

# IBM Flex System x240 M5 Compute Node is a high-performance server that offers improved virtualization with increased CPU performance, memory capacity, and flexible configuration options

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## At a glance

IBM Flex System® is a new category of computing that integrates multiple server architectures, networking, storage, and system management capability into a single system.

Offerings in this announcement include:

- IBM Flex System Compute Nodes
- IBM Flex System Network Adapters
- IBM Flex System Storage RAID Controller Flash Kits

For ordering, contact your IBM representative, an IBM Business Partner, or IBM Americas Call Centers at 800-IBM-CALL (Reference: SE001).

## Overview

The IBM Flex System x240 M5 Compute Node is a high-performance server that offers new security, efficiency, and reliability features to handle business-critical workloads.

The Flex System x240 M5 supports up to two Intel™ E5-2600 v3 series processors, available with as many as 18 cores, with memory speed up to 2133 MHz, designed to deliver improved performance without sacrificing energy efficiency. This family of processors features up to 45 MB L3 cache per socket, integrated Peripheral Component Interconnect Express® (PCIe) 3.0, Intel Turbo Boost Technology 2.0, Hyper-Threading Technology and two QuickPath interconnects.

TruDDR4 Memory support is also new and requires only 1.2 V of power, compared to 1.35 V and 1.5 V for previous modules. Each x240 M5 is designed to support up to 1.5 TB of memory in 24 DIMM slots running at up to 2133 MHz. The TruDDR4 Memory portfolio includes RDIMMs and LRDIMMs with advanced error correction for reliability, performance and maximum memory capacity. In addition, TruDDR4 Memory can support memory performance that exceeds industry standards. The x240 M5 also offers versatile high-performance storage options such as dual 2.5-inch PCIe flash storage and mirrored SD card for hypervisor.

In addition to the new IBM Flex System x240 M5, new networking connectivity options are also available that offer optimum I/O performance while offering connectivity options based on client need.

- IBM Flex System CN4052 2-port 10 Gb Virtual Fabric Adapter: This is a two-port 10 Gb adapter that supports Ethernet, FCoE, and iSCSI protocols. This adapter extends the value of IBM Virtual Fabric by offering high performance features such as NVGRE, RoCE, VXLAN, and Overlay Networks. The built-in Virtual Fabric feature offers vNIC capability to help reduce cost and complexity.
- IBM Flex System CN4058S 8-port 10 Gb Virtual Fabric Adapter: This is an 8-port 10 Gb adapter that supports Ethernet, FCoE, and iSCSI protocols. This adapter also supports virtual NIC (vNIC) capability to help reduce cost and complexity. This adapter enables clients to get maximum ports and performance per Flex System node. Clients can now enable up to 12 ports per two-socket node using this adapter.

The IBM Flex System x240 M5 is part of the newly announced M5 portfolio of enterprise rack and tower servers, dense systems, and blade and integrated systems. Combining balanced reliability, efficient performance, and flexibility, the M5 portfolio is an excellent fit for small and medium businesses and large enterprises. It provides outstanding uptime to keep business-critical applications and cloud deployments running securely. Every M5 family member is designed to help:

- Provide power savings using improved thermal and cooling design and more efficient components
- Boost cloud performance with greater VM density and low latency flash storage
- Reduce unplanned downtime by delivering industry-leading uptime
- Safeguard enterprise data with built-in System x® Trusted Platform Assurance to mitigate attacks against boot firmware and management controllers

As organizations face continued pressure to consolidate data center infrastructure, they also wrestle with the need to handle more compute-intensive workloads which are analyzing more data faster than ever before. The IBM Flex System x240 M5 Compute Node is designed to meet all these challenges, enhancing your IBM Flex System environment.

The x240 M5 also features a new line of PCIe NVMe SSDs as the latest in System x options in flash storage. The new line of PCIe NVMe SSDs utilizes PCIe 3.0 standard with the NVMe 1.0 specification. The PCIe with NVMe is engineered to bring data transfer and storage closer to the processor, eliminating latency and simplifying server-side storage architecture. This delivers a streamlined server platform with the highest density and performance at a reduced cost.

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## Key prerequisites

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- IBM Flex System Enterprise Chassis
- IBM Flex System network modules
- Appropriate PDUs and main power distribution
- Monitor, keyboard, and mouse for setup

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## Planned availability date

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December 5, 2014: All except:

- February 16, 2015:
  - IBM Flex System CN4058S Virtual Fabric Adapter SW Upgrade (FoD)
  - IBM Flex System CN4052 Virtual Fabric Adapter SW Upgrade (FoD)
- March 31, 2015:

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## Description

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### **IBM Flex System compute nodes**

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Compute nodes typically contain the number and type of microprocessors, memory modules, and hard disk drives that are needed to support a specific workload environment. These nodes use integrated network ports or optional network adapters to connect to external devices through the switches or modules that are installed in the chassis.

**Note:** The network adapters and ports in the compute nodes must be compatible with the network switches or modules in the chassis.

These compute nodes come with Intel Xeon™ microprocessors and provide the function, reliability, and performance of the X-Architecture® systems in a small form factor design. They support a variety of Microsoft™ Windows™, Linux™, and VMware operating systems and are ideally suited for high-performance and virtualized environments such as memory-intensive computing, collaboration, general and mission-critical processing, and enterprise application workloads. All models come with an integrated management module (IMM2) that connects to the Chassis Management Module to provide the integrated systems-management functions for the node.

### **Flex System x240 M5 Compute Node**

The IBM Flex System x240 M5 Compute Node is a high-density, scalable compute node that is ideally suited for high-performance and virtualized environments.

The Flex System x240 M5 Compute Node provides support for optional devices, such as the following devices:

- Up to two multi-core microprocessors
- Up to 24 dual inline LP memory modules (DIMMs)
- Up to two hot-swap storage drives
- Up to two I/O expansion adapters
- Up to two SD card slots to support redundant hypervisors

The Flex System x240 M5 Compute Node is supported in the IBM Flex System Enterprise Chassis only.

The IBM Flex System x240 M5 Compute Node supports memory mirroring. Chipkill is supported in any mode when x4-based DIMM memory is used. Chipkill memory correction for up to four bits per DIMM helps to keep your server up and running.

### **Additional features**

- The IBM Flex System x240 M5 Compute Node system board contains 24 DIMM connectors.
  - Each DIMM connector supports 4 GB, 8 GB, 16 GB, 32 GB, or 64 GB low-profile (LP) double-data rate (DDR4) DRAM.
  - Chipkill is supported in x4 DIMM memory configurations only.
- Support is provided for up to two hot-swap, Small Form Factor (SFF) Serial Attached SCSI (SAS), Serial ATA (SATA), or solid-state (SSD) storage drives.
- Dual 10-Gigabit Ethernet connections are provided on selected models.

IBM Flex System x240 M5 Compute Node servers are designed for high throughput from processor to memory, and to bus I/O.

