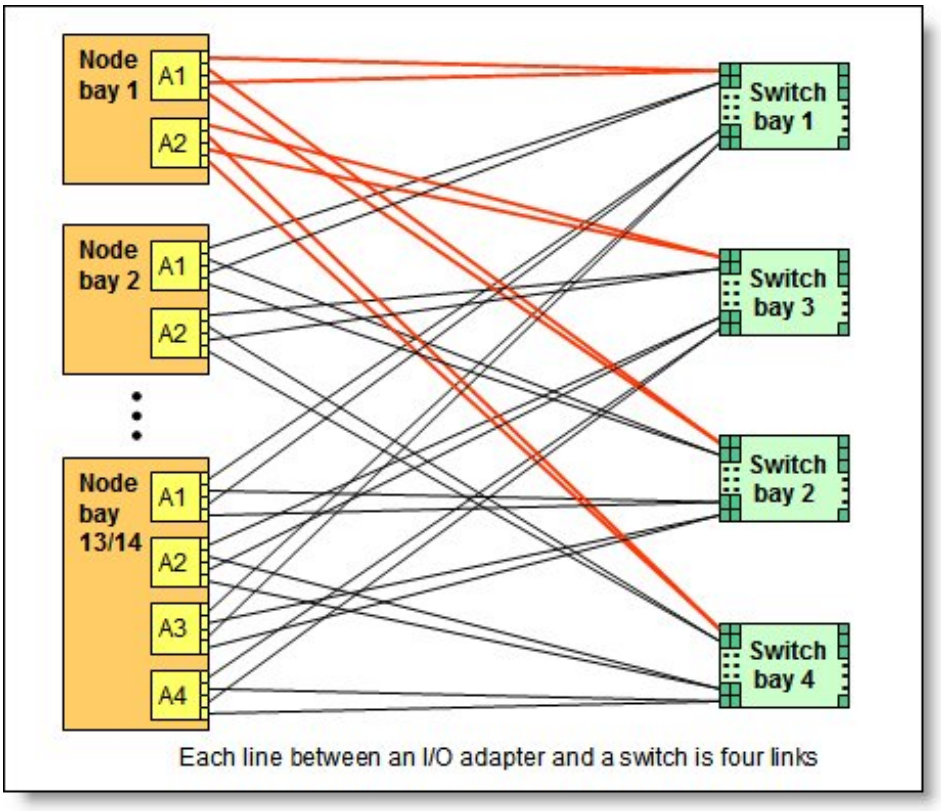

Figure 6. Logical layout of the inter-connections between four-port I/O adapters and I/O modules

The following table shows the connections between adapter slots in the compute nodes to the switch bays in the chassis.

Table 5. Adapter to I/O bay correspondence

I/O adapter slot in the server	Port on the adapter	Corresponding I/O module bay in the chassis
Slot 1	Port 1	Module bay 1
	Port 2	Module bay 2
	Port 3 (for 4-port cards)*	Module bay 1
	Port 4 (for 4-port cards)*	Module bay 2
Slot 2	Port 1	Module bay 3
	Port 2	Module bay 4
	Port 3 (for 4-port cards)*	Module bay 3
	Port 4 (for 4-port cards)*	Module bay 4
Slot 3 (full-wide compute nodes only)	Port 1	Module bay 1
	Port 2	Module bay 2
	Port 3 (for 4-port cards)*	Module bay 1
	Port 4 (for 4-port cards)*	Module bay 2
Slot 4 (full-wide compute nodes only)	Port 1	Module bay 3
	Port 2	Module bay 4
	Port 3 (for 4-port cards)*	Module bay 3
	Port 4 (for 4-port cards)*	Module bay 4

* To make use of all four ports of a four-port adapter, the switch must have 28 internal ports enabled, and two switches must be installed in the bays as indicated.

Chassis Management Module

The Chassis Management Module (CMM) provides single-chassis management in the Enterprise Chassis. The CMM is used to communicate with the integrated management module (IMM) controller in each compute node to provide system monitoring, event recording and alerts, and to manage the chassis, its devices, and the compute nodes.

The chassis has one CMM installed standard but supports two CMMs for redundancy. If one CMM fails, the second CMM can detect its inactivity and activate itself to take control of the system without any disruption. The CMM is central to the management of the chassis and is required in the Enterprise Chassis.

There are two versions of the Chassis Management Module available:

- Chassis Management Module 2 (00FJ669) -- contains a Trusted Platform Module (TPM) v2.0 chip and has a Lenovo-signed firmware codebase. This module is recommended for new installation.
- First generation Chassis Management Module (68Y7030) -- contains a Trusted Platform Module (TPM) v1.1 chip and has an IBM-signed firmware codebase

Standard and TopSeller models of the chassis contain either a CMM (68Y7030) or a CMM2 (00FJ669) as listed in Table 2. The selection of CMM determines which compute nodes and I/O modules are supported in the chassis. See Tables 3 and 4 respectively for details. You can replace a CMM with a CMM2, however mixing is not supported -- you cannot have a chassis with one CMM (68Y7030) and one CMM2 (00FJ669).

The following table shows the ordering information.

Table 6. Chassis Management Module

Part number	Feature codes*	Description	Standard / Maximum
68Y7030	A0TM / A0UE	Flex System Chassis Management Module	1 / 2
00FJ669	ASPT / ASQ8	Flex System Chassis Management Module 2	1 / 2

* The first feature code corresponds to the base CMM installed in the chassis. The second feature code corresponds to the optional second CMM which provides redundancy.

The following figure shows the Chassis Management Module. See Figure 3 for the location of the CMM in the chassis.

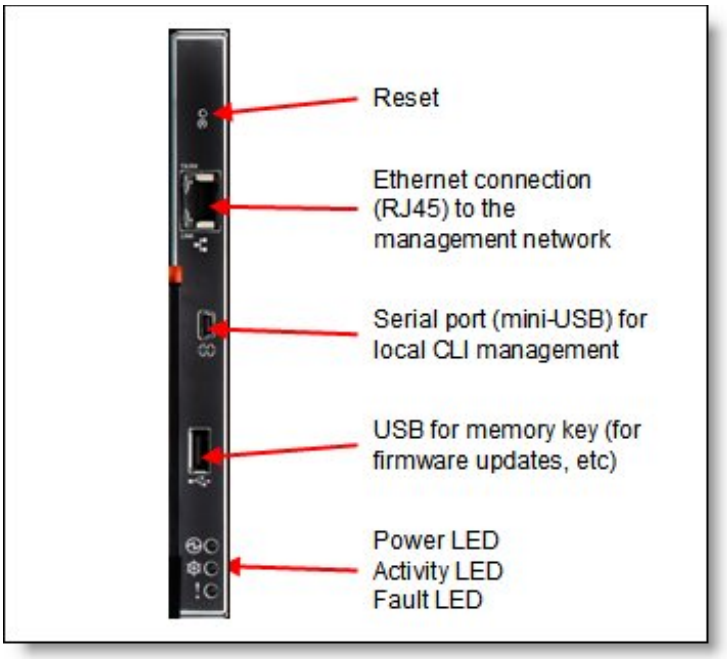

Figure 7. Chassis Management Module

The CMM provides these functions:

- Power control
- Fan management
- Chassis and compute node initialization
- Switch management
- Diagnostics: chassis, I/O options, and compute nodes
- Resource discovery and inventory management
- Resource alerts and monitoring management
- Chassis and compute node power management
- Security policy management
- Role-based access control
- Support for up to 84 local CMM user accounts
- Support for up to 32 simultaneous sessions

The CMM has the following connectors:

- USB connection. This connection can be used for insertion of a USB media key for tasks, such as firmware updates.
- 10/100/1000 Mbps RJ45 Ethernet connection to connect to a management network. The CMM can be managed via this Ethernet port.
- Serial port (mini-USB) for local command-line interface (CLI) management. Use serial cable 90Y9338 for connectivity.

The CMM has the following light-emitting diodes (LEDs) that provide the following information:

- Power-on LED
- Activity LED
- Error LED
- Ethernet port link and port activity LEDs

The CMM also incorporates a reset button, which, when pressed, resets the CMM back to its default condition. It has two functions, depending on how long the button is pressed:

- When pressed for less than 5 seconds, the CMM restarts.
- When pressed for more than 5 seconds (for example, 10 or 15 seconds), the CMM configuration is reset to the manufacturing defaults, and then the CMM restarts.

The CMM supports a web-based graphical user interface (GUI) that provides a way to perform CMM functions within a supported web browser. You can also perform management functions through the CMM command-line interface (CLI). Both the web-based GUI and the CLI are accessible via the single RJ45 Ethernet connector on the CMM or from any other system that is connected to the same (management) network.

The CMM has the following default static IPv4 address. By default, the CMM is configured to respond to Dynamic Host Configuration Protocol (DHCP) first before using its static IPv4 address:

- IP address: 192.168.70.100
- Subnet: 255.255.255.0
- User ID: USERID (all capital letters)
- Password: PASSW0RD (all capital letters, with a zero instead of the letter O)

The CMM does not have a fixed static IPv6 IP address, by default. Initial access to the CMM in an IPv6 environment can be performed by either using the IPv4 IP address or the IPv6 link-local address. The IPv6 link-local address is automatically generated based on the Media Access Control (MAC) address of the CMM.

The CMM is the key component enabling the integrated management network. Internally, the CMM has a multiple port L2 1Gigabit Ethernet switch with dedicated links to all 14 node bays, all four switch bays, and the second CMM, if installed. These connections are all point-to-point, ensuring dedicated bandwidth. The 1GbE links are full-duplex, fixed speed (not auto-negotiate) links. The 1 GbE management network is only accessible by each node's management controller (IMMv2 or FSP), each switch module's management interfaces, the CMM, and the Flex System Manager (FSM) management appliance. This design permits the separation of the management network from the data network.

The CMM has a high-security policy that is enabled by default, which means that the following policies are enabled by default:

- Strong password policies with automatic validation and verification checks
- Required update of the default passwords after the initial setup
- Only secure communication protocols, such as SSH and SSL. Unencrypted protocols, such as HTTP, Telnet, and SNMPv1, are disabled.
- Certificates to establish secure, trusted connections for applications that run on the management processors

Lenovo XClarity Administrator

Lenovo XClarity Administrator is centralized resource management solution aimed at reducing complexity, speeding response and enhancing availability of both Lenovo server systems and solutions.

Lenovo XClarity Administrator provides agent-free hardware management for System x rack servers and Flex System compute nodes and components, including the Chassis Management Module and Flex System I/O modules. The following figure shows the Lenovo XClarity Administrator interface, where both Flex System components and rack servers are being managed and can be seen on the dashboard.

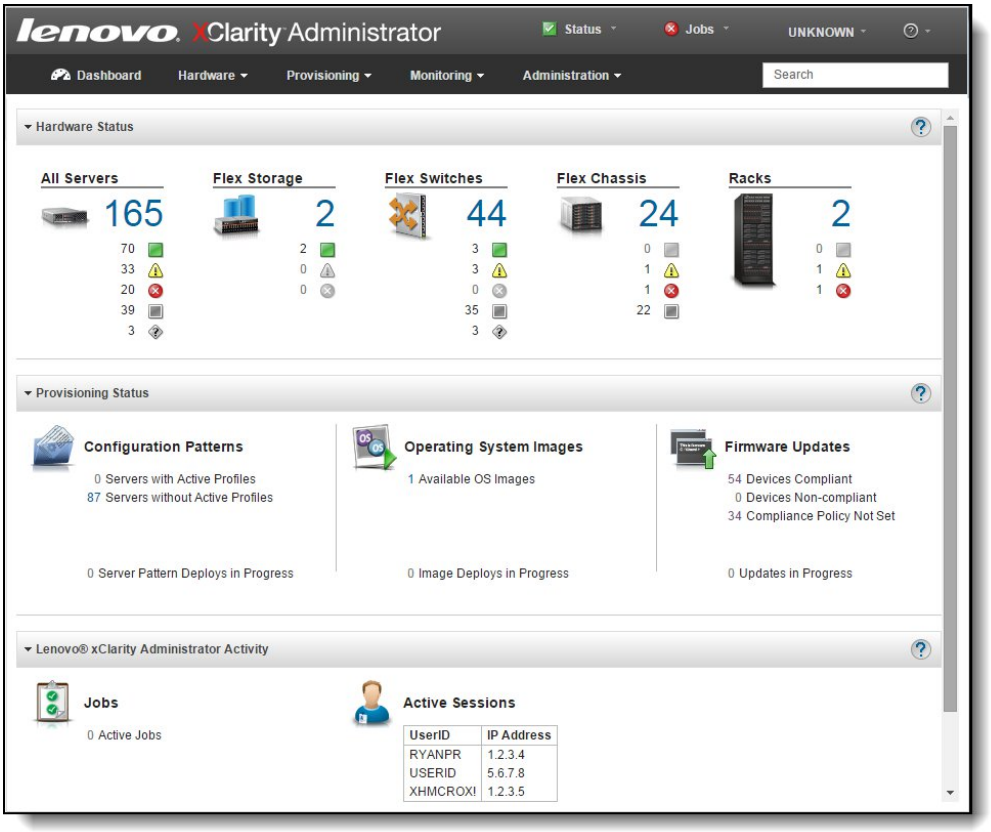

Figure 8. Lenovo XClarity Administrator dashboard

For information about Lenovo XClarity Administrator, see the Lenovo Press Product Guide: http://lenovopress.com/tips1200

Power supplies

A maximum of six power supplies can be installed in the Enterprise Chassis. In models where only two power supplies are standard, additional power supplies are orderable per the following table. All installed power supplies must be the same.

