IBM System x iDataPlex dx320 server offers an innovative data center solution

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At a glance

The IBM® System x® platform takes a new approach to solving data center challenges through its latest innovation, iDataPlex -- a flexible and power-efficient design that enables massive scale-out deployments with affordable and customized value.

The iDataPlex dx320 server features a highly efficient, low-power design that substantially reduces power consumption compared to any 1U rack server with similar compute capability.

This new server includes support for:

• Dual Intel® Xeon® quad-core processors
• Up to 1333 MHz front side bus (FSB)
• Up to 48 GB of PC2-5300 DDR2 ECC 667 MHz memory
• Dual Gigabit Ethernet
IBM service options: Machine type 6388 three-year Customer Replaceable Unit (CRU) and on-site\(^1\) limited warranty\(^2\)

Easy-to-order, robust factory-built configurations are supported by IBM.

**Overview**

System x iDataPlex is an innovative data center solution for Web 2.0, High Performance Computing (HPC) clusters, and corporate batch-processing clients who want to reduce the power, cooling, or physical space requirements for their servers. It represents a new approach for useable density through innovation at the node level, at the rack level, and at the data center level.

An iDataPlex rack is built with industry-standard components to create flexible configurations of servers, chassis, and networking switches that integrate easily. Customized solutions for your applications can be configured to meet your specific business needs for compute power, storage intensity, and the right I/O and networking.

In addition to flexibility at the server level, iDataPlex offers flexibility at the rack level. It can be cabled either through the bottom if it's set on a raised floor or from the ceiling. Front-access cabling and Direct Dock Power enable you to make changes in networking, power connections, and storage quickly and easily. The rack also supports multiple networking topologies including Ethernet, InfiniBand, and Fibre Channel.

IBM manufacturing sites fully integrate the components on site and test them as a complete solution before shipping the rack to your location. When you receive the rack, it is uncrated, placed in its proper location, powered up, and connected to the network in minimal time. IBM personnel confirm that the servers and network are functioning properly before acceptance.

With the optional IBM Rear Door Heat eXchanger as part of an iDataPlex solution, you can have a high-density data center environment that can alleviate the cooling challenges. With further adjustments, the Rear Door Heat eXchanger can help cool the room -- helping reduce the need for air conditioning in the data center.

- Innovative design helps save power and cooling costs for more affordable computing.
- Unparalleled efficiency and easy deployment help you get up and running quickly.
- Flexible node and rack configuration enables better customization for expanding data centers.
- Front access and intelligent rack components simplify serviceability and manageability.

\(^1\) You may be asked certain diagnostic questions before a technician is sent.

\(^2\) For information on IBM's Statement of Limited Warranty, contact your IBM representative. Copies are available upon request.

**Key prerequisites**

- Supported operating system
- Device drivers, as required

**Planned availability date**

April 8, 2009
Description

Rack management appliance (4369)

The iDataPlex solution comes configurable with a rack management appliance based on the Avocent MergePoint 5300 device. The device, which uses the IPMI 2.0 protocol for multiple management functions, offers an intelligent aggregated rack solution. Clients with custom solutions that depend on IPMI 2.0 can find full functionality with iDataPlex servers and can manage systems management data at the rack level.

IBM System x iDataPlex Rack (6385)

This specially designed rack is used in iDataPlex configurations.

The iDataPlex Rack is designated as IBM-installed for easy on-site installation. This designation, coupled with the factory integration services and optional on-site installation and verification of software, results in a ready-to-run cluster system.

The iDataPlex solution offers increased density in a holistic rack design. For ease of serviceability, all hard drive, planar, and I/O access is from the front of the rack.

Flex nodes

Technology for flexible node configurations enables the servers for iDataPlex to be configured in numerous ways. In addition to compute-oriented configurations, the iDataPlex solution offers a storage-rich configuration.

System x iDataPlex 2U Flex chassis (6385)

- One or two server nodes
- Support for both high-performance SAS and low-cost, high-capacity SATA HDDs
- High-density storage offering
- Shared high-efficiency power supply
- Shared low power-consuming fans
- Choice of SAS, Ethernet, or iSCSI host interface

System x iDataPlex 3U chassis (7834): For intensive storage applications.

Power and cooling advantages

iDataPlex servers help pack more processors into the same power and cooling envelope, better utilize floor space, and "right size" data center design. With the iDataPlex solution, less power per processor means more processing capacity per kilowatt. The iDataPlex can run cooler to deliver greater reliability.