These features, combined with SMP capability and blade-thin density, make the IBM Flex System x240 M5 Compute Node an excellent choice for space-constrained and power-constrained environments used for:

- Database
- Virtualization
- General enterprise applications such as ERP and SCM
- Simulations

### ***High-availability and serviceability features***

- Hot-swap capability:  
Hot-swap compute nodes enable easy access to each node server.
- Management module  
The management module interfaces with each node server for single systems management control.
- Dynamic System Analysis (DSA)  
IBM Dynamic System Analysis (DSA) collects and analyzes system information to aid in diagnosing compute node problems. DSA collects the following information about the compute node:
  - Drive health information
  - Event logs for ServeRAID controllers and service processors
  - Hardware inventory, including PCI and USB information
  - Installed applications and hot fixes
  - Kernel modules
  - Light path diagnostics status
  - Network interfaces and settings
  - Performance data and details about processes that are running
  - RAID and controller configuration
  - Integrated management module 2 status and configuration
  - System configuration
  - Vital product data and firmware information

DSA creates a DSA log, which is a chronologically ordered merge of the system-event log (as the IPMI event log), the IMM event log (as the ASM event log), and the operating-system event logs. You can send the DSA log as a file to a support representative or view the information as a text file or HTML file.

- Flexible network support  
The compute node provides flexible network capabilities:
  - The compute node has connectors on the system board for optional expansion adapters for adding network communication capabilities to the compute node. Depending on the model, you can install up to two I/O expansion adapters for network support. This provides the flexibility to install expansion adapters that support a variety of network communication technologies.
- Hard disk drive support  
The compute node supports up to two hot-swap hard disk drives. You can implement RAID 0 or RAID 1 for the drives.
- IBM ServerGuide Setup and Installation CD  
The ServerGuide Setup and Installation CD, which you can download from the web, provides programs to help you set up the compute node and install a Windows operating system. The ServerGuide program detects installed optional

hardware devices and provides the correct configuration programs and device drivers.

- IBM X-Architecture

IBM X-Architecture systems combine proven, innovative IBM designs to make your x86-processor-based compute node powerful, scalable, and reliable.

- Integrated management module 2 (IMM2)

The IMM2 combines systems-management function, video controller, the remote presence, and blue-screen capture features in a single chip. The IMM2 provides advanced systems-management control, monitoring, and alerting function. If an environmental condition exceeds a threshold or if a system component fails, LEDs are illuminated on the IMM2 to help you diagnose the problem, the error is recorded in the IMM event log, and a problem alert is sent to you.

Optionally, the IMM2 also provides a virtual presence capability for remote systems management capabilities. The IMM2 provides remote systems management through industry-standard interfaces:

- Common Information Model (CIM)
- Intelligent Platform Management Interface (IPMI), version 2.0
- Simple Network Management Protocol (SNMP), version 3.0
- Web browser

- Large system-memory capacity

The compute node supports up to 1536 GB of system memory. The memory controller provides support for up to 24 industry-standard registered or LRDIMM ECC DDR4 on low-profile (LP) DIMMs on the system board.

- Light path diagnostics

Light path diagnostics provides light-emitting diodes (LEDs) to help diagnose problems.

- Microprocessor technology

The compute node supports up to two multi-core Intel Xeon microprocessors.

- Peripheral Component Interconnect Express (PCIe)

PCIe is a computer expansion bus that is used for chip-to-chip interconnect and expansion adapter interconnect. You can add optional I/O and storage devices.

- Power throttling

By enforcing a configurable power policy known as power-domain oversubscription, the IBM Flex System chassis will allow for a larger overall chassis power budget depending on the number of power supplies installed. When a fault occurs in one or more power supplies, the power supplies can run oversubscribed for a short period of time. During this time period the compute nodes will throttle to safe power level in order to allow all components in the chassis to stay operational and survive the power supply failure. This policy is enforced by the Chassis Management Module in cooperation with every installed compute node in the IBM Flex System chassis. The policy is in effect when initial power is applied to the IBM Flex System chassis or when an administrator changes the policy.

The following settings for this policy are available:

- Basic power management
- Power module redundancy (N+N or N+1)
- Power module redundancy with compute node throttling allowed (N+N or N+1)

An administrator can configure the policy and monitor the overall chassis power environment by using the Chassis Management Module user interface.

- Systems-management support

The compute node supports the IBM Flex System Chassis Management Module (CMM) and IBM Flex System Manager® management software.

- CMM is a hot-swap module that provides system-management functions for all components in an IBM Flex System chassis. It controls a serial port for remote connection and a 10/100 Mbps Ethernet remote-management connection.
- IBM Flex System Manager management software is a platform-management foundation that streamlines the way you manage physical and virtual systems in a heterogeneous environment. By using industry standards, IBM Flex System Manager management software supports multiple operating systems and virtualization technologies.

### **P3600 NVMe 2.5-inch G3HS Enterprise Value PCIe SSD**

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IBM Flex System x240 M5 Compute Node will feature a new line of PCIe NVMe SSDs as the latest in System x options in flash storage. The new line of PCIe NVMe SSDs utilizes PCIe 3.0 standard with the NVMe 1.0 specification. The PCIe with NVMe is engineered to bring data transfer and storage closer to the processor, eliminating latency and simplifying server-side storage architecture. This delivers a streamlined server platform with the highest density and performance at a reduced cost.

### **Flex System networking portfolio**

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Networking in data centers is undergoing a transition from a discrete traditional model to a more flexible, optimized model or "smarter" model. Clients are looking to support more workloads with decreasing or flat IT budget. The network architecture on the Flex System platform has been designed to address the key challenges clients are facing in their data centers. The key attributes of the network architecture on this platform are:

- Integrated
  - Efficient integrated management as part of the management appliance
  - Move from physical network management to logical network management in a virtualized environment
- Automated
  - Seamless provisioning, management, and deployment of both physical and virtual network parameters using tools like Virtual Fabric Manager, IBM SoftSwitch (5000v), and VMready®
- Optimized
  - Creation of a flat logical network so there are fewer elements to manage
  - Reduced cost and complexity by leveraging IBM Virtual Fabric and I/O convergence
  - Reduced risk and cost by leveraging scalable switches that can provide both port and bandwidth flexibility

One of the key attributes of the products on this platform is scalability. When modules are marked "scalable" this means that clients can buy the base product with certain number of ports; and when they need to scale up for more ports, they can just buy the license to enable the extra ports without having to provision any new hardware.

### **The Flex System networking portfolio enhancements**

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- IBM Flex System CN4052 2-port 10 Gb Virtual Fabric Adapter: This is a two-port 10 Gb adapter that supports Ethernet, FCoE, and iSCSI protocols. This adapter extends the value of IBM Virtual Fabric by offering high performance features like NVGRE, RoCE, VXLAN, and Overlay Networks. The built-in Virtual Fabric feature offers vNIC capability to help reduce cost and complexity.
- IBM Flex System CN4058S 8-port 10 Gb Virtual Fabric Adapter: This is an 8-port 10 Gb adapter that supports Ethernet, FCoE, and iSCSI protocols. This adapter also supports virtual NIC (vNIC) capability to help reduce cost and complexity.

This adapter enables clients to get maximum ports and performance per Flex System node. Clients can now enable up to 12 ports per two-socket node using this adapter.

