



# IBM Flex System x280 X6, x480 X6, and x880 X6 Compute Nodes are high-performance server offering improved virtualization with increased CPU performance, memory capacity, and flexible configuration options

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## At a glance

The new IBM Flex System® X6 Compute Node Portfolio incorporates the sixth generation (X6) of IBM® enterprise X-Architecture® to help deliver better, more efficient business results using the IBM Flex System. X6 platforms are fast, agile, and resilient so they can produce significantly faster compute performance than previous-generation systems. The X6 portfolio increases virtualization density, and decreases infrastructure costs and complexity. This enables you to design faster analytics engines, rein in IT sprawl, and deliver information with high reliability. The new IBM Flex System X6 Compute Node family consists of:

- The Flex System x280 X6 is a 2-socket server optimized for workloads that require large memory footprint and virtualization performance.
- The Flex System x480 X6 is scalable to a 4-socket system optimized for applications that require more processor cores and memory for larger virtual machines and database.
- The Flex System x880 X6 is scalable to an 8-socket system ideal for workloads that demand the highest levels of performance such as analytics and large databases.
- Additional standard models leverage a LOM-less design to specific client networks or storage environments. These models allow for flexibility in choosing the right elements based on ServerProven® and interoperability plans.

## Overview

IBM Flex System X6 Compute Node portfolio includes the IBM Flex System x280 X6, IBM Flex System x480 X6, and the IBM Flex System x880 X6.

Highlights of X6:

- Fast, with 50% more cores than previous generation eX5 systems. X6 is designed to delivers up to 100% higher performance based on a 4-socket x480 configuration, and up to 300% higher performance based on an 8-socket x880 configuration.

**Note:** Based on projected performance scores for x480 and x880 and IBM internal lab measurements on an IBM BladeCenter® HX5 server configured with four processors.

- Agile, with a modular, scalable design that supports multiple generations of CPUs. X6 provides stability and flexibility through forthcoming technology developments, allowing users to scale up now and upgrade efficiently in the future. Fast setup and configuration patterns simplify deployment and lifecycle management.
- Resilient, with features that can help extend cloud delivery models to mission-critical applications. Memory and storage increase virtual machine capacity to allow SaaS delivery of applications. Autonomous self-healing CPU and memory systems optimize application uptime by proactively identifying potential failures and taking action to correct them. In addition, Upward Integration Modules can help reduce the cost and complexity of system administration by allowing operators to perform management tasks through virtualization tools.

IBM Flex System X6 compute node features:

- Powerful RAS features, real-time fault tolerance
- Support for Intel Xeon™ E7 2800 V2, 4800V2, and 8800 V2 series processors
- CPUs based on Intel™ E7 2800 v2, 4800 v2, and 8800 v2 product families
- Forty-eight DIMM slots on base up to 96 DIMM Slots in a 4-socket configuration, and up to 192 DIMM slots in an 8-socket configuration
- Support for up to two 2.5-inch hot-swap SAS/SATA drives
- 6 Gbps and 12 Gbps SAS controller
- Support for 8 Gb or 16 Gb FC and QDR/FDR InfiniBand
- Support for advanced Flex System management capabilities

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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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June 13, 2014

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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 optional network adapters to connect to external devices through the switches or modules that are installed in the chassis.

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

These compute nodes include 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 X6 Compute Nodes**

The IBM Flex System X6 Compute Nodes is a high-density, scalable compute node that is ideally suited for high-performance and virtualized environments.

The base 2-socket Flex System X6 Compute Nodes provide support for optional devices, such as the following devices:

- Up to two multi-core microprocessors
- Up to 48 dual inline LP memory modules (DIMMs)
- Up to two 2.5-inch hot-swap storage drives
- Up to four I/O expansion adapters
- Up to two internal bootable USB flash keys

The Flex System X6 Compute Nodes are supported in the IBM Flex System Enterprise Chassis only.

The IBM Flex System X6 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 X6 Compute Node system board contains 48 DIMM connectors.
  - Each DIMM connector supports 4 GB, 8 GB, 16 GB, 32 GB, or 64 GB low-profile (LP) double-data rate (DDR3) 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.

IBM Flex System X6 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 it 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**

- 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 four 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 by 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.

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

Each 2-socket compute node supports up to 3 TB of system memory. The memory controller provides support for up to 48 industry-standard registered or LRDIMM ECC DDR3 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.