System x iDataPlex Rear Door Heat eXchanger (43V6048)

For dense data center environments, IBM offers smart rack-level heat management solutions like the super-efficient IBM Rear Door Heat eXchanger. The water-cooled door is designed to dissipate heat generated from the back of the rack to help reduce the overall room temperature. With this combination of benefits at the server and data center level, IBM systems deliver strong power and cooling benefits to iDataPlex clients.

The iDataPlex Rear Door Heat eXchanger for iDataPlex racks helps reduce the air temperature in your growing data center to approximately the same air temperature as that entering the rack, alleviating the need to add air conditioning units. This unobtrusive solution brings more cooling capacity to areas where the heat is greatest, around racks of servers with multiple, more powerful processors.

Design simplicity delivers chilling results. This cooling efficiency can help alleviate or even eliminate the need for additional air conditioning power and the associated construction cost.
Solution Enablement Consulting

Solution Enablement Consulting is available at a flat-rate price per day that includes resource, travel, and expenses for predefined engagements.

The fee covers expenses for solution enablement engagements of the following type:

- Staging and integration of hardware and software components at the manufacture site or another location
- Solution integration into an existing cluster or cluster upgrades
- Solution acceptance testing
- Software installation and integration, including operating system, management software, file system, compilers, or customer applications
- Instructor-led on-site training
- Project management

Factory integration -- product customization services

The iDataPlex offering features several hardware validation and test services collectively referred to as product customization services. These services include the integration of hardware and software on Intel processor-based System x servers in technologically advanced manufacturing facilities. You can deploy systems in almost any IT environment. This means your IT resources can be better used elsewhere.

These options are integrated into the servers. IBM can install the chassis in an iDataPlex Rack and have it shipped to you. Performing the same services on site could take hours or even days.

In addition, iDataPlex manufacturing offers specific services for the iDataPlex called Cluster Systems Validation and Test to confirm that all system settings are enabled and tested to enable smooth on-site deployment:

- Enable BIOS management
- Configure BIOS on each node
- Set up ASM and RSA
- Create disk partitioning
- Configure (network, firewall, language, and time zone)
- Configure services
- Set up storage
- Install terminal server
- Set up DNS
- Test, debug, and confirm that cluster is ready for operation

IBM has the skills and technology to offer this type of service. The iDataPlex product customization portfolio delivers tremendous value, especially for clients interested in complex offerings such as Linux® cluster.

Services

Installation and deployment services

The System x iDataPlex solutions deployed in the iDataPlex rack enclosures include on-site hardware installation service:

- Basic installation planning services
- On-site installation of hardware

Additional optional on-site software installation and customization services include Linux and Microsoft® Windows® customization and skills transfer for system administration personnel.
Lab services

iDataPlex installation planning

Features:

- Assess client's air conditioning and air distribution in support of iDataPlex systems
- Evaluate the need for any Rear Door Heat eXchanger installations and offer necessary guidance
- Review the iDataPlex power specifications based on the client's hardware configurations and offer necessary guidance

Typical benefits:

- Offers accurate environmental information as required for supporting iDataPlex systems most reliably
- Identifies the most efficient approach to the iDataPlex system cooling and ventilation needs
- Reduces potential installation shortfalls with open and ongoing communication with the client surrounding their specific iDataPlex system requirements

On-site post installation services

Cluster setup and configuration:

- Configure and verify console switches
- Configure management node:
  - Verify and update BIOS
  - Verify and configure RAID
  - Install and configure operating system
  - Install and configure cluster manager
- Configure and verify Ethernet networking equipment:
  - Configure switch
  - Test and validate Gb Ethernet network operation
- Configure storage subsystem
- Verify and configure storage node RAID
- Load and validate operating system on compute nodes and storage nodes
- Check and update node BIOS and firmware
- Configure and verify InfiniBand networking equipment (depending on configuration)
  - Configure InfiniBand switch
  - Test and validate InfiniBand network
- Implement and verify:
  - File system
  - Default configurations of resource manager, scheduler resource manager, and scheduler
  - Miscellaneous cluster software and functions, including compilers, MPI, and SSH

Test and validate cluster operation:

- Perform™ power-down and power-up test
- Perform testing (stream, ping-pong) to place load on the cluster
- Analyze results for anomalies and address problems

Skills transfer

Quarterly health check
One-year support agreement includes:

- 8 x 5 support (except weekends and holidays) with 24-hour response time
- Remote monitoring and alerting of the systems and monitoring the operating system
- Maintaining patch and firmware releases (Red Hat, SUSE Linux, and Storage Manager) as validated by IBM on ongoing basis
- Four site visits per year (one per quarter):
  - Health check assessment
  - Software update (firmware, device drivers, and patches for other software if applicable)
  - Skills transfer on best practices, such as TREX administration and updates and Storage Manager (if applicable)
  - Performance tuning (if applicable)

For more information on these services, visit

http://www.ibm.com/services

iDataPlex Systems Management

The System x iDataPlex product family offers systems management support for large scale-out compute environments via standards-based, scriptable interfaces. This support starts with the embedded Intelligent Platform Management Interface (IPMI) baseboard management controller (BMC).