- IBM Flex System CN4058S Virtual Fabric Adapter SW Upgrade (FoD)
- IBM Flex System CN4052 Virtual Fabric Adapter SW Upgrade (FoD)

## Standard IBM Flex System x240 M5 Compute Node configuration

### Model information

Model	Intel Xeon name	Cores	CPU speed	CPU GT/s	CPU power	Memory/ type	I/O
9532-L6x	E5-2680v3 Cache: 30 MB	12	2.5 GHz	9.6	120w	1x16 GB 2133 MHz	CN4052
9532-J6x	E5-2670v3 Cache: 30 MB	12	2.3 GHz	9.6	120w	1x16 GB 2133 MHz	CN4052
9532-H6x	E5-2660v3 Cache: 25 MB	10	2.6 GHz	9.6	105w	1x16 GB 2133 MHz	CN4052
9532-D6x	E5-2640v3 Cache: 20 MB	8	2.6 GHz	8.0	90w	1x16 GB 1866 MHz	CN4052
9532-B6x	E5-2620v3 Cache: 15 MB	8	2.4 GHz	8.0	85w	1x16 GB 1866 MHz	CN4052

EMEA x = G

**Note:** The model "x" designation is geography dependent and is spelled out explicitly in the [Product number](#) section.

### Accessibility by people with disabilities

A US Section 508 Voluntary Product Accessibility Template (VPAT) containing details on accessibility compliance can be requested at

[http://www.ibm.com/able/product\\_accessibility/index.html](http://www.ibm.com/able/product_accessibility/index.html)

## Product positioning

IBM Flex System suits multiple delivery models, from highly customizable hardware platforms to a fully integrated and optimized system.

- IBM Flex System hardware building blocks made up of individual components that can be mixed and matched, and fully customizable with optional management
- IBM Flex System solutions made up of a chassis with an integrated management appliance, IBM networking, and storage standard
- IBM Flex System optimized offerings made up of preconfigured, highly customized systems - focused on selected workloads or single-purpose such as PureFlex™ or Cloudburst

## Product number

The following are features already announced for the 3331, 9532 machine type:

Description	MT	Model	Feature
IBM Flex System CN4058S 8-port 10Gb Virtual Fabric Adapter	3331	HC1	A4R6
IBM Flex System CN4058S 8-port 10Gb Virtual Fabric Adapter	9532	AC1	

				MC1	
IBM Flex System CN4058S Virtual Fabric Adapter SW Upgrade (FoD)	3331	HC1		A4R9	
IBM Flex System CN4058S Virtual Fabric Adapter SW Upgrade (FoD)	9532	AC1		MC1	
IBM Flex System CN4052 2-port 10Gb Virtual Fabric Adapter	3331	HC1		A5RP	
IBM Flex System CN4052 2-port 10Gb Virtual Fabric Adapter	9532	AC1		MC1	
IBM Flex System CN4052 Virtual Fabric Adapter SW Upgrade (FoD)	3331	HC1		A5RV	
IBM Flex System CN4052 Virtual Fabric Adapter SW Upgrade (FoD)	9532	AC1		MC1	
P3600 400GB NVMe 2.5" G3HS Enterprise Value PCIe SSD for System x	3331	HC1		A5RW	
P3600 400GB NVMe 2.5" G3HS Enterprise Value PCIe SSD for System x	9532	AC1		MC1	
P3600 800GB NVMe 2.5" G3HS Enterprise Value PCIe SSD for System x	3331	HC1		A5RX	
P3600 800GB NVMe 2.5" G3HS Enterprise Value PCIe SSD for System x	9532	AC1		MC1	
P3600 1.6TB NVMe 2.5" G3HS Enterprise Value PCIe SSD for System x	3331	HC1		A5RY	
P3600 1.6TB NVMe 2.5" G3HS Enterprise Value PCIe SSD for System x	9532	AC1		MC1	
P3600 2.0TB NVMe 2.5" G3HS Enterprise Value PCIe SSD for System x	3331	HC1		A5RZ	
P3600 2.0TB NVMe 2.5" G3HS Enterprise Value PCIe SSD for System x	9532	AC1		MC1	
NVMe Enterprise PCIe SSD Enablement Kit for IBM Flex System x240 M5	3331	HC1		A5SH	
NVMe Enterprise PCIe SSD Enablement Kit for IBM Flex System x240 M5	9532	AC1		MC1	
64GB TruDDR4 Memory (4Rx4, 1.2V) PC4-17000 CL15 2133MHZ LP LRDIMM	9532	AC1		A5UK	
				MC1	

## Single Entity Offerings (SEO)

Description	SEO number
IBM Flex System x240 M5 Compute Node	9532L6U 9532J6U 9532H6U 9532D6U 9532B6U

## Options

Description	Type	Model	Feature	SEO Number	Part Number
P3600 400GB NVMe 2.5" G3HS Enterprise Value PCIe SSD for System x	3331	HC1	A5RW	90Y3227	90Y3227
P3600 800GB NVMe 2.5" G3HS Enterprise Value PCIe SSD for System x	3331	HC1	A5RX	90Y3230	90Y3230
P3600 1.6TB NVMe 2.5" G3HS Enterprise Value PCIe SSD for System x	3331	HC1	A5RY	90Y3233	90Y3233
P3600 2.0TB NVMe 2.5" G3HS Enterprise Value PCIe SSD for System x	3331	HC1	A5RZ	90Y3236	90Y3236

IBM Flex System CN4052 2-port 10Gb Virtual Fabric Adapter	3331	HC1	A5RP	00JY800	00JY800
IBM Flex System CN4058S 8-port 10Gb Virtual Fabric Adapter	3331	HC1	A4R6	94Y5160	94Y5160
IBM Flex System CN4052 Virtual Fabric Adapter SW Upgrade (FOD)	3331	HC1	A5RV	00JY804	00JY804
IBM Flex System CN4058S Virtual Fabric Adapter SW Upgrade	3331	HC1	A4R9	94Y5164	94Y5164
NVMe Enterprise PCIe SSD Enablement Kit for IBM Flex System x240 M5	3331	HC1	A5SH	00JX177	00JX177

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## Business Partner information

If you are a Direct Reseller - System Reseller acquiring products from IBM, you may link directly to Business Partner information for this announcement. A PartnerWorld® ID and password are required (use IBM ID).

<https://www.ibm.com/partnerworld/mem/sla.jsp?num=114-184>

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## Publications

The *User's Guide*, *Maintenance Guide*, and *Problem Determination and Service Guide*, for IBM Flex System x240 M5 Compute Node solutions, in US English versions, are available from

<http://www-947.ibm.com/support/entry/portal/support>

Under "Product Support", select "System x", and under "Choose your page" select "Documentation."

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## Services

### Global Technology Services®

IBM services include business consulting, outsourcing, hosting services, applications, and other technology management.

These services help you learn about, plan, install, manage, or optimize your IT infrastructure to be an on-demand business. They can help you integrate your high-speed networks, storage systems, application servers, wireless protocols, and an array of platforms, middleware, and communications software for IBM and many non-IBM offerings. IBM is your one-stop shop for IT support needs.

For details on available services, contact your IBM representative or visit

<http://www.ibm.com/services/>

For details on available IBM Business Continuity and Recovery Services, contact your IBM representative or visit

<http://www.ibm.com/services/continuity>

For details on education offerings related to specific products, visit

<http://www.ibm.com/services/learning/>

Select your country, and then select the product as the category.