## **Flex System networking portfolio**

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Networking in datacenters is undergoing a transition from a discrete traditional model to a more flexible, optimized model or the "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 datacenters. 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 such as 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 network scalability. When modules are marked "scalable," this means that the base product can be purchased with a certain number of ports; when they need to scale up for more ports, you can just buy the license to enable the extra ports without having to provision any new hardware.

## Standard IBM Flex System X6 Compute Node configuration

### Model information

Model	Intel Xeon name	CPU Cores	CPU speed	CPU GT/s	CPU power	Memory/ type	I/O
<b>IBM Flex System x880 X6 Compute Node</b>							
7903-R2x	2xE7-8890v2	15	2.8 GHz	8.0	155w	2x16 GB 1600 MHz	LOM-less
	Cache: 37.5 MB						
7903-Q2x	2xE7-8880v2	15	2.5 GHz	8.0	130w	2x16 GB 1600 MHz	LOM-less
	Cache: 37.5 MB						
7903-N2x	2xE7-8850v2	12	2.3 GHz	7.2	105w	2x16 GB 1600 MHz	LOM-less
	Cache: 24 MB						
<b>IBM Flex System x480 X6 Compute Node</b>							
7903-M2x	2xE7-4890v2	15	2.8 GHz	8.0	155w	2x16 GB 1600 MHz	LOM-less
	Cache: 37.5 MB						
7903-J2x	2xE7-4870v2	15	2.3 GHz	8.0	130w	2x16 GB 1600 MHz	LOM-less
	Cache: 30 MB						
7903-G2x	2xE7-4830v2	10	2.2 GHz	7.2	105w	2x16 GB 1600 MHz	LOM-less
	Cache: 20 MB						
7903-F2x	2xE7-4820v2	8	2.0 GHz	7.2	105w	2x16 GB 1600 MHz	LOM-less
	Cache: 16 MB						
<b>IBM Flex System x280 X6 Compute Node</b>							
7903-C2x	2xE7-2890v2	15	2.8 GHz	8.0	155w	2x16 GB 1600 MHz	LOM-less
	Cache: 37.5 MB						
7903-B2x	2xE7-2880v2	15	2.5 GHz	8.0	130w	2x16 GB 1600 MHz	LOM-less
	Cache: 37.5 MB						
7903-A2x	2xE7-2850v2	12	2.3 GHz	7.2	105w	2x16 GB 1600 MHz	LOM-less
	Cache: 24 MB						

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)

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## Product positioning

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

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## Product number

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Note: All models are GAV.

Description	Machine Model	Part number
IBM Flex System x880 X6 Compute Node	7903 R2G	7903R2G
	7903 Q2G	7903Q2G
	7903 N2G	7903N2G
IBM Flex System x480 X6 Compute Node	7903 M2G	7903M2G
	7903 J2G	7903J2G
	7903 G2G	7903G2G
	7903 F2G	7903F2G
IBM Flex System x280 X6 Compute Node	7903 C2G	7903C2G
	7903 B2G	7903B2G
	7903 A2G	7903A2G

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## Publications

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The *User's Guide*, *Maintenance Guide*, and *Problem Determination and Service Guide*, for IBM Flex System X6 Compute Node solutions, in US English versions, are available from

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

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

IBM Systems Information Center provide you with a single site where you can access product documentation for IBM systems hardware, operating systems, and server software. Through a consistent framework, you can efficiently find information and personalize your access. The IBM Systems information Centers are at

<http://publib14.boulder.ibm.com/infocenter/systems>

Multilingual support is provided for many of the components in the following languages:

- Brazilian Portuguese
- Chinese (Simplified and Traditional)
- English (US and UK)

- French
- German
- Italian
- Japanese
- Korean
- Spanish

The multilingual support includes national language keyboard support, multilingual nomenclature, and translated documentation as required by the individual countries.