Note: The following power supplies are withdrawn from marketing:

- 2100W Power Module, 47C7633
- HVDC 2500W Power Module, 00AM765

Table 7. Ordering part number and feature code

Description	Part number	Feature code
Flex System Enterprise Chassis 2500W Power Module	43W9049	A0UC
Flex System Enterprise Chassis -48V DC 2500W Power Module	00FJ635	A5VC

Each AC power supply part number ships with one 2.0m (6.5 ft) 16A/100-250V, C19 to IEC 320-C20 rack power cable, feature 6292. Other supported AC line cords including three-way split line cords, are listed in the following table.

Table 8. Supported AC line cords

Description	Part number	Feature code
4.3m, 16A/208V, C19 to NEMA L6-20P (US) Line Cord	40K9772	6275
2.5m, 16A/100-240V, C19 to IEC 320-C20 Rack Power Cable	39Y7916	6252
2m, 16A/100-250V, C19 to IEC 320-C20 Rack Power Cable	None	6292
4.3m, US/CAN, NEMA L15-30P - (3P+Gnd) to 3X IEC 320 C19	00D7192	A2Y3
4.3m, EMEA/AP, IEC 309 32A (3P+N+Gnd) to 3X IEC 320 C19	00D7193	A2Y4
4.3m, A/NZ, (PDL/Clipsal) 32A (3P+N+Gnd) to 3X IEC 320 C19	00D7194	A2Y5

The -48V DC power supply operates at -48V to -60 V dc (nominal) and has a Molex 1060 Power Connector. The power supply ships with one 2.0m DC power cord (FRU part number 69Y1652)

The following figure shows the power supply and highlights the light-emitting diodes (LEDs).

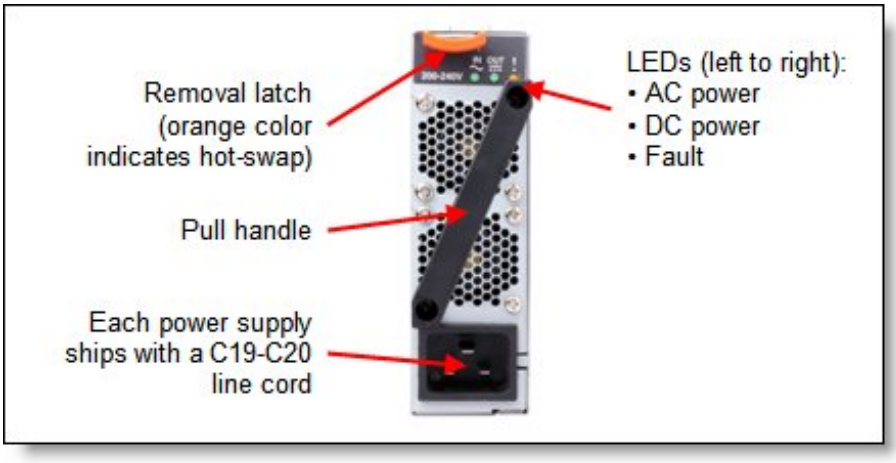

Figure 9. Power supply option

The AC power supplies are 80 PLUS Platinum-certified. The 2500W modules are 2500 Watts output rated at 200VAC to 208VAC (nominal), and 2750W at 220VAC to 240VAC (nominal). The power supply has an oversubscription rating of up to 3538 Watts output at 200VAC. The power supply operating range is 200-240 VAC. The power supplies also contain two dual independently powered 40mm cooling fan modules that are powered not from the power supply itself, but from the chassis midplane. The fan modules are variable speed and controlled by the chassis fan logic.

80 PLUS is a performance specification for power supplies used within servers and computers. To meet the 80 PLUS standard, the power supply must have an efficiency of 80% or greater, at 20%, 50%, and 100% of rated load with PF of .09 or greater. The standard has several grades, such as Bronze, Silver, Gold, and Platinum. More information on 80 PLUS is available at http://www.80PLUS.org

The chassis allows configurations of power supplies to give N+N or N+1 redundancy. A chassis can operate on only three power-supply units (PSUs) with no redundancy, but N+1 or N+N is advised. Three power supplies (or six with N+N redundancy) allow for a balanced three-phase configuration.

All power supply modules are combined into a single power domain within the chassis, which distributes power to each of the compute nodes, I/O modules, and ancillary components through the Enterprise Chassis midplane. The midplane is a highly reliable design with no active components. Each power supply is designed to provide fault isolation and is hot swappable.

In the case of the 2500W supplies, power monitoring of both the DC and AC signals allows the Chassis Management Module to accurately monitor the power supplies.

The following figure shows the compute node bay numbering (left) and power supply bay numbering (right).