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### System x and BladeCenter® support services

#### **Recommended core technical support**

When you buy IBM System x technology, include the support services you need -- to help keep both your hardware and software working for you, day after day, at

peak performance. It is your first step toward helping to protect your investment and sustain high levels of system availability. We offer service-level and response-time options to fit your business needs. And we will help you get started with a core support package that includes:

- **Continuous system monitoring**

Electronic monitoring that helps speed up problem-solving with automated, early detection of potential problems and system errors.

- **Hardware maintenance**

World-class remote and on-site hardware problem determination and repair services.

- **Software technical support**

Access to help line calls for fast, accurate answers to your questions during installation and throughout ongoing operations.

For more information, visit

<http://www.ibm.com/servers/eserver/xseries/services.html>

## Technical information

### Specified operating environment

#### *Physical specifications*

#### **IBM Flex System x240 M5 Compute Node**

9532-L6x

Processor	Intel Xeon E5-2680 v3
	12 core 120w
Internal speed	2.5 GHz
Maximum memory speed	2133 MHz
CPU interconnect speed	9.6 GT/s
Number standard	1
Maximum	2
L3 cache (full speed)	30 MB
Memory (LP ECC DDR4)	16 GB
DIMMs (Standard)	1 x 16 GB
DIMM sockets	24
Capacity	1536 GB <sup>1</sup>
Mezzanine Card	Standard <sup>4</sup>
Standard	1
Maximum	2
Video	SVGA
Memory	128 MB
Disk controller	SAS
Channels	2
Connector internal	2
Connector external	0
RAID	Standard
Internal capacity	3.2 TB <sup>2</sup>
Total HDD or SSD bays	Up to 2
Management processor	Standard
Ethernet controller	Not integrated (mezz card standard)
Front access connectors	
KVM connector	1 <sup>3</sup>
USB connector	1

## 9532-J6x

Processor	Intel Xeon E5-2670 v3
	12 core 120w
Internal speed	2.3 GHz
Maximum memory speed	2133 MHz
CPU interconnect speed	9.6 GT/s
Number standard	1
Maximum	2
L3 cache (full speed)	30 MB
Memory (LP ECC DDR4)	16 GB
DIMMs (Standard)	1 x 16 GB
DIMM sockets	24
Capacity	1536 GB <sup>1</sup>
Mezzanine Card	Standard <sup>4</sup>
Standard	1
Maximum	2
Video	SVGA
Memory	128 MB
Disk controller	SAS
Channels	2
Connector internal	2
Connector external	0
RAID	Standard
Internal capacity	3.2 TB <sup>2</sup>
Total HDD or SSD bays	Up to 2
Management processor	Standard
Ethernet controller	Not integrated (mezz card standard)
Front access connectors	
KVM connector	1 <sup>3</sup>
USB connector	1

## 9532-H6x

Processor	Intel Xeon E5-2660 v3
	10 core 105w
Internal speed	2.6 GHz
Maximum memory speed	2133 MHz
CPU interconnect speed	9.6 GT/s
Number standard	1
Maximum	2
L3 cache (full speed)	25 MB
Memory (LP ECC DDR4)	16 GB
DIMMs (Standard)	1 x 16 GB
DIMM sockets	24
Capacity	1536 GB <sup>1</sup>
Mezzanine Card	Standard <sup>4</sup>
Standard	1
Maximum	2
Video	SVGA
Memory	128 MB
Disk controller	SAS
Channels	2
Connector internal	2
Connector external	0
RAID	Standard
Internal capacity	3.2 TB <sup>2</sup>
Total HDD or SSD bays	Up to 2
Management processor	Standard
Ethernet controller	Not integrated (mezz card standard)
Front access connectors	
KVM connector	1 <sup>3</sup>
USB connector	1

## 9532-D6x

Processor	Intel Xeon E5-2640 v3
	8 core 90w
Internal speed	2.6 GHz
Maximum memory speed	1866 MHz
CPU interconnect speed	8.0 GT/s
Number standard	1
Maximum	2
L3 cache (full speed)	20 MB
Memory (LP ECC DDR4)	16 GB
DIMMs (Standard)	1 x 16 GB
DIMM sockets	24
Capacity	1536 GB <sup>1</sup>
Mezzanine Card	Standard <sup>4</sup>
Standard	1
Maximum	2
Video	SVGA
Memory	128 MB
Disk controller	SAS
Channels	2
Connector internal	2
Connector external	0
RAID	Standard
Internal capacity	3.2 TB <sup>2</sup>
Total HDD or SSD bays	Up to 2
Management processor	Standard
Ethernet controller	Not integrated (mezz card standard)
Front access connectors	
KVM connector	1 <sup>3</sup>
USB connector	1

## 9532-B6x

Processor	Intel Xeon E5-2620 v3
	6 core 85w
Internal speed	2.4 GHz
Maximum memory speed	1866 MHz
CPU interconnect speed	8.0 GT/s
Number standard	1
Maximum	2
L3 cache (full speed)	15 MB
Memory (LP ECC DDR4)	16 GB
DIMMs (Standard)	1 x 16 GB
DIMM sockets	24
Capacity	1536 GB <sup>1</sup>
Mezzanine Card	Standard <sup>4</sup>
Standard	1
Maximum	2
Video	SVGA
Memory	128 MB
Disk controller	SAS
Channels	2
Connector internal	2
Connector external	0
RAID	Standard
Internal capacity	3.2 TB <sup>2</sup>
Total HDD or SSD bays	Up to 2
Management processor	Standard
Ethernet controller	Not integrated (mezz card standard)
Front access connectors	
KVM connector	1 <sup>3</sup>
USB connector	1

**Note:** The model "x" designation is geography dependent and is spelled out explicitly in the [Product number](#) section.

<sup>1</sup> Total system memory capacity is based on using 64 GB memory DIMMs.

<sup>2</sup> Capacities are based on installation of two 1.6 TB drives.

<sup>3</sup> Use of the IBM Flex System Console Breakout Cable provided with each chassis and sold separately allows connection of standard KVM options.

<sup>4</sup> One IBM Flex System CN4052 2-port 10 Gb Virtual Fabric Adapter is installed in this model.