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## Services

### Global Technology Services®

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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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## Technical information

### Specified operating environment

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#### ***Physical specifications - IBM Flex System X6 Compute Node***

IBM Flex System x880 X6 Compute Node  
7903-R2G

Processor	Intel Xeon E7-8890 v2 15 core 155w
Internal speed	2.8 GHz
Maximum memory speed	1600 MHz
CPU interconnect speed	8.0 GT/s
Number standard	2
Maximum	2
L3 cache (full speed)	37.5 MB
Memory (LP ECC DDR3)	32 GB
DIMMs (Standard)	2 x 16 GB
DIMM sockets	48
Capacity	3 TB <sup>1</sup>
Mezzanine Card	

Standard	0
Maximum (LOM-less)	4
Video	SVGA
Memory	16 MB
Disk controller	SAS
Channels	4
Connector internal	2
Connector external	0
RAID	Standard
Internal capacity	3.2 TB <sup>2</sup>
Total HDD or SSD bays	2 x 2.5"
Management processor	Standard
Ethernet controller	None
Front access connectors	
KVM connector	1 <sup>3</sup>
USB connector	1

IBM Flex System x880 X6 Compute Node  
7903-Q2G

Processor	Intel Xeon E7-8880 v2
	15 core 130w
Internal speed	2.5 GHz
Maximum memory speed	1600 MHz
CPU interconnect speed	8.0 GT/s
Number standard	2
Maximum	2
L3 cache (full speed)	37.5 MB
Memory (LP ECC DDR3)	32 GB
DIMMs (Standard)	2 x 16 GB
DIMM sockets	48
Capacity	3 TB <sup>1</sup>
Mezzanine Card	
Standard	0
Maximum (LOM-less)	4
Video	SVGA
Memory	16 MB
Disk controller	SAS
Channels	4
Connector internal	2
Connector external	0
RAID	Standard
Internal capacity	3.2 TB <sup>2</sup>
Total HDD or SSD bays	2 x 2.5"
Management processor	Standard
Ethernet controller	None
Front access connectors	
KVM connector	1 <sup>3</sup>
USB connector	1

IBM Flex System x880 X6 Compute Node  
7903-N2G

Processor	Intel Xeon E7-8850 v2
	12 core 105w
Internal speed	2.3 GHz
Maximum memory speed	1600 MHz
CPU interconnect speed	7.2 GT/s
Number standard	2
Maximum	2
L3 cache (full speed)	24 MB
Memory (LP ECC DDR3)	32 GB
DIMMs (Standard)	2 x 16 GB
DIMM sockets	48
Capacity	3 TB <sup>1</sup>
Mezzanine Card	
Standard	0
Maximum (LOM-less)	4
Video	SVGA

Memory	16 MB
Disk controller	SAS
Channels	4
Connector internal	2
Connector external	0
RAID	Standard
Internal capacity	3.2 TB <sup>2</sup>
Total HDD or SSD bays	2 x 2.5"
Management processor	Standard
Ethernet controller	None
Front access connectors	
KVM connector	1 <sup>3</sup>
USB connector	1

IBM Flex System x480 X6 Compute Node  
7903-M2G

Processor	Intel Xeon E7-4890 v2 15 core 155w
Internal speed	2.8 GHz
Maximum memory speed	1600 MHz
CPU interconnect speed	8.0 GT/s
Number standard	2
Maximum	2
L3 cache (full speed)	37.5 MB
Memory (LP ECC DDR3)	32 GB
DIMMs (Standard)	2 x 16 GB
DIMM sockets	48
Capacity	3 TB <sup>1</sup>
Mezzanine Card	
Standard	0
Maximum (LOM-less)	4
Video	SVGA
Memory	16 MB
Disk controller	SAS
Channels	4
Connector internal	2
Connector external	0
RAID	Standard
Internal capacity	3.2 TB <sup>2</sup>
Total HDD or SSD bays	2 x 2.5"
Management processor	Standard
Ethernet controller	None
Front access connectors	
KVM connector	1 <sup>3</sup>
USB connector	1

IBM Flex System x480 X6 Compute Node  
7903-J2G

Processor	Intel Xeon E7-4870 v2 15 core 130w
Internal speed	2.3 GHz
Maximum memory speed	1600 MHz
CPU interconnect speed	8 GT/s
Number standard	2
Maximum	2
L3 cache (full speed)	30 MB
Memory (LP ECC DDR3)	32 GB
DIMMs (Standard)	2 x 16 GB
DIMM sockets	48
Capacity	3 TB <sup>1</sup>
Mezzanine Card	
Standard	0
Maximum (LOM-less)	4
Video	SVGA
Memory	16 MB
Disk controller	SAS
Channels	4