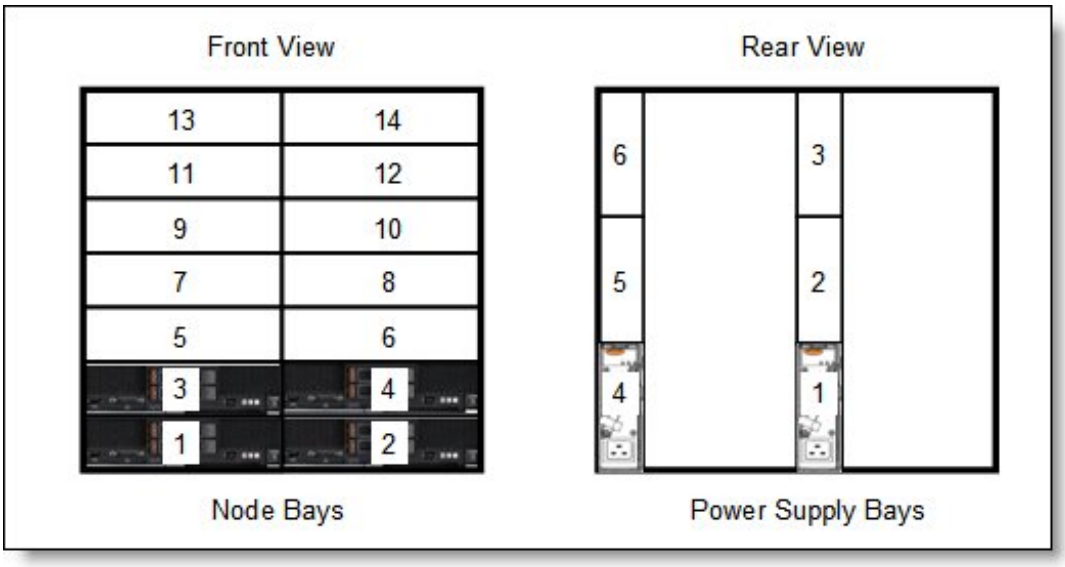

Figure 10. Power supply bay numbering

The following table shows the number of compute nodes that are supported in the chassis based on the power supplies used (2100W or 2500W), the number of power supplies installed, and the power redundancy policy enabled (N+1 or N+N).

Note: 2100W power supplies are now withdrawn from marketing.

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

- Green cell: Supported with no restrictions as to the number of compute nodes that can be installed
- Yellow cell: Supported but with restrictions on the number of compute nodes that can be installed.

Note: These tables assume the chassis is filled with idential compute nodes. For more complex configurations, use the Power Configurator:
https://support.lenovo.com/documents/LNVO-PWRCONF

Table 9. Specific number of compute nodes supported based on installed power supplies

	2100W power supplies*				**2500W power supplies**			
CPU TDP	**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 x220								

CPU TDP	2100W power supplies*				2500W power supplies			
	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
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
Flex System x222								
50 W	14	14	13	14	14	14	14	14
60 W	14	14	12	12	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
Flex System 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
Flex System x240 M5								
52 W	14	14	11	11	14	14	14	14
55 W	14	14	11	11	14	14	14	14
65 W	14	14	11	11	14	14	14	14
75 W	14	14	11	11	14	14	14	14
85 W	14	14	11	11	14	14	14	14
90 W	14	14	11	11	14	14	14	14
105 W	14	14	11	11	14	14	13	14
120 W	14	14	11	11	14	14	13	14
135 W	14	13	11	11	14	14	12	13
145 W	14	13	11	11	14	14	12	13
Flex System 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
Flex System x880 X6, x480 X6 and x280 X6								
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
Flex System V7000 Storage Node								

CPU TDP	2100W power supplies*				2500W power supplies			
	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
N/A	3	3	3	3	3	3	3	3
Flex System p24L								
All	14	12	9	10	14	14	12	13
Flex System p260								
All	14	12	9	10	14	14	12	13
Flex System p270								
All	14	12	9	9	14	14	12	12
Flex System p460								
All	7	6	4	5	7	7	6	6

* The 2100W Power Module, part number 47C7633, is withdrawn from marketing

Fan modules

The Enterprise Chassis supports up to a total of ten hot-swap fan modules: two 40 mm (1.57 in) fan modules and eight 80 mm (3.14 in) fan modules.

The two 40 mm fan modules distribute airflow to the I/O modules and chassis management modules. Both of these fan modules ship with the chassis. The 80 mm fan modules distribute airflow to the compute nodes through the chassis from front to rear. Each 80 mm fan module actually contains two 80 mm fan modules, back to back at each end of the module, which are counter-rotating. The following figure shows the 80 mm fan module.

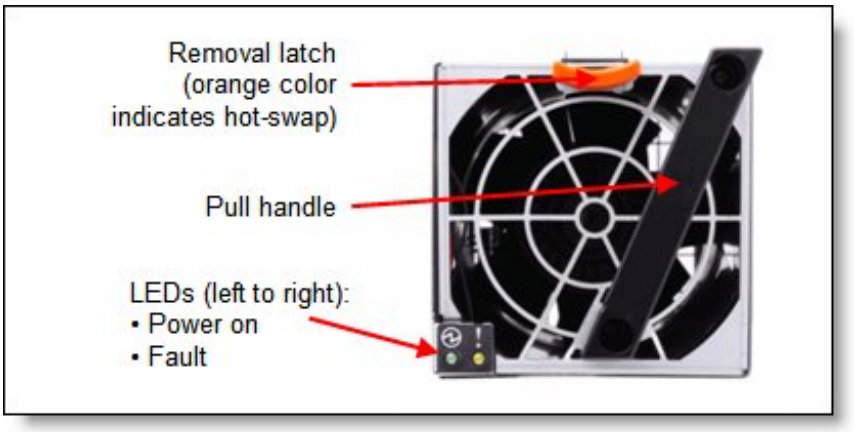

Figure 11. 80 mm fan module

Four 80 mm fan modules are installed standard in chassis model 8721-A1x and CTO orders. The maximum number of 80 mm fan modules that can be installed is eight. Ordering information is shown in the following table. When the modules are ordered as a part number, they are supplied as a pair. The feature codes is comprised of one fan.

Table 10. Fan module ordering information

Description	Part number	Feature code
Flex System Enterprise Chassis 80mm Fan Module	43W9078 (2 fan modules)	A0UA (1 fan module)

The 80 mm fan modules are populated, depending on the nodes installed. To support the base configuration and up to four nodes, chassis model 8721-A1x ships with four 80 mm fan modules and two 40 mm fan modules preinstalled. There are two cooling zones for the nodes: a left zone and a right zone. Fan modules must be installed in pairs as shown in the following figure. If there are insufficient fan modules for the number of nodes installed, the compute nodes might be throttled to balance heat generation and cooling capacity.