For latest information on supported HDD options, visit

<http://www.ibm.com/servers/eserver/serverproven/compat/us/>

## **IBM Flex System x240 M5 Compute Node specifications**

### **Video subsystem**

- 128 MB DDR3
- Integrated on the IMM2

### **Supported IBM Flex System x240 M5 Compute Node video resolutions**

Resolution	Maximum Refresh Rate Supported	Bpp
640 x 400	60, 72, 75, 85	8, 16, 24
800 x 600	60, 72, 75, 85	8, 16, 24
1024 x 768	60, 72, 75, 85	8, 16, 24
1280 x 1024	60, 75	8, 16, 24
1440 x 900	60, 60 RB	8, 16, 24
1600 x 1200	60, 75	8, 16, 24
1680 x 1050	60, 60 RB	8, 16, 24

### **Notes:**

- 24 Bpp (16.7 million colors) aligned on a 32-bit boundary for performance
- Each resolution supports both CRT and Flat Panel monitors. For CRT monitors, each resolution complies with CRT ISO 9241.3
  - 1440 x 900 and 1680 x 1050 are typically wide screen flat panel (non CRT) settings so they are only available at 60 Hz
  - 1440 x 900 and 1680 x 1050 are available at 60 Hz with support for 60 Hz Reduced Blanking Mode
  - For the resolutions supported by different operating systems, refer the operating system documentation

### **Dimensions - IBM Flex System x240 M5 Compute Node**

- Height: 55.5 mm (2.19 in.)
- Depth: 492.24 mm (19.38 in.)
- Width: 217.35 mm (8.56 in.)
- Maximum weight: 7.1 kg (15.6 lb.) (depending on the configuration when options are added)

### **Electrical**

IBM Flex System x240 M5 Compute Node: 12.2 (nominal) V dc

**Note:** All weights and measurements are approximate.

### **Solid-state drive specifications**

- Capacities: 400 GB, 800 GB, 1.2 TB, and 2 TB
- Interface: 2.5-inch PCIe 3.0 x 4 (4 GB/s) NVMe with SFF 8639-compatible connector

- Sequential R/W bandwidth up to 2600/1700 MBps
- Random R/W performance (4K) up to 450,000/65,000 IOPS
- Latency for Sequential R/W: 20/20 us
- Endurance rating of 3 DWPD
- Datacenter-class features such as Power Loss Protection and end-to-end data protection
- Supports hot-pluggable removal and insertion

SSD write endurance is an important factor to consider because unlike spinning disk media, NAND flash has a finite number of program/erase cycles it will accept. SSD write endurance is typically measured by the number of program/erase cycles, or P/E cycles each cell incurs over its lifetime and per drive is listed as Total Bytes Written (TBW) in the drive specification.

This statistic can be used to give an estimate of the drive's remaining life based on the workload the drive will be subjected to. The TBW value assigned to a solid-state drive is the total bytes of written data (based on number of P/E cycles) a drive can be guaranteed to complete. Reaching this limit does not cause the drive to immediately fail; it simply denotes the maximum number of writes that can be guaranteed.

A solid-state drive will not fail upon reaching the specified TBW. At some point based on manufacturing variance margin, after surpassing the TBW value, the drive will reach the end-of-life point, at which the drive will go into a "read-only" mode.

As a result of the technology limitations, care must be taken to use SSDs in environments that will not exceed the TBW of the drive before the required life expectancy of the application.

As an example, assume an access pattern of 50% random data and 50% sequential data with block size mixes of 5% of the data is 4k block size, 5% of the data is 8k block size, 10% of the data is 16k block size 35% of the data is 64k block size and 35% of the data is 128k block size. A drive capable of 72 TB of lifetime writes, assuming an approximation of the workload stated above as being worse case, the drive workload must be limited to no more than 40 GB of writes per day to last five years and stay inside the 72 TBW limit. For the device to last three years, the drive write workload must be limited to no more than 65 GB of writes per day.

- Maximum warranted drive writes per drive is 3.00 Full Drive Writes per Day for five years or 2.19 PB TBW on the 400 GB NVMe SSD depending on workload and data patterns.
- Maximum warranted drive writes per drive is 3.00 Full Drive Writes per Day for five years or 4.38 PB TBW on the 800 GB NVMe SSD depending on workload and data patterns.
- Maximum warranted drive writes per drive is 3.00 Full Drive Writes per Day for five years or 8.76 PB TBW on the 1.6 TB NVMe SSD depending on workload and data patterns.
- Maximum warranted drive writes per drive is 3.00 Full Drive Writes per Day for five years or 10.95 PB TBW on the 2.0 TB NVMe SSD depending on workload and data patterns.

Additional information is available at

<http://www-03.ibm.com/systems/x/options/storage/solidstate/index.html>

## **Standards**

### **Equipment approvals and safety**

- 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

## **Operating environment**

The IBM Flex System x240 M5 compute node complies with ASHRAE Class A3

- Power on:
  - Temperature: 5°C to 40°C (41°F to 104°F)
  - Humidity, noncondensing: -12°C dew point (10.4°F) and 8% - 85% relative humidity
  - Maximum dew point: 24°C (75°F)
  - Maximum altitude: 3,048 m (10,000 ft)
  - Maximum rate of temperature change: 5°C/hr (41°F/hr)
- Power off:
  - Temperature: 5°C to 45°C (41°F to 113°F)
  - Relative humidity: 8% - 85%
  - Maximum dew point: 27°C (80.6°F)
- Storage (non-operating):
  - Temperature: 1°C to 60°C (33.8°F to 140°F)
  - Altitude: 3,050 m (10,006 ft)
  - Relative humidity: 5% - 80%
  - Maximum dew point: 29°C (84.2°F)
- Shipment (non-operating):
  - Temperature: -40°C to 60°C (-40°F to 140°F)
  - Altitude: 10,700 m (35,105 ft)
  - Relative humidity: 5% - 100%
  - Maximum dew point: 29°C (84.2°F)

## **Hardware requirements**

For service, the IBM Flex System x240 M5 Compute Node requires a compatible:

- Monitor
- Combination USB keyboard and pointing device such as IBM part number 40K5372
- USB CD-RW/DVD drive such as the IBM and Lenovo® part number 73P4515 or 73P4516

## **Software requirements**

The following network operating systems have been tested for compatibility with the IBM Flex System x240 Compute Node:

- Microsoft:
  - Microsoft Windows Server 2012
- Linux:
  - SUSE LINUX Enterprise Server 11 with Xen for AMD64/EM64T, Service Pack 3
  - Novell SUSE Linux Enterprise Server 11 for AMD64/EM64T, Service Pack 3
  - Red Hat Enterprise Linux 6 Server x64 Edition, U5
  - Red Hat Enterprise Linux 7 (Limited configurations)
- VMware:
  - VMware vSphere 5.1 (ESXi) U2
  - VMware vSphere 5.5 (ESXi) U2

**Note:** For additional support, certification, and version information on network operating systems, visit

## **Compatibility**

The IBM Flex System x240 M5 Compute Node contains licensed system programs that include set configuration, set features, and test programs. IBM system BIOS is loaded from a "flash" EEPROM into system memory. This BIOS provides instructions and interfaces designed to support the standard features of the x240 M5 Compute Node and to maintain compatibility with many current software programs.

Contact your IBM representative or IBM Business Partner, or refer to the *IBM Sales Manual* for information on the compatibility of hardware and software for System x servers. The *Sales Manual* is updated periodically as new features and options are announced that support these servers.