Connector internal	2
Connector external	0
RAID	Standard
Internal capacity	3.2 TB <sup>2</sup>
Total HDD or SSD bays	2 x 2.5"
Management processor	Standard
Ethernet controller	None
Front access connectors	
KVM connector	1 <sup>3</sup>
USB connector	1

IBM Flex System x480 X6 Compute Node  
7903-G2G

Processor	Intel Xeon E7-4830 v2
	10 core 105w
Internal speed	2.2 GHz
Maximum memory speed	1600 MHz
CPU interconnect speed	7.2 GT/s
Number standard	2
Maximum	2
L3 cache (full speed)	20 MB
Memory (LP ECC DDR3)	32 GB
DIMMs (Standard)	2 x 16 GB
DIMM sockets	48
Capacity	3 TB <sup>1</sup>
Mezzanine Card	
Standard	0
Maximum (LOM-less)	4
Video	SVGA
Memory	16 MB
Disk controller	SAS
Channels	4
Connector internal	2
Connector external	0
RAID	Standard
Internal capacity	3.2 TB <sup>2</sup>
Total HDD or SSD bays	2 x 2.5"
Management processor	Standard
Ethernet controller	None
Front access connectors	
KVM connector	1 <sup>3</sup>
USB connector	1

IBM Flex System x480 X6 Compute Node  
7903-F2G

Processor	Intel Xeon E7-4820 v2
	8 core 105w
Internal speed	2.0 GHz
Maximum memory speed	1600 MHz
CPU interconnect speed	7.2 GT/s
Number standard	2
Maximum	2
L3 cache (full speed)	16 MB
Memory (LP ECC DDR3)	32 GB
DIMMs (Standard)	2 x 16 GB
DIMM sockets	48
Capacity	3 TB <sup>1</sup>
Mezzanine Card	
Standard	0
Maximum (LOM-less)	4
Video	SVGA
Memory	16 MB
Disk controller	SAS
Channels	4
Connector internal	2
Connector external	0
RAID	Standard

Internal capacity	3.2 TB <sup>2</sup>
Total HDD or SSD bays	2 x 2.5"
Management processor	Standard
Ethernet controller	None
Front access connectors	
KVM connector	1 <sup>3</sup>
USB connector	1

IBM Flex System x280 X6 Compute Node  
7903-C2G

Processor	Intel Xeon E7-2890 v2
	15 core 155w
Internal speed	2.8 GHZ
Maximum memory speed	1600 MHz
CPU interconnect speed	8.0 GT/s
Number standard	2
Maximum	2
L3 cache (full speed)	37.5 MB
Memory (LP ECC DDR3)	32 GB
DIMMs (Standard)	2 x 16 GB
DIMM sockets	48
Capacity	3 TB <sup>1</sup>
Mezzanine Card	
Standard	0
Maximum (LOM-less)	4
Video	SVGA
Memory	16 MB
Disk controller	SAS
Channels	4
Connector internal	2
Connector external	0
RAID	Standard
Internal capacity	3.2 TB <sup>2</sup>
Total HDD or SSD bays	2 x 2.5"
Management processor	Standard
Ethernet controller	None
Front access connectors	
KVM connector	1 <sup>3</sup>
USB connector	1

IBM Flex System x280 X6 Compute Node  
7903-B2G

Processor	Intel Xeon E7-2880 v2
	15 core 130w
Internal speed	2.5 GHZ
Maximum memory speed	1600 MHz
CPU interconnect speed	8.0 GT/s
Number standard	2
Maximum	2
L3 cache (full speed)	37.5 MB
Memory (LP ECC DDR3)	32 GB
DIMMs (Standard)	2 x 16 GB
DIMM sockets	48
Capacity	3 TB <sup>1</sup>
Mezzanine Card	
Standard	0
Maximum (LOM-less)	4
Video	SVGA
Memory	16 MB
Disk controller	SAS
Channels	4
Connector internal	2
Connector external	0
RAID	Standard
Internal capacity	3.2 TB <sup>2</sup>
Total HDD or SSD bays	2 x 2.5"
Management processor	Standard

Ethernet controller	None
Front access connectors	
KVM connector	1 <sup>3</sup>
USB connector	1