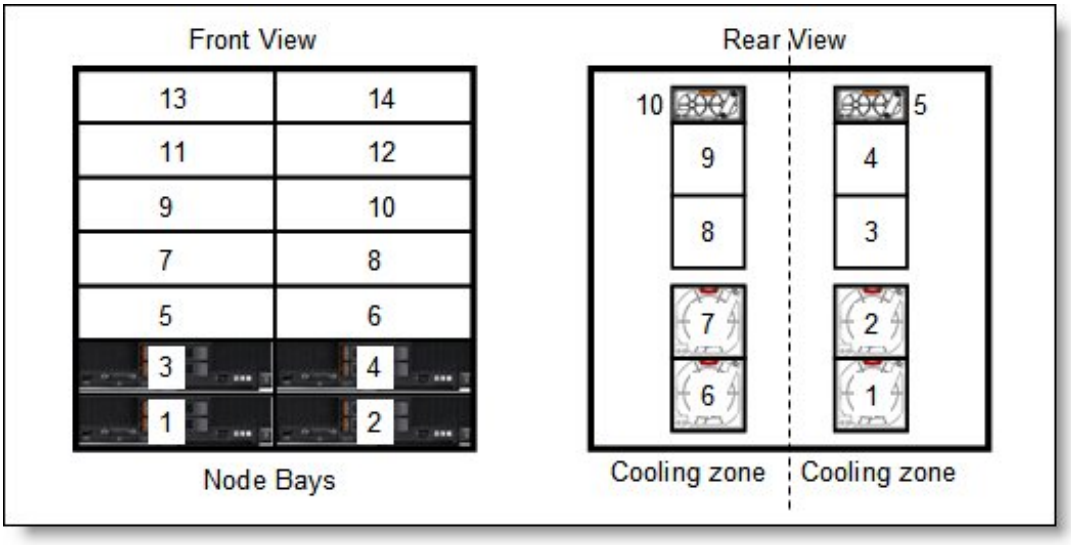

Figure 12. Fan module locations and cooling zones

The 40 mm fan modules are always required. Additional 80 mm fan modules are required as listed in the following table.

Table 11. 80 mm fan module requirements

Description	80 mm fan module requirements
Up to four half-wide compute nodes (node bays 1 - 4)	4 fan modules (fan bays 1, 2, and 6, 7)
Up to eight half-wide compute nodes (node bays 1 - 8)	6 fan modules (fan bays 1, 2, 3 and 6, 7, 8)
All 14 compute node bays (node bays 1 - 14)	8 fan modules (fan bays 1, 2, 3, 4 and 6, 7, 8, 9)

Physical specifications

Dimensions:

- Height: 440 mm (17.3 inches)
- Width: 447 mm (17.6 in)
- Depth, measured from front bezel to rear of chassis: 800 mm (31.5 in)
- Depth, measured from node latch handle to the power supply handle: 840 mm (33.1 in)

Weight:

- Minimum configuration: 96.62 kg (213 lb)
- Maximum configuration: 220.45 kg (486 lb)

Shipping dimensions (approximate):

- Height: 81 cm (32 in)
- Length: 102 cm (40 in)
- Width: 71 cm (24 in)

Supported environment

The Flex System Enterprise Chassis complies with ASHRAE Class A3 specifications.

The following environment is the supported operating environment.

Temperature:

- 0 - 914 m (0 - 3,000 ft): 5 - 40 °C (41 - 104 °F)
- 914 m - 3048 m (3,000 - 10,000 ft): The maximum ambient temperature drops 1 °C for every additional 178 m (584 ft) increase in altitude until the maximum temperature is 28 °C at 3,048 m (10,000 ft)

Relative humidity: 8% - 85%

Maximum altitude: 3,048 m (10,000 ft)

Electrical power:

- 200 - 240 V ac (nominal), 50 or 60 Hz
- Minimum configuration: 0.51 kVA (two power supplies)
- Maximum configuration: 13 kVA (six power supplies)

Power consumption: 12,900 watts maximum

Thermal output, full configuration - 12,900 watts (43,900 Btu/hr)

Acoustical noise emissions for Flex Chassis:

- 7.5 bels operating
- 7.5 bels idling

The noise emission level stated is the declared (upper limit) sound power level, in bels, for a random sample of machines. All measurements are made in accordance with ISO 7779 and reported in conformance with ISO 9296.

Warranty options

The system has a three-year warranty with 24x7 standard call center support and 9x5 Next Business Day onsite coverage. Also available are Lenovo Services warranty maintenance upgrades and post-warranty maintenance agreements, with a well-defined scope of services, including service hours, response time, term of service, and service agreement terms and conditions.

Lenovo warranty service upgrade offerings are country-specific. Not all warranty service upgrades are available in every country. For more information about Lenovo warranty service upgrade offerings that are available in your country, go to the Data Center Advisor and Configurator (formerly known as LESC) website http://lesc.lenovo.com, then do the following:

1. In the Parts & Services box in the middle of the page, click the **Services only** radio button
2. In the same box, type in your machine type & model and press Enter
3. From the search results, you can click either **Deployment Services** or **Support Services** to view the offerings

The following table explains warranty service definitions in more detail.

Table 12. Warranty service definitions

Term	Description
On-site service	A service technician will arrive at the client's location for equipment service.
24x7x2 hour	A service technician is scheduled to arrive at the client's location within two hours after remote problem determination is completed. Lenovo provides service around the clock, every day, including Lenovo holidays.
24x7x4 hour	A service technician is scheduled to arrive at the client's location within four hours after remote problem determination is completed. Lenovo provides service around the clock, every day, including Lenovo holidays.
9x5x4 hour	A service technician is scheduled to arrive at the client's location within four business hours after remote problem determination is completed. Lenovo provides service 8:00 am - 5:00 pm in the client's local time zone, Monday-Friday, excluding Lenovo holidays. For example, if a customer reports an incident at 3:00 pm on Friday, the technician will arrive by 10:00 am the following Monday.
9x5 next business day	A service technician is scheduled to arrive at the client's location on the business day after remote problem determination is completed. Lenovo provides service 8:00 am - 5:00 pm in the client's local time zone, Monday - Friday, excluding Lenovo holidays. Calls received after 4:00 pm local time require an extra business day for service dispatch. Next business day service is not guaranteed.
Committed Repair	Problems receive priority handling so that repairs are completed within the committed time of 6, 8, or 24 hours. Lenovo provides service 24 hours/day, every day, including Lenovo holidays.

The following Lenovo warranty service upgrades are available:

- Warranty and maintenance service upgrades:
  - Three, four, or five years of 9x5 or 24x7 service coverage
  - Onsite response from next business day to 2 or 4 hours
  - Committed repair service
  - Warranty extension of up to 5 years
  - Post warranty extensions
- Committed Repair Service
  Committed Repair Services enhances the level of Warranty Service Upgrade or Post Warranty/Maintenance Service offering associated with the selected systems. Offerings vary and are available in select countries.
  - Priority handling to meet defined time frames to restore the failing machine to good working condition
  - Committed repair service levels are measured within the following coverage hours:
    - 24x7x6: Service performed 24 hours per day, 7 days per week, within 6 hours
    - 24x7x8: Service performed 24 hours per day, 7 days per week, within 8 hours
    - 24x7x24: Service performed 24 hours per day, 7 days per week, within 24 hours
- Hard Disk Drive Retention
  Lenovo's Hard Disk Drive Retention (HDDR) service is a multi-drive hard drive retention offering that ensures your data is always under your control, regardless of the number of hard drives that are installed in your Lenovo server. In the unlikely event of a hard drive failure, you retain possession of your hard drive while Lenovo replaces the failed drive part. Your data stays safely on your premises, in your hands. The Hard Drive Retention service can be purchased in convenient bundles with our warranty upgrades and extensions.
- Microcode Support
  Keeping microcode current helps prevent hardware failures and security exposure. There are two levels of service: analysis of the installed base and analysis and update where required. Offerings vary by country and can be bundled with other warranty upgrades and extensions.