For rapid diagnosis of problems, iDataPlex supports IBM Dynamic System Analysis (DSA) preboot diagnostics as well as online data collection for problem determination in supported Windows and Linux environments. Refer to the Dynamic System Analysis product documentation for additional detail on DSA features.

For large-scale environments where out-of-band management aggregation is needed, the iDataPlex product portfolio includes the Avocent MergePoint 5300. This device enables aggregation of IPMI BMC devices on the management network with serial terminal server-style behavior for serial over LAN (SOL) as well as proxy services for the Distributed Management Task Force (DMTF), Systems Management Architecture for Server Hardware (SMASH), Command Line Protocol (CLP), DMTF Web Services for Management (WS-Management), and Simple Network Management Protocol (SNMP). A dedicated management network and shared network topology are both supported.

iDataPlex compute nodes support IBM Systems Director with limited function. Refer to IBM Systems Director product documentation for specific details on supported functions on iDataPlex hardware.

The compute nodes have been tested with the Extreme Cluster Administration Toolkit (xCAT), an open source community-based cluster administration tool set tailored to scale-out compute environments. You can download xCAT from SourceForge at

http://sourceforge.net/projects/xcat/

For additional information on xCAT, contact your IBM Sales and Support Team, or visit

http://www.xcat.org/

One-Day System x Lab Services Consultation - 49Y3780

One day of STG Lab Services for System x (LSx) consulting. This unit-based fee covers one day or eight hours of LSx consulting including travel and expenses. Example engagements include the following:

- BladeCenter®
- High-End System x3850/x3950
- Systems Management - IBM Director, IBM RDM, and Altiris
- VMware Virtual Infrastructure and P2V
• Clustering with Microsoft Datacenter
• Imaging preload configuration
• DS4000<sup>tm</sup> Storage
• Server Consolidation and Server Migration

Users can select the required number of units of consulting needed for each engagement based on LSx supplied sizing per the customer’s requirements.

Terms and Conditions items:
• Minimum order quantity: 3
• Before ordering, contact an LSx Opportunity Manager for sizing
• Once ordered, provide LSx Opportunity Manager with order number
• A signed Statement of Work and IBM Agreement for Services or IBM Customer Agreement are required before services are performed
• Customer billed for services within 30 days of order
• For non-delivery of services, customer can request refund within six months of order

**Accessibility by people with disabilities**

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


**Product positioning**

IBM delivers innovations that meet your specific needs. The right choice depends on your business requirements, target applications, and operating environment. iDataPlex focuses on:

• Price/performance per watt
• Fast, large scale-out deployments
• Compute density
• Customization
• Targeted workloads
• Data center model for rip-and-replace IT resources

The iDataPlex hardware platform is positioned for cost-conscious large enterprises that rely on recovery-oriented architecture that enables redundancy through the software layer instead of redundant hardware.

**Product number**

<table>
<thead>
<tr>
<th>Description</th>
<th>Machine Model</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM System x iDataPlex dx320 server</td>
<td>6388 22X</td>
<td>638822X</td>
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</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDPX 1U Dummy Riser Cage</td>
<td>46C6585</td>
</tr>
<tr>
<td>8GB PC2-5300 CL5 ECC DDR2 SDRAM RDIMM</td>
<td>46C6662</td>
</tr>
<tr>
<td>4.0GB DDR2 667 MHz DIMM memory</td>
<td>46C6590</td>
</tr>
</tbody>
</table>
These parts, along with the newly announced parts, are supported only with the iDataPlex or System Cluster 1350™ and are not validated nor supported in other configurations.

**IBM System x iDataPlex**

**Product customization services**

The following product customization services are included with iDataPlex.

For information, refer to the following and contact your IBM representative.