IBM Flex System x280 X6 Compute Node  
7903-A2G

Processor	Intel Xeon E7-2850 v2 12 core 105w
Internal speed	2.3 GHz
Maximum memory speed	1600 MHz
CPU interconnect speed	7.2 GT/s
Number standard	2
Maximum	2
L3 cache (full speed)	24 MB
Memory (LP ECC DDR3)	32 GB
DIMMs (Standard)	2 x 16 GB
DIMM sockets	48
Capacity	3 TB <sup>1</sup>
Mezzanine Card	
Standard	0
Maximum (LOM-less)	4
Video	SVGA
Memory	16 MB
Disk controller	SAS
Channels	4
Connector internal	2
Connector external	0
RAID	Standard
Internal capacity	3.2 TB <sup>2</sup>
Total HDD or SSD bays	2 x 2.5"
Management processor	Standard
Ethernet controller	None
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> Capacity is 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.

For latest information on supported HDD options, visit

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

### **Video subsystem**

- 16 MB DDR3
- Integrated on the IMM2

### **Supported IBM Flex System X6 Compute Node video resolutions**

Resolution	Maximum Refresh Rate Supported	Bpp
640 x 400	60, 72, 75, 85	8, 16, 32
800 x 600	60, 72, 75, 85	8, 16, 32
1024 x 768	60, 72, 75, 85	8, 16, 32
1280 x 1024	60, 75	8, 16, 32
1440 x 900	60, 60 RB	8, 16, 32
1600 x 1200	60, 75	8, 16, 32

**Note:** 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 X6 Compute Node**

- Height: 55.5 mm (2.19 in.)
- Depth: 500 mm (19.7 in.)
- Width: 435.3 mm (17.14 in.)
- Maximum weight: 12.25 kg (27 lb) (depending on the configuration when options are added)

### **Electrical**

IBM Flex System X6 Compute Node: 12.2 (nominal) V dc

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

### **Standards**

#### **Equipment approvals and safety**

- Russia/GOST ME01, IEC 60950-1, GOST R 51318.22, GOST R 51318.249, GOST R 51317.3.2, GOST R 51317.3.3
- IEC 60950-1 (CB Certificate and CB Test Report)
- 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)

### **Operating environment**

The IBM Flex System X6 Compute Node complies with ASHRAE Class A3 specifications.

- 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 - 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 - 140°F)
  - Altitude: 10,700 m (35,105 ft)
  - Relative humidity: 5% - 100%
  - Maximum dew point: 29°C (84.2°F)
  - Particulate contamination

### **Homologation**

This product is not certified for direct connection by any means whatsoever to interfaces of public telecommunications networks. Certification may be required by law prior to making any such connection. Contact an IBM representative or reseller for any questions.

### **Hardware requirements**

For service, the IBM Flex System X6 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 X6 Compute Node:

- Microsoft :
  - Microsoft Windows Server 2008 R2 with Service Pack 1
  - Microsoft Windows Server 2008 R2
  - Microsoft Windows Server 2012
- Linux :
  - Novell SUSE Linux Enterprise Server 11 for AMD64/EM64T, Service Pack 3
  - Novell SUSE Linux Enterprise Server 11 with Xen for AMD64/EM64T, Service Pack 3
  - Red Hat Enterprise Linux 6 Server x64 Edition, U4
- VMware:
  - VMware vSphere 5.1 (ESXi) U2
  - VMWare vSphere 5.5 (ESXi)

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

<http://www-03.ibm.com/systems/info/x86servers/serverproven/compat/us>

### **Compatibility**

The IBM Flex System X6 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 X6 Compute Nodes 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 IBM Flex System X6 Compute Node contain 48 DIMM sockets. A maximum of 3 TB of system memory is supported by using a 64 GB DIMM of ECC DDR3 memory in each of the DIMM sockets. A minimum of one memory feature must be installed. All memory installed must be of the same type (RDIMM, or LR DIMM).
- 64 GB DIMMs are only supported in 2-socket or 4-socket configurations.
- Processor modules must be of the same type, power level, and clock speed on each Flex System X6 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 X6 Compute Node is supported only in the IBM Flex System Enterprise Chassis.
- For mezzanine expansion cards Flex System CN4054R 10 Gb Virtual Fabric Adapter, Flex System EN4024 4-port 1 Gb Ethernet Adapter, and Flex System FC5054 4-port 16 Gb FC Adapter, a maximum of two mezzanine cards are supported.
- The following I/O cards (Mezz cards) are not supported in Mezz slot 3 and Mezz slot 4:
  - IBM Flex System EN2024 4-port 1Gb Ethernet Adapter - 49Y7900
  - IBM Flex System CN4054R 10Gb Virtual Fabric - 00Y3306
  - Flex System FC5054 4-port 16 Gb FC Adapter - 95Y2391
- Mezzanine expansion cards installed in the Flex System X6 Compute Node require a switch module in the Flex System Enterprise Chassis of the same connectivity type.
- 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 X6 Compute Node server is designated as customer setup. Customer setup instructions are shipped with each system.