- Remote Technical Support Services (RTS)
  RTS provides comprehensive technical call center support for covered servers, storage, operating systems, and applications. Providing a single source for support of hardware and software issues, RTS can reduce problem resolution time, decreasing the cost to address technical problems and increasing uptime. Offerings are available for Windows, Linux, IBM Systems Director, VMware, Microsoft business applications, and Lenovo System x storage devices, and IBM OEM storage devices.

Regulatory compliance

The server conforms to the following standards:

- ASHRAE Class A3
- FCC - Verified to comply with Part 15 of the FCC Rules Class A
- Canada ICES-004, issue 3 Class A
- UL/IEC 60950-1
- CSA C22.2 No. 60950-1
- NOM-019
- Argentina IEC 60950-1
- Japan VCCI, Class A
- IEC 60950-1 (CB Certificate and CB Test Report)
- China CCC (GB4943); (GB9254, Class A); (GB17625.1)
- Taiwan BSMI CNS13438, Class A; CNS14336
- Australia/New Zealand AS/NZS CISPR 22, Class A
- Korea KN22, Class A, KN24
- Russia/GOST ME01, IEC 60950-1, GOST R 51318.22, GOST R 51318.249, GOST R 51317.3.2, GOST R 51317.3.3
- CE Mark (EN55022 Class A, EN60950-1, EN55024, EN61000-3-2, EN61000-3-3)
- CISPR 22, Class A
- TUV-GS (EN60950-1/IEC 60950-1, EK1-ITB2000)

External disk storage systems

The following table lists the NAS and SAN external storage systems that are offered by Lenovo.

Table 13. External disk storage systems

Part number	Description
Lenovo Network-Attached Storage (NAS connectivity)	
70FX / 70FY*	Lenovo Storage N3310
70G0 / 70G1*	Lenovo Storage N4610
Lenovo Storage S2200 (SAS, iSCSI, or FC host connectivity)	
64112B1	Lenovo Storage S2200 LFF Chassis SAS Single Controller, Rack Kit, 9x5NBD
64112B2	Lenovo Storage S2200 LFF Chassis SAS Dual Controller, Rack Kit, 9x5NBD
64114B1	Lenovo Storage S2200 LFF Chassis FC/iSCSI Single Controller, Rack Kit, 9x5NBD
64114B2	Lenovo Storage S2200 LFF Chassis FC/iSCSI Dual Controller, Rack Kit, 9x5NBD
64112B3	Lenovo Storage S2200 SFF Chassis SAS Single Controller, Rack Kit, 9x5NBD

Part number	Description
64112B4	Lenovo Storage S2200 SFF Chassis SAS Dual Controller, Rack Kit, 9x5NBD
64114B3	Lenovo Storage S2200 SFF Chassis FC/iSCSI Single Controller, Rack Kit, 9x5NBD
64114B4	Lenovo Storage S2200 SFF Chassis FC/iSCSI Dual Controller, Rack Kit, 9x5NBD
Lenovo Storage S3200 (SAS, iSCSI, or FC host connectivity)	
64113B1	Lenovo Storage S3200 LFF Chassis SAS Single Controller, Rack Kit, 9x5NBD
64113B2	Lenovo Storage S3200 LFF Chassis SAS Dual Controller, Rack Kit, 9x5NBD
64116B1	Lenovo Storage S3200 LFF Chassis FC/iSCSI Single Controller, Rack Kit, 9x5NBD
64116B2	Lenovo Storage S3200 LFF Chassis FC/iSCSI Dual Controller, Rack Kit, 9x5NBD
64113B3	Lenovo Storage S3200 SFF Chassis SAS Single Controller, Rack Kit, 9x5NBD
64113B4	Lenovo Storage S3200 SFF Chassis SAS Dual Controller, Rack Kit, 9x5NBD
64116B3	Lenovo Storage S3200 SFF Chassis FC/iSCSI Single Controller, Rack Kit, 9x5NBD
64116B4	Lenovo Storage S3200 SFF Chassis FC/iSCSI Dual Controller, Rack Kit, 9x5NBD
Lenovo Storage V Series (SAS, iSCSI, FC, or FCoE host connectivity)	
6535C1D	Lenovo Storage V3700 V2 LFF Control Enclosure
6535EC1	Lenovo Storage V3700 V2 LFF Control Enclosure (Top Seller)
6535C2D	Lenovo Storage V3700 V2 SFF Control Enclosure
6535EC2	Lenovo Storage V3700 V2 SFF Control Enclosure (Top Seller)
6535C3D	Lenovo Storage V3700 V2 XP LFF Control Enclosure
6535EC3	Lenovo Storage V3700 V2 XP LFF Control Enclosure (Top Seller)
6535C4D	Lenovo Storage V3700 V2 XP SFF Control Enclosure
6535EC4	Lenovo Storage V3700 V2 XP SFF Control Enclosure (Top Seller)
6536C12	Lenovo Storage V5030 LFF Control Enclosure 3Yr S&S
6536C32	Lenovo Storage V5030 LFF Control Enclosure 5Yr S&S
6536C22	Lenovo Storage V5030 SFF Control Enclosure 3Yr S&S
6536C42	Lenovo Storage V5030 SFF Control Enclosure 5Yr S&S
IBM Storwize for Lenovo (SAS [except V7000], iSCSI, FC, or FCoE host connectivity)	
6096CU2**	IBM Storwize V3500 3.5-inch Dual Control Storage Controller Unit
6096CU3**	IBM Storwize V3500 2.5-inch Dual Control Storage Controller Unit
6099L2C	IBM Storwize V3700 3.5-inch Storage Controller Unit
6099S2C	IBM Storwize V3700 2.5-inch Storage Controller Unit
6099T2C	IBM Storwize V3700 2.5-inch DC Storage Controller Unit
6194L2C†	IBM Storwize V5000 LFF Control Enclosure, w/3 Yr S&S
6194L2L‡	IBM Storwize V5000 LFF Control Enclosure, w/3 Yr S&S (LA)
61941A1†	IBM Storwize V5000 LFF Control Enclosure, w/5 Yr S&S
61941AL‡	IBM Storwize V5000 LFF Control Enclosure, w/5 Yr S&S (LA)
6194S2C†	IBM Storwize V5000 SFF Control Enclosure, w/3 Yr S&S
6194S2L‡	IBM Storwize V5000 SFF Control Enclosure, w/3 Yr S&S (LA)
61941C1†	IBM Storwize V5000 SFF Control Enclosure, w/5 Yr S&S
61941CL‡	IBM Storwize V5000 SFF Control Enclosure, w/5 Yr S&S (LA)
6195SC5†	IBM Storwize V7000 2.5-inch Storage Controller Unit, w/3 Yr S&S
6195SCL‡	IBM Storwize V7000 2.5-inch Storage Controller Unit, w/3 Yr S&S (LA)