## **Limitations**

- The Flex System x240 M5 Compute Nodes contain 24 DIMM sockets. A maximum of 1.5 TB of system memory is supported using ECC DDR4 memory. A minimum of one memory feature must be installed. All memory installed must be of the same type (RDIMM or LR DIMM).
- Processor modules must be of the same type, power level, and clock speed on each Flex System x240 M5 Compute Node. Mixing processor modules of different speeds, power levels, or cache sizes or upgrading the base processors is not supported. Mixing processor speeds and memory speeds will result in the system running at the lower of rated speeds.
- The Flex System x240 M5 Compute Node is supported only in the IBM Flex System Enterprise Chassis.
- Up to two mezzanine expansion cards can be installed in the Flex System x240 M5 Compute Node.
- Mezzanine expansion cards installed in the Flex System x240 M5 Compute Node require a switch module in the Flex System Enterprise Chassis of the same connectivity type.
- Windows Server 2012 is supported as both a boot device and a data device. RHEL 6.5, SLES 11.3, and VMware ESX5.5U2 and 5.1.U2 versions support the NVMe drives as data devices only. Booting from the NVMe drives will be supported on later versions of these operating systems. For the latest information on supported NVMe configurations, visit

<http://www.ibm.com/servers/eserver/serverproven/compat/us/>

To use currently supported versions of Linux or VMware with the new NVMe options, users can boot from the hypervisor, a SAN, or by having one SAS or SATA disk option installed along with one of the NVMe disks.

- Regarding the use of solid-state disk drives, solid-state memory cells have an intrinsic, finite number of write cycles that each cell can incur. As a result, each solid-state device has a maximum amount of write cycles to which it can be subjected, documented as Total Bytes Written (TBW). IBM is not responsible for replacement of hardware that has reached the maximum guaranteed number of write cycles. This limit may be revealed as the device failing to respond to system-generated commands or becoming incapable of being written to. Additional information is available at

<http://www-03.ibm.com/systems/x/options/storage/solidstate/index.html>

## **Planning information**

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### **Customer responsibilities**

The IBM Flex System x240 M5 Compute Node server is designated as customer setup. Customer setup instructions are shipped with each system.

## Supported memory options

Option

Number Description

46W0788	8GB	TruDDR4 Memory (1Rx4, 1.2V)	PC4-17000	CL15	2133MHz	LP	RDIMM
46W0784	4GB	TruDDR4 Memory (1Rx8, 1.2V)	PC4-17000	CL15	2133MHz	LP	RDIMM
46W0792	8GB	TruDDR4 Memory (2Rx8, 1.2V)	PC4-17000	CL15	2133MHz	LP	RDIMM
46W0800	32GB	TruDDR4 Memory (4Rx4, 1.2V)	PC417000	CL15	2133MHz	LP	LRDIMM
95Y4812	64GB	TruDDR4 Memory (4Rx4, 1.2V)	PC4-17000	CL15	2133MHz	LP	LRDIMM
95Y4821	16GB	TruDDR4 Memory (2Rx4, 1.2V)	PC4-17000	CL15	2133MHz	LP	RDIMM

## Cable orders

All cables are supplied with the IBM Flex System x240 M5 Compute Node. Depending on the applications, the cables may be fully installed, partially installed (plugged at one end and packaged for shipping), or included as part of a shipment group.

## Packaging

### Ship group

The system carton contains the system unit and a ship-group kit containing the following documents and CDs:

- Important Notices booklet
- IBM Warranty Information booklet
- Product Documentation CD that includes the following documents:
  - Installation and Service Guide
  - IBM Safety Information
  - Product machine code license and other licenses and notices
- Environmental Notice and User Guide Documentation CD

The *Installation and Service Guide* on the Product Documentation CD contains the installation, use, and troubleshooting information necessary to use and service the product.

## Security, auditability, and control

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Three of the most important features in compute node design are reliability, availability, and serviceability (RAS). These RAS features help to ensure the integrity of the data that is stored in the compute node, the availability of the compute node when you need it, and the ease with which you can diagnose and correct problems.

The compute node has the following RAS features:

- Advanced Configuration and Power Interface (ACPI)
- Automatic server restart (ASR)
- Built-in diagnostics using DSA Preboot, which is stored NAND Flash memory
- Built-in monitoring for temperature, voltage, and hard disk drives
- Customer support center 24 hours per day, 7 days a week
- Customer upgrade of flash ROM-resident code and diagnostics
- Customer-upgradeable Unified Extensible Firmware Interface (UEFI) code and diagnostics
- ECC protected DDR4 memory
- ECC protection on the L3 cache
- Error codes and messages

- Integrated management module 2 (IMM2) that communicates with the Chassis Management Module to enable remote systems management
- Light path diagnostics
- Memory parity testing
- Microprocessor built-in self-test (BIST) during power-on self-test (POST)
- Microprocessor serial number access
- PCI Express 2.0 and PCI Express 3.0
- PCI PMI 2.2
- POST
- Power policy 24-hour support center
- Processor presence detection
- ROM-resident diagnostics
- System-error logging
- Vital product data (VPD) on memory
- Wake on LAN capability
- Wake on PCI (PME) capability
- Wake on USB 2.0 capability

This offering uses the security and auditability features from standard IBM offerings and supported Linux distributions.

The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communications facilities.

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## Terms and conditions

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### **IBM Global Financing**

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Yes

### **Products - terms and conditions**

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To obtain copies of the Lenovo Statement of Limited Warranty, contact your reseller or Lenovo.

In the United States, write to:

Warranty Information  
 1009 Think Place  
 B1/4B23  
 Morrisville, NC 27560  
 Attn: Lenovo Services

### **Warranty period**

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- Three years
- Optional features - One year

**Note:** For configurations that support the RAID Battery, the RAID battery will be warranted for 1-year effective on its date of installation. All other product warranty terms for the machine remain unchanged.

A Lenovo part or feature installed during the initial installation of a Lenovo machine is subject to a full warranty effective on the date of installation of the machine. A Lenovo part or feature which replaces a previously installed part or feature assumes the remainder of the warranty period for the replaced part or feature. A Lenovo

part or feature added to a machine without replacing a previously installed part or feature is subject to a full warranty effective on its date of installation. Unless specified otherwise, the warranty period, type of warranty service, and service level of a part or feature is the same as the machine it is installed.

The following have been designated as consumables, supply items, or structural parts and therefore not covered by this warranty:

- 2.5-inch HDD filler
- Top cover assembly
- Heatsink filler
- Airbaffle, above DIMM
- Handle, cam assembly left
- HDD cage
- Rear bulkhead
- Intel socket
- Heatsink assembly front
- Heatsink assembly rear

### **Warranty service**

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If required, Lenovo provides repair or exchange service, depending on the type of warranty service specified below for the machine. Lenovo will attempt to resolve your problem over the telephone or electronically by access to a Lenovo website. Certain machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with Lenovo. You must follow the problem determination and resolution procedures that Lenovo specifies. Following problem determination, if Lenovo determines On-site Service is required, scheduling of service will depend upon the time of your call, machine technology and redundancy, and availability of parts. Service levels are response-time objectives and are not guaranteed. The specified level of warranty service may not be available in all worldwide locations. Additional charges may apply outside Lenovo's normal service area. Contact your local Lenovo representative or your reseller for country-specific and location-specific information.

The type of service is Customer Replaceable Unit (for example, keyboard, mouse, speaker, memory, or hard disk drive) Service and On-site Service.

### **Customer Replaceable Unit (CRU) Service**

Lenovo provides a replacement CRU to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from Lenovo at any time on your request. A CRU is designated as being either a Tier 1 (mandatory) or a Tier 2 (optional) CRU. Installation of Tier 1 CRUs, as specified in this announcement, is your responsibility. If Lenovo installs a Tier 1 CRU at your request, you will be charged for the installation. You may install a Tier 2 CRU yourself or request Lenovo to install it, at no additional charge, under the type of warranty service designated for your machine.