### Supported memory options

Option Number	Description
00D5024	4GB (1x4GB, 1Rx4, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHZ LP RDIMM
00D5036	8GB (1x8GB, 1Rx4, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHZ LP RDIMM
46W0672	16GB (1x16GB, 2Rx4, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHZ LP RDIMM
46W0676	32GB (1x32GB, 4Rx4, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHZ LP LRDIMM
46W0741	64GB (1x64GB, 8Rx4, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHZ LP LRDIMM

## ***Cable orders***

All cables are supplied with the IBM Flex System X6 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.

### **Approximate shipping dimensions and weight**

- Single pack dimensions: 603 mm x 197 mm x 430 mm (23.74 in. x 7.76 in. x 16.93 in.)
- Single pack weight: 8 kg (17.64 lb)
- Quantity per pallet: 30
- Pallet load dimensions: 1016 mm x 1219 mm x 125 mm (40 in. x 47.99 in. x 4.92 in.)
- Pallet load weight: 256.4 kg (566.59 lb)
- Estimated safe stacking: 2 high

## **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 DDR3 memory
- ECC protection on the L2 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 (PST)
- 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.

### **Global Technology Services**

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Contact your IBM representative for the list of selected services available in your country, either as standard or customized offerings, for the efficient installation, implementation, and/or integration of this product.

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## **Terms and conditions**

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

### **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.

An IBM part or feature installed during the initial installation of an IBM machine is subject to a full warranty effective on the date of installation of the machine. An IBM part or feature which replaces a previously installed part or feature assumes the remainder of the warranty period for the replaced part or feature. An IBM 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
- Airbaffle, above DIMM
- Handle, cam assembly left
- HDD cage
- Rear bulkhead
- Intel socket
- Heatsink assembly (heat pipe)

## **Warranty service**

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If required, IBM provides repair or exchange service, depending on the type of warranty service specified below for the machine. IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM website. Certain machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with IBM. You must follow the problem determination and resolution procedures that IBM specifies. Following problem determination, if IBM 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 IBM's normal service area. Contact your local IBM 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**

IBM provides a replacement CRU to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM 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 IBM 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 IBM 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. IBM specifies in the materials shipped with a replacement CRU whether a defective CRU must be returned to IBM. 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 IBM 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:

- Front bezel with power button
- System service label
- Miscellaneous parts kit
- HDD backplanes
- Mezz retention kit
- Memory DIMMs
- 3x8 double ended periscope receptacle
- Indicator panel
- RFID label tag assembly
- Storage drives
- 2 GB USB memory flash key

- Mezzanine adapters
- Air with USB baffle
- KVM dongle cable

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

At IBM's discretion you will receive CRU service or IBM 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 IBM 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 an IBM service center. In those locations where On-site Service is not available, the normal in-country service delivery is used.

### ***International Warranty Service (IWS)***

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>

For more information on IWS, refer to Services Announcement [ZS01-0168](#), dated September 25, 2001.

### ***Licensing***

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

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

Two

### ***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.

### ***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.

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## Prices

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For all local charges, contact your IBM representative.

### **EMEA ServicePac® Service Upgrades**

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#### **ServicePac for Warranty Upgrade and Maintenance**

ServicePac can be purchased from your IBM Business Partner and are specific to the machines/products listed.

The upgrade level of service is dependant on country.

For a full list of ServicePac offerings and prices, refer to the IBM ServicePac Product Selector Tool. Visit

<https://www-304.ibm.com/sales/gss/download/spst/servicepac/extProductSelectorWWW.do>

### **IBM Global Financing**

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

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reduce costs, minimize risk, and preserve your ability to make flexible equipment decisions throughout the entire technology lifecycle.

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## **Announcement countries**

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All European, Middle Eastern, and African countries.

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