Part number	Description
61951F1†	IBM Storwize V7000 2.5-inch Storage Controller Unit, w/5 Yr S&S
61951FL‡	IBM Storwize V7000 2.5-inch Storage Controller Unit, w/5 Yr S&S (LA)

* Machine Type; see the respective Product Guide in the NAS Storage category for models: http://lenovopress.com/storage/nas
** Available only in China.
† Available worldwide except Latin America.
‡ Available only in Latin America.

For more information, see the list of Product Guides in the following categories:

- Lenovo Network-Attached Storage: http://lenovopress.com/storage/nas
- Lenovo SAN Storage: https://lenovopress.com/storage/san/lenovo
- IBM Storwize: https://lenovopress.com/storage/san/ibm

Top-of-rack Ethernet switches

For enterprise-class installations with multiple Flex System Enterprise Chassis configurations, a top-of-rack Ethernet switch from Lenovo provides the necessary level of networking between racks of systems and the rest of your production network. The following table lists the available top-of-rack switches.

Table 14. Top-of-rack switches

Description	Part number
1 Gb Ethernet top-of-rack switches	
Lenovo RackSwitch G7028 (Rear to Front)	7159BAX
Lenovo RackSwitch G7052 (Rear to Front)	7159CAX
Lenovo RackSwitch G8052 (Rear to Front)	7159G52
10 Gb Ethernet top-of-rack switches	
Lenovo RackSwitch G8124E (Rear to Front)	7159BR6
Lenovo RackSwitch G8264 (Rear to Front)	7159G64
Lenovo RackSwitch G8264CS (Rear to Front)	7159DRX
Lenovo RackSwitch G8272 (Rear to Front)	7159CRW
Lenovo RackSwitch G8296 (Rear to Front)	7159GR6
40 Gb Ethernet top-of-rack switches	
Lenovo RackSwitch G8332 (Rear to Front)	7159BRX

For more information, see the list of Product Guides in the Top-of-rack switches categories:

- 1 Gb Ethernet switches: http://lenovopress.com/networking/tor/1gb?rt=product-guide
- 10 Gb Ethernet switches: http://lenovopress.com/networking/tor/10gb?rt=product-guide
- 40 Gb Ethernet switches: http://lenovopress.com/networking/tor/40gb?rt=product-guide

Fibre Channel SAN switches

The following table lists the Fibre Channel SAN switches that are offered by Lenovo and can be used with this system.

Table 15. Fibre Channel SAN switches

Part number	Description
8 Gb Fibre Channel	
3873AR3	Lenovo B300, 8 ports activated w/ 8Gb SWL SFPs, 1 PS, Rail Kit
3873AR4	Lenovo B6505, 12 ports activated w/ 8Gb SWL SFPs, 1 PS, Rail Kit
3873BR2	Lenovo B6510, 24 ports activated w/ 8Gb SWL SFPs, 2 PS, Rail Kit
3873AR1*	Brocade 300 FC SAN Switch
16 Gb Fibre Channel	
3873AR5	Lenovo B6505, 12 ports activated w/ 16Gb SWL SFPs, 1 PS, Rail Kit
3873BR3	Lenovo B6510, 24 ports activated w/ 16Gb SWL SFPs, 2 PS, Rail Kit
3873AR2*	Brocade 6505 FC SAN Switch
3873BR1*	Brocade 6510 FC SAN Switch

* Withdrawn from marketing

For more information, see the list of Product Guides in the Rack SAN Switches category:
http://lenovopress.com/storage/switches/rack

Power distribution units

Power planning for an Flex System Enterprise Chassis is essential.

The Enterprise Chassis has a maximum of six power supplies installed. So, careful consideration must be given to providing the best power-optimized source. Both N+N and N+1 configurations are supported for maximum flexibility in power redundancy. Each AC power supply in the chassis has a 16A C20 three-pin socket and can be fed by a C19 power cable, from a suitable supply.

The chassis has the ability to accommodate a maximum of six power supplies, so it is possible to balance a three-phase power input into a single chassis or a group of chassis. The chassis power system is designed for efficiency using data center power consisting of three-phase, 60A Delta 200 VAC (North America) or three-phase 32A wye 380-415 VAC (international). The chassis can also be fed from single-phase 200 - 240VAC supplies, if required.

For further details, see the *Flex System Enterprise Chassis Power Requirements Guide* , available from: https://support.lenovo.com/documents/LNVO-POWINF

Table 16. Power distribution units

Part number	Description
Switched and monitored AC PDUs	
46M4002	1U 9 C19/3 C13 Active Energy Manager DPI® PDU
46M4003	1U 9 C19/3 C13 Active Energy Manager 60A 3 Phase PDU
46M4167	1U 9 C19/3 C13 Switched and Monitored 30A 3 Phase PDU
46M4134	0U 12 C19/12 C13 Switched and Monitored 50A 3 Phase PDU
46M4140	0U 12 C19/12 C13 50A 3 Phase PDU
Enterprise AC PDUs	
71762MX	Ultra Density Enterprise PDU C19 PDU+ (WW)
71762NX	Ultra Density Enterprise PDU C19 PDU (WW)
71763MU	Ultra Density Enterprise PDU C19 3 phase 60A PDU+ (NA)
71763NU	Ultra Density Enterprise PDU C19 3 phase 60A PDU (NA)
39Y8923	DPI 60A Three Phase C19 Enterprise PDU with IEC309 3P+G (208 V) fixed line cord
39Y8948	DPI Single Phase C19 Enterprise PDU without line cord
Front-end AC PDUs	
39Y8934	DPI 32amp/250V Front-end PDU with IEC 309 2P+Gnd connector
39Y8938	30amp/125V Front-end PDU with NEMA L5-30P connector
39Y8939	30amp/250V Front-end PDU with NEMA L6-30P connector
39Y8940	60amp/250V Front-end PDU with IEC 309 60A 2P+N+Gnd connector
DC PDUs	
44T0966	1U Higher Voltage DC PDU (240V/380V)

Uninterruptible power supply units

The Flex System Enterprise Chassis supports attachments to the uninterruptible power supply units listed in the following table.