Based upon availability, a CRU will be shipped for next-business-day (NBD) delivery. Lenovo specifies in the materials shipped with a replacement CRU whether a defective CRU must be returned to Lenovo. When return is required, return instructions and a container are shipped with the replacement CRU, and you may be charged for the replacement CRU if Lenovo does not receive the defective CRU within 15 days of your receipt of the replacement.

The following parts or features have been designated as Tier 1 CRUs:

- HDD/SSD, External
- Tobago Super Cap
- Front bezel with power button

- System service label
- Miscellaneous parts kit
- HDD backplane
- Mezz retention kit
- Memory DIMMs
- Indicator panel
- 3.0 volt battery
- RFID label tag assembly
- Mezzanine adapters
- Air baffle
- KVM dongle cable (Console Breakout Cable)

### ***On-site Service***

At Lenovo's discretion you will receive CRU service; or Lenovo or your reseller will repair the failing machine at your location and verify its operation. If required, On-site Repair is provided, 9 hours per day, Monday through Friday excluding holidays, NBD response. You must provide a suitable working area to allow disassembly and reassembly of the Lenovo machine. The area must be clean, well lit, and suitable for the purpose. On-site Service is not available in all countries, and some countries have kilometer or mileage limitations from a Lenovo service center. In those locations where On-site Service is not available, the normal in-country service delivery is used.

Call Lenovo at 1-800-IBM-SERV (426-7378) to assist with problem isolation for hardware to determine if warranty service is required. Telephone support may be subject to additional charges, even during the limited warranty period.

Calls must be received by 5:00 p.m. local time in order to qualify for NBD service.

### ***International Warranty Service***

International Warranty Service (IWS) is available in selected countries or regions.

The warranty service type and the service level provided in the servicing country may be different from that provided in the country in which the machine was purchased.

Under IWS, warranty service will be provided with the prevailing warranty service type and service level available for the IWS-eligible machine type in the servicing country, and the warranty period observed will be that of the country in which the machine was purchased.

To determine the eligibility of your machine and to view a list of countries where service is available, visit

<http://www-947.ibm.com/support/entry/portal/docdisplay?Indocid=GCOR-3FBJK2>

### ***Licensing***

Programs included with this product are licensed under the terms and conditions of the License Agreements that are shipped with the system.

### ***Maintenance services***

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#### ***ServicePac®, ServiceSuite®, ServiceElect, and ServiceElite***

ServicePac, ServiceSuite, ServiceElect, and ServiceElite provide hardware warranty service upgrades, maintenance, and selected support services in one agreement.

### **Warranty service upgrade**

During the warranty period, a warranty service upgrade provides an enhanced level of On-site Service for an additional charge. A warranty service upgrade must be purchased during the warranty period and is for a fixed term (duration). It is not refundable or transferable and may not be prorated. If required, Lenovo will provide the warranty service upgrade enhanced level of On-site Service acquired by the customer. Service levels are response-time objectives and are not guaranteed.

Lenovo will attempt to resolve your problem over the telephone or electronically by access to a Lenovo website. Certain machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with Lenovo. You must follow the problem determination and resolution procedures that Lenovo specifies. Following problem determination, if Lenovo determines On-site Service is required, scheduling of service will depend upon the time of your call, machine technology and redundancy, and availability of parts.

CRUs will be provided as part of the machine's standard warranty CRU Service except that you may install a Tier 2 CRU yourself or request Lenovo installation, at no additional charge, under one of the On-site Service levels specified below.

Lenovo will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the Lenovo machine. The area must be clean, well lit, and suitable for the purpose.

### **Maintenance service**

If required, Lenovo provides repair or exchange service, depending on the type of maintenance service specified below for the machine. Lenovo will attempt to resolve your problem over the telephone or electronically by access to a Lenovo website. Certain machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with Lenovo. You must follow the problem determination and resolution procedures that Lenovo specifies. Following problem determination, if Lenovo determines On-site Service is required, scheduling of service will depend upon the time of your call, machine technology and redundancy, and availability of parts. Service levels are response-time objectives and are not guaranteed.

#### *CRU Service*

If your problem can be resolved with a CRU (for example, keyboard, mouse, speaker, memory, or hard disk drive), Lenovo will ship the CRU to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from Lenovo at any time on your request.

Lenovo specifies in the materials shipped with a replacement CRU whether a defective CRU must be returned to Lenovo. When return is required, return instructions and a container are shipped with the replacement CRU, and you may be charged for the replacement CRU if Lenovo does not receive the defective CRU within 15 days of your receipt of the replacement.

#### *On-site Service*

Lenovo will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the Lenovo machine. The area must be clean, well lit, and suitable for the purpose.

### **Maintenance service (ICA)**

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Maintenance services are available for ICA legacy contracts.

### ***Alternative service (warranty service upgrades)***

During the warranty period, a warranty service upgrade provides an enhanced level of On-site Service for an additional charge. A warranty service upgrade must be purchased during the warranty period and is for a fixed term (duration). It is not refundable or transferable and may not be prorated. If required, Lenovo will provide the warranty service upgrade enhanced level of On-site Service acquired by the customer. Service levels are response-time objectives and are not guaranteed.

Lenovo will attempt to resolve your problem over the telephone or electronically by access to a Lenovo website. Certain machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with Lenovo. You must follow the problem determination and resolution procedures that Lenovo specifies. Following problem determination, if Lenovo determines On-site Service is required, scheduling of service will depend upon the time of your call, machine technology and redundancy, and availability of parts.

A CRU will be provided as part of the machine's standard warranty CRU Service except that you may install a Tier 1 CRU yourself or request Lenovo to install it, at no additional charge, under the type of warranty service designated for your machine.

Lenovo will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the Lenovo machine. The area must be clean, well lit, and suitable for the purpose.

### ***Maintenance service***

If required, Lenovo provides repair or exchange service, depending on the type of maintenance service specified below for the machine. Lenovo will attempt to resolve your problem over the telephone or electronically by access to a Lenovo website. Certain machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with Lenovo. You must follow the problem determination and resolution procedures that Lenovo specifies. Following problem determination, if Lenovo determines On-site Service is required, scheduling of service will depend upon the time of your call, machine technology and redundancy, and availability of parts. Service levels are response-time objectives and are not guaranteed.

#### *CRU Service*

If your problem can be resolved with a CRU (for example, keyboard, mouse, speaker, memory, or hard disk drive), Lenovo will ship the CRU to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from Lenovo at any time on your request.

Lenovo specifies in the materials shipped with a replacement CRU whether a defective CRU must be returned to Lenovo. When return is required, return instructions and a container are shipped with the replacement CRU, and you may be charged for the replacement CRU if Lenovo does not receive the defective CRU within 15 days of your receipt of the replacement.

#### *On-site Service*

Lenovo will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the Lenovo machine. The area must be clean, well lit, and suitable for the purpose.

### **Non-Lenovo parts support**

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#### ***Warranty service***

Lenovo is now shipping machines with selected non-Lenovo parts that contain a Lenovo field replaceable unit (FRU) part number label. These parts are to be serviced during the Lenovo machine warranty period. Lenovo is covering the service

on these selected non-Lenovo parts as an accommodation to its customers, and normal warranty service procedures for the Lenovo machine apply.