<table>
<thead>
<tr>
<th>Description</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>iDataPlex Rack Assembly (100U)</td>
<td>2312</td>
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<tr>
<td>Rack Installation of 1U Component in iDataPlex</td>
<td>2313</td>
</tr>
<tr>
<td>Rack Installation of &gt;1U Component in iDataPlex</td>
<td>2314</td>
</tr>
<tr>
<td>iDataPlex Hardware / Configuration Verification</td>
<td>2315</td>
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</tbody>
</table>

Applicable quantities are configuration-dependent and will be determined in the configuration process.

**Publications**


https://www-304.ibm.com/systems/support/

Under Product Support, select System x, and under Popular links, select Publications lookup. Select the Product family and click on continue.

IBM Systems Information Center provides you with a single information center 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 Center is at


The languages that are available are:

- English
- French
- German
- Japanese
- Brazilian
- Portuguese
- Simplified Chinese

**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


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

**Technical information**

**Specified operating environment**

**Physical specifications**

**System x iDataPlex dx320 server**

6388-22X

- Processor - Xeon Quad-Core 2.5 GHz (L5420)
- External speed - 1333 MHz
- Number standard - 0
- Maximum - 2
- L2 cache (full speed) - 12 MB
- Memory (667 MHz SDRAM)
  - DIMMs standard - 0
  - DIMM sockets - 6
  - Address capability - 48 GB
- Video - Aspeed AST1100
- Memory - 64 MB shared with BMC
- HDD controller - SATA
- Channels - 5
- Connector internal - 5
- Connector external - 0
- Total PCI slots - 0
- PCI (LP) - 0
- PCI E (x8, FHHL) - 0
- Slots available - 0
- Management proc - BMC
- Ethernet controller - 2 x 1 Gb
- DVD-ROM - None

**Note:** Default memory operating speed would be 533 MHz for Web 2.0 / Power saving optimization. Adjustable in BIOS setup menu for performance application.

**iDataPlex dx320 server 6388 specifications**

**Electrical**

- 100 to 127 (nominal) V ac; 50 Hz or 60 Hz; 5.0 A
- 200 to 240 (nominal) V ac; 50 Hz or 60 Hz; 2.5 A
- Input kilovolt-amperes (kVA) (approximately):
  - Minimum configuration: 0.110 kVA
  - Maximum configuration: 0.500 kVA
- Btu output:
  - Ship configuration: 375 Btu/hr (154 watts)
Full configuration: 1705 Btu/hr (952 watts)

900-watt electrical power specifications

- 100 V ac to 240V ac auto-ranging operation
- Built-in overload and surge protection
- 100 to 127 (nominal) V ac; 50 or 60 Hz; 12.0 A (maximum)
- 200 to 240 (nominal) V ac; 50 or 60 Hz; 6.0 A (maximum)

Power requirements (per rack) max configuration

- Operating voltage: 100 to 240 Vac at 50/60 Hz
- Electrical output: 21.6 KW (maximum)
- Power source loading: 34.6 kVA (maximum) 60 Hz
- Thermal output: 21.6 KW (73656 Btu/hr) (maximum configuration)

Standards

EMC compliance strategy

Typical configurations of the iDataPlex will be tested under the Class A requirement plus jurisdictional regulations for offer of sale in all target markets identified by marketing.

Equipment approvals and safety

- Russia/GOST ME01, IEC 60950-1, GOST R 51318.22-99, GOST R 51318.24-99, GOST R 51318.24-99, GOST R 51317.3.2-2006, GOST R 51317.3.3-99
- 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 iDataPlex products are designed to operate in a general business environment, such as a Class A or A1, temperature and humidity-controlled room.

- Temperature:
  - 10.0 to 35.0 degrees C (50 to 95 degrees F) (server on)
  - 0.0 to 60.0 degrees C (-32 to 140 degrees F) (server off)
- Relative humidity: 10% to 80%
- Maximum altitude: 3,048 m (10,000 ft) at 28 degrees C. Decrease maximum altitude by 1,000 ft for every 1 degree C increase in ambient temperature up to 3,000 ft at 35 degrees C ambient.
- Declared noise level: 5.7 bels (idling)

Hardware requirements

For service, the iDataPlex 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

Note: Rack must have 784.86 mm (30.9 in) minimum clearance on the front and back sides of the rack to allow service.

Software requirements
The following network operating systems are supported in the iDataPlex:

- Microsoft Windows Server 2003/2003 R2, Datacenter x64 Edition
- Linux
  - Red Hat Linux Enterprise Server 4 64 bit

**Note:** For additional support, certification, and version information on network operating systems, visit [http://www-03.ibm.com/servers/eserver/serverproven/compat/us/](http://www-03.ibm.com/servers/eserver/serverproven/compat/us/)

**Compatibility**

All components of the System x iDataPlex are compatible when purchased as a supported iDataPlex solution.