Table 17. Uninterruptible power supply units

Part number	Description
55946KX	RT6kVA 3U Rack or Tower UPS (200-240VAC)
55948KX	RT8kVA 6U Rack or Tower UPS (200-240VAC)
55949KX	RT11kVA 6U Rack or Tower UPS (200-240VAC)
55948PX	RT8kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC)
55949PX	RT11kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC)

For more information, see the related Lenovo Press Product Guides in the UPS category:
https://lenovopress.com/servers/options/ups

Rack cabinets

The Flex System Enterprise Chassis is supported in the rack cabinets as listed in the following table. The suggested rack for Flex System is the 42U 1100 mm Enterprise V2 Deep Dynamic Rack, 93634PX.

Table 18. Rack cabinets

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*
93072PX	6690	S2 25U Static Standard Rack	Yes
93072RX	1042	S2 25U Dynamic Standard Rack	Yes
93074RX	1043	S2 42U Standard Rack	Yes
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

* This Office Enablement kit is specifically designed for the BladeCenter S Chassis. The Flex System Enterprise Chassis can be installed in this kit with 1U of space remaining, however the noise generated by the chassis may not be acceptable for office use.

KVM console options

The following table lists the supported KVM console, keyboards and KVM switches.

Table 19. Console keyboards

Part number	Description
Consoles	
17238BX	1U 18.5" Standard Console (without keyboard)
Console keyboards	
00MW310	Lenovo UltraNav Keyboard USB - US Eng
46W6713	Keyboard w/ Int. Pointing Device USB - Arabic 253 RoHS v2
46W6714	Keyboard w/ Int. Pointing Device USB - Belg/UK 120 RoHS v2
46W6715	Keyboard w/ Int. Pointing Device USB - Chinese/US 467 RoHS v2
46W6716	Keyboard w/ Int. Pointing Device USB - Czech 489 RoHS v2
46W6717	Keyboard w/ Int. Pointing Device USB - Danish 159 RoHS v2
46W6718	Keyboard w/ Int. Pointing Device USB - Dutch 143 RoHS v2
46W6719	Keyboard w/ Int. Pointing Device USB - French 189 RoHS v2
46W6720	Keyboard w/ Int. Pointing Device USB - Fr/Canada 445 RoHS v2
46W6721	Keyboard w/ Int. Pointing Device USB - German 129 RoHS v2
46W6722	Keyboard w/ Int. Pointing Device USB - Greek 219 RoHS v2
46W6723	Keyboard w/ Int. Pointing Device USB - Hebrew 212 RoHS v2
46W6724	Keyboard w/ Int. Pointing Device USB - Hungarian 208 RoHS v2
46W6725	Keyboard w/ Int. Pointing Device USB - Italian 141 RoHS v2
46W6726	Keyboard w/ Int. Pointing Device USB - Japanese 194 RoHS v2
46W6727	Keyboard w/ Int. Pointing Device USB - Korean 413 RoHS v2
46W6728	Keyboard w/ Int. Pointing Device USB - LA Span 171 RoHS v2
46W6729	Keyboard w/ Int. Pointing Device USB - Norwegian 155 RoHS v2
46W6730	Keyboard w/ Int. Pointing Device USB - Polish 214 RoHS v2
46W6731	Keyboard w/ Int. Pointing Device USB - Portugese 163 RoHS v2
46W6732	Keyboard w/ Int. Pointing Device USB - Russian 441 RoHS v2
46W6733	Keyboard w/ Int. Pointing Device USB - Slovak 245 RoHS v2
46W6734	Keyboard w/ Int. Pointing Device USB - Spanish 172 RoHS v2
46W6735	Keyboard w/ Int. Pointing Device USB - Swed/Finn 153 RoHS v2
46W6736	Keyboard w/ Int. Pointing Device USB - Swiss F/G 150 RoHS v2
46W6737	Keyboard w/ Int. Pointing Device USB - Thai 191 RoHS v2
46W6738	Keyboard w/ Int. Pointing Device USB - Turkish 179 RoHS v2
46W6739	Keyboard w/ Int. Pointing Device USB - UK Eng 166 RoHS v2
46W6740	Keyboard w/ Int. Pointing Device USB - US Euro 103P RoHS v2
46W6741	Keyboard w/ Int. Pointing Device USB - Slovenian 234 RoHS v2
Console switches	
1754D2X	Global 4x2x32 Console Manager (GCM32)
1754D1X	Global 2x2x16 Console Manager (GCM16)
1754A2X	Local 2x16 Console Manager (LCM16)
1754A1X	Local 1x8 Console Manager (LCM8)
Console switch cables	
43V6147	Single Cable USB Conversion Option (UCO)

Part number	Description
39M2895	USB Conversion Option (4 Pack UCO)
46M5383	Virtual Media Conversion Option Gen2 (VCO2)
46M5382	Serial Conversion Option (SCO)

For more information, see the list of Product Guides in the KVM Switches and Consoles category:
http://lenovopress.com/servers/options/kvm

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Related publications and links

For more information, see the following resources:

- Flex System product page
  http://shop.lenovo.com/us/en/systems/servers/blades/flex-system/
- US Product Announcement for the Flex System Enterprise Chassis
  http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS112-053
- Flex System Information Center
  http://publib.boulder.ibm.com/infocenter/flexsys/information/index.jsp
- *Flex System Enterprise Chassis Installation and Service Guide*
  http://publib.boulder.ibm.com/infocenter/flexsys/information/topic/com.ibm.acc.8721.doc/printable_doc.html
- ServerProven hardware compatibility page for Flex System
  http://www.lenovo.com/us/en/serverproven/flexsystem.shtml
- *Flex System Interoperability Guide*
  http://lenovopress.com/fsig
- Power Configurator
  https://support.lenovo.com/documents/LNVO-PWRCONF
- *Flex System Enterprise Chassis Power Requirements Guide*
  https://support.lenovo.com/documents/LNVO-POWINF
- *Lenovo Flex System Products and Technology* , SG24-8255
  http://lenovopress.com/sg248255
- System x and Cluster Solutions configurator (x-config)
  https://lesc.lenovo.com/products/hardware/configurator/worldwide/bhui/asit/
- IBM System Storage® Interoperation Center
  http://www.ibm.com/systems/support/storage/ssic

Related product families

Product families related to this document are the following:

- Blade Chassis

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