### ***Warranty service upgrades and maintenance services***

Under certain conditions, Lenovo repairs selected non-Lenovo parts at no additional charge for machines that are covered under warranty service upgrades or maintenance services.

Lenovo Service provides hardware problem determination on non-Lenovo parts (for example, adapter cards, PCMCIA cards, disk drives, or memory) installed within Lenovo machines covered under warranty service upgrades or maintenance services and provides the labor to replace the failing parts at no additional charge.

If Lenovo has a Technical Service Agreement with the manufacturer of the failing part, or if the failing part is an accommodations part (a part with a Lenovo FRU label), Lenovo may also source and replace the failing part at no additional charge. For all other non-Lenovo parts, customers are responsible for sourcing the parts. Installation labor is provided at no additional charge, if the machine is covered under a warranty service upgrade or a maintenance service.

### ***IBM hourly service rate classification***

One

### ***Field-installable features***

Yes

### ***Model conversions***

No

### ***Machine installation***

Customer setup. Customers are responsible for installation according to the instructions IBM provides with the machine.

### ***Graduated program license charges apply***

No

### ***Licensed Machine Code***

IBM Machine Code is licensed for use by a customer on the IBM machine for which it was provided by IBM under the terms and conditions of the IBM License Agreement for Machine Code, to enable the machine to function in accordance with its specifications, and only for the capacity authorized by IBM and acquired by the customer. You can obtain the agreement by contacting your IBM representative or visiting

[http://www-304.ibm.com/servers/support/machine\\_warranties/machine\\_code.html](http://www-304.ibm.com/servers/support/machine_warranties/machine_code.html)

IBM may release changes to the Machine Code. IBM plans to make the Machine Code changes available for download from the IBM System x technical support website

<http://www.ibm.com/support>

If the machine does not function as warranted and your problem can be resolved through your application of downloadable Machine Code, you are responsible for downloading and installing these designated Machine Code changes as IBM specifies. If you would prefer, you may request IBM to install downloadable Machine Code changes; however, you may be charged for that service.

Access to IBM Flex System fix downloads will be granted upon entitlement validation. The terms and conditions for fixes will be covered under the License Agreement for Machine Code, International Program License Agreement, International License Agreement for Non-Warranted Programs and/or other terms provided with the fix, as applicable.

**Educational allowance**

None

**Prices**

For current prices, contact IBM at 888-Shop-IBM (746-7426) or visit

<http://www-03.ibm.com/systems/x/>

To locate the web price, search on the feature number in the Search field.

The following are features already announced for the 3331 machine type:

Description	Model Number	Feature Number	Initial/MES/Both/Support
IBM Flex System CN4058S 8-port 10Gb Virtual Fabric Adapter	HC1	A4R6	MES
IBM Flex System CN4058S Virtual Fabric Adapter SW Upgrade (FoD)	HC1	A4R9	MES
IBM Flex System CN4052 2-port 10Gb Virtual Fabric Adapter	HC1	A5RP	MES
IBM Flex System CN4052 Virtual Fabric Adapter SW Upgrade (FoD)	HC1	A5RV	MES
P3600 400GB NVMe 2.5" G3HS Enterprise Value PCIe SSD for System x	HC1	A5RW	MES
P3600 800GB NVMe 2.5" G3HS Enterprise Value PCIe SSD for System x	HC1	A5RX	MES
P3600 1.6TB NVMe 2.5" G3HS Enterprise Value PCIe SSD for System x	HC1	A5RY	MES
P3600 2.0TB NVMe 2.5" G3HS Enterprise Value PCIe SSD for System x	HC1	A5RZ	MES
NVMe Enterprise PCIe SSD Enablement Kit for IBM Flex System x240 M5	HC1	A5SH	MES

The following are features already announced for the 9532 machine type:

Description	Model Number	Feature Number	Initial/MES/Both/Support
IBM Flex System CN4058S 8-port 10Gb Virtual Fabric Adapter	AC1 MC1	A4R6	Initial Initial
IBM Flex System CN4058S Virtual Fabric Adapter SW Upgrade (FoD)	AC1	A4R9	Initial

	MC1		Initial
IBM Flex System CN4052 2-port 10Gb Virtual Fabric Adapter			
	AC1	A5RP	Initial
	MC1		Initial
IBM Flex System CN4052 Virtual Fabric Adapter SW Upgrade (FoD)			
	AC1	A5RV	Initial
	MC1		Initial
P3600 400GB NVMe 2.5" G3HS Enterprise Value PCIe SSD for System x			
	AC1	A5RW	Initial
	MC1		Initial
P3600 800GB NVMe 2.5" G3HS Enterprise Value PCIe SSD for System x			
	AC1	A5RX	Initial
	MC1		Initial
P3600 1.6TB NVMe 2.5" G3HS Enterprise Value PCIe SSD for System x			
	AC1	A5RY	Initial
	MC1		Initial
P3600 2.0TB NVMe 2.5" G3HS Enterprise Value PCIe SSD for System x			
	AC1	A5RZ	Initial
	MC1		Initial
NVMe Enterprise PCIe SSD Enablement Kit for IBM Flex System x240 M5			
	AC1	A5SH	Initial
	MC1		Initial
64GB TruDDR4 Memory (4Rx4,1.2V) PC4-17000 CL15 2133MHZ LP LRDIMM			
	AC1	A5UK	Initial
	MC1		Initial

#### IBM Flex System x240 M5 Compute Node

Description	SEO Number	Initial/ MES/ Both/ Support	CSU
IBM Flex System x240 M5 Compute Node			
	9532L6U	Both	Yes
	9532J6U	Both	Yes
	9532H6U	Both	Yes
	9532D6U	Both	Yes
	9532B6U	Both	Yes

#### SEO Options

Description	SEO Number	Initial/ MES/ Both/ Support	CSU
P3600 400GB NVMe 2.5" G3HS Enterprise Value PCIe SSD for System x	90Y3227	Both	Yes
P3600 800GB NVMe 2.5" G3HS Enterprise Value PCIe SSD for System x	90Y3230	Both	Yes
P3600 1.6TB NVMe 2.5" G3HS Enterprise Value PCIe SSD for System x	90Y3233	Both	Yes
P3600 2.0TB NVMe 2.5" G3HS Enterprise Value PCIe SSD for System x	90Y3236	Both	Yes
IBM Flex System CN4052 2-port 10Gb Virtual Fabric Adapter	00JY800	Both	Yes
IBM Flex System CN4058S 8-port 10Gb Virtual Fabric Adapter	94Y5160	Both	Yes
IBM Flex System CN4052 Virtual Fabric Adapter SW Upgrade (FoD)	00JY804	Both	Yes
IBM Flex System CN4058S Virtual Fabric			

Adapter SW Upgrade	94Y5164	Both	Yes
NVMe Enterprise PCIe SSD Enablement Kit for IBM Flex System x240 M5	00JX177	Both	Yes

### **Maintenance charges**

For additional information on maintenance and pricing, please contact your IBM Sales Representative or your IBM Business Partner, or call 1-800-IBM-CALL (1-800-426-2255).

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