**Limitations**

System x iDataPlex options are supported only when ordered and deployed in an iDataPlex solution. They will not be supported when ordered without a corresponding order for an iDataPlex Rack configuration.

**Planning information**

**Customer responsibilities**

Installation of hardware components is provided by IBM on the iDataPlex.

Clients are responsible for preparing their site for installation.

You are expected to review the *Installation Planning Guide* before the delivery of your iDataPlex. Clients’ responsibilities must be verified as complete before scheduling an IBM installer to come on site. Visit [https://www-304.ibm.com/systems/support/](https://www-304.ibm.com/systems/support/)

To service your iDataPlex or obtain IBM service, the iDataPlex 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

**Note:** Rack must have 784.86 mm (30.9 in) minimum clearance on the front and back sides of the rack to allow service.

**Cable orders**

All cables are supplied with the iDataPlex. 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.

**Installability**

Installation of hardware components is provided by IBM with the exception of plumbing connections to the optional Rear Door Heat eXchanger. (Refer to the Limitations section for additional information.)

**Packaging**

**System x iDataPlex shipping contents**

- iDataPlex CD, which contains the following documentation in portable document format (PDF):
  - IBM Safety Information (multilingual)
Supplies
None

Security, auditability, and control

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

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.

Terms and conditions

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

Warranty period

• Machine type 6388 - Three years

Optional IBM features initially installed in an IBM machine carry the same warranty period as the machine. If installed after the initial machine installation, they carry the balance of the machine warranty or the optional feature warranty, whichever is greater.

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

• Battery

Warranty service
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 Web site. 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- 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 specified below, On-site Service.

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 have been designated as Tier 1 CRUs:

- Hard disk drive
- Power cord
- Service label
- System label
- Top cover

On-site Service

This provides On-site Repair, 9 hours per day, Monday through Friday excluding holidays, NBD response. IBM or your reseller 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 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

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
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


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 Web site

http://www-304.ibm.com/systems/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.

**Pricing**

For all local charges, contact your IBM representative.

**IBM Global Financing**

IBM Global Financing offers competitive financing to credit-qualified customers to assist them in acquiring IT solutions. Offerings include financing for IT acquisition, including hardware, software, and services, from both IBM and other manufacturers or vendors. Offerings (for all customer segments: small, medium, and large enterprise), rates, terms, and availability can vary by country. Contact your local IBM Global Financing organization or visit

http://www.ibm.com/financing
IBM Global Financing offers are provided through IBM Credit LLC in the United States, and other IBM subsidiaries and divisions worldwide to qualified commercial and government customers. Rates are based on a customer's credit rating, financing terms, offering type, equipment type, and options, and may vary by country. Other restrictions may apply. Rates and offerings are subject to change, extension, or withdrawal without notice.

IBM Global Financing can assist your clients with attractive low rate financing for all new IBM System x iDataPlex hardware, software, and services. For more information, contact a local IGF sales representative or visit http://www.ibm.com/financing

IBM Global Financing services are available worldwide for eligible customers acquiring products and services from IBM.

IBM Global Financing can assist your clients with competitive customized financing structures for your IBM System x iDataPlex equipment. IBM Global Financing solutions can help avoid large up front investments, preserve cash, and speed project approvals. Our solutions enable customers to acquire the IT solution they need to grow and reduce budgetary objections and constraints. Leasing also helps hedge against technology obsolescence risk and eases asset management burdens. We can provide financing for other hardware, software and services from both IBM and other manufacturers or vendors - all presented in one single contract.

IBM Global Financing leasing forms the foundation of a cohesive technology strategy that can be superior to ownership. Leasing structures can lower total cost of ownership, minimize risk, improve accountability, and enable customers to focus on their core business strategies while still preserving their ability to make flexible equipment decisions throughout the entire technology life cycle. In addition, as performance and capacity needs grow, our flexible mid-lease options offer easy upgradeability, usually with little or no change to the monthly payment.

IBM Project Financing™ provides clients with the ability to finance larger IT infrastructure projects helping to aligning costs to expected project benefits. Project Financing can include financing for select facility design and construction, building and structural upgrades, infrastructure equipment, IT hardware, software, services and consulting.

Through our Global Asset Recovery Services we offer buy-back and disposal, of older technology, in an environmentally friendly and secure manner, complying with all government laws and regulations.

**Announcement countries**

All European, Middle Eastern, and African countries.

**Trademarks**

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