IBM System Storage DS5000 series midrange disk offering delivers new high-performance DS5100 and DS5300 storage controllers and high-capacity EXP5000 storage expansion unit

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At a glance

DS5000 Controller

IBM® System Storage™ DS5000 series highlights include:

- The initial offering consists of DS5100 and DS5300 high-performance 4 Gbps Fibre Channel (FC) storage controllers and high-capacity EXP5000 storage expansion unit that deliver scalable configurations up to 256 terabytes (TB).
- Modular architecture provides flexibility, scalability, and investment protection.
- Modular host port building blocks: Initial options of eight or sixteen 4 Gbps FC host ports (four or eight ports per controller).
- Modular cache memory blocks: Initial options of 8 GB or 16 GB cache memory.

Overview

IBM expands its midrange disk storage offerings of high-performance, high availability, business-critical storage solutions with the introduction of the IBM System Storage DS5000 series.

The System Storage DS5000 series disk system is IBM's newest midrange disk offering, specifically designed to meet the needs of midrange/departmental storage requirements, delivering high performance, advanced function, high availability, modular and scalable storage capacity, with SAN-attached 4 Gbps Fibre Channel (FC) connectivity, and support for RAID 0, 1, 3, 5, 6, and 10, with up to 256 TB physical storage capacity.

The DS5000 series is designed to deliver up to a two-fold IOP performance increase over the current generation DS4800 offerings and represents the seventh-generation architecture within the midrange disk family.

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DS5000 series members

- DS5100 Storage Controller (1818-51A)
- DS5300 Storage Controller (1818-53A)
- EXP5000 Storage Expansion Unit (1818-D1A)

The DS5000 series initial offering consists of the DS5100 and DS5300 high-performance storage controllers and the mating EXP5000 storage expansion unit. DS5100 and DS5300 controllers come packaged in 4U rack-mountable enclosures and have dual-active RAID controllers that operate at 4 Gbps FC speeds. The EXP5000 is a high-capacity 16-drive bay expansion unit packaged in a 3U rack-mountable enclosure.

DS5100 and DS5300 controllers can attach up to 16 EXP5000 expansion units, providing modular and highly scalable storage solutions that range up to 256 TB physical storage capacity.

Key prerequisites

- Selection of specific options for the DS5100 and DS5300 are required at time of initial plant order. Refer to the Description section for details.
- IBM System p™, System i™, or System x™ servers
- Selected Sun and HP UNIX® servers and Intel-based servers running Windows® 2000, Windows Server 2003, Linux®, or Novell NetWare

Planned availability date

September 5, 2008

Description

The System Storage DS5000 series is IBM's newest midrange disk storage offering, specifically designed to provide solutions to meet the needs of midrange/departmental storage requirements, delivering high performance, advanced function, high availability, modular and scalable storage capacity, with SAN-attached 4 Gbps FC connectivity, and support for RAID 0, 1, 3, 5, 6, and 10, with up to 256 TB physical storage capacity.

DS5000 modular, flexible, and scalable architecture

The DS5300 (1818-53A) and DS5100 (1818-51A) controller models come in 4U rack-mountable enclosures that house redundant, dual-active intelligent RAID controllers designed to provide high availability, and allow modular addition of host port and cache memory building blocks.

The EXP5000 (1818-D1A) storage expansion unit is packaged in a 3U rack-mountable, high-capacity 16-drive bay enclosure containing dual switched 4 Gbps ESMs, dual power supplies, and redundant cooling. EXP5000s connect to DS5000 controllers via high-speed 4 Gbps FC disk expansion ports and have a physical storage capacity of up to 16 TB per enclosure, using 1000 GB SATA DDMs (disk drive modules) and up to 7.2 TB per enclosure, using 450 GB FC DDMs.

The DS5000 modular architecture helps to address the requirement for high-performance storage solutions, providing flexibility, scalability, and investment protection. A design feature of the architecture is to allow for an increase in the number of host ports over time, as well as add or change host port types as higher-speed host ports or new industry standards-based protocol host port types are introduced. At initial introduction, the DS5000 series controllers offer options of eight and sixteen host ports (four ports per controller or eight ports per controller).

Modular cache memory building blocks allow the DS5000 series to meet initial requirements, while providing the means to add more cache memory as needs dictate over time. At initial introduction, the DS5000 series offers 8 GB and 16 GB cache memory options.

Additionally, the DS5100 offers further value in flexibility, scalability, and investment protection with the optional DS5100 Performance Upgrade. The DS5100 provides excellent performance

for dynamic storage consolidation solutions beginning deployment stage, with the full assurance that this model can be upgraded to full DS5300 performance level if required.

The DS5100 Performance Upgrade option is designed to provide enhanced storage server processing capability internally within the DS5100 controller. With the DS5100 Performance Upgrade option applied, the DS5100 is designed to provide the equivalent storage server processing capability as the DS5300.

The DS5000 attaches up to 16 EXP5000 Storage Expansion Units, supporting configurations up to 256 TB of FC or Serial Advanced Technology Attachment (SATA) disks. The DS5000 provides further investment protection with the ability to attach up to 16 DS4000™ EXP810 Expansion Units or a combination of up to 16 EXP5000s and EXP810s. This provides a rich set of upgrade paths to extend the DS4000 series installed base of EXP810s, while gaining the modular scalability and high performance built into the DS5000 family.

As part of the base machine functionality, the DS5000 controllers and EXP5000 are designed to support integration and use of up to 256 high-performance Fibre Channel disk drive modules (DDMs), and up to 48 high-capacity SATA DDMs.

When configuring more than 48 SATA DDMs on the DS5000 controllers, one or more SATA Disk Drive Attachment features must be selected to maintain entitlement and support.

The SATA Disk Drive Attachment features only apply to configurations with SATA DDMs installed within EXP5000s and EXP810s attached to a DS5000 controller, and consist of the following three features:

- DS5000 49-96 SATA Drive Attachment Entitlement (#7390)
- DS5000 97-160 SATA Drive Attachment Entitlement (#7391)
- DS5000 161-256 SATA Drive Attachment Entitlement (#7392)

DS5000 advanced functions

Advanced storage management, copy service options, and optional advanced disaster recovery functions are available for the DS5000, including DS Storage Manager, Storage Partitions, FlashCopy®, VolumeCopy, Enhanced Remote Mirroring, and Enhanced Remote Mirror - 64-128 Mirror Upgrade.

DS Storage Manager is the storage management platform for both the DS5000 and DS4000 midrange disk series. The DS Storage Manager is designed to provide administrators with a powerful, yet easy-to-use management interface, where all tasks, including configuration, reconfiguration, expansion, maintenance, and performance tuning, are designed to be performed with no system downtime and no interruption to system I/O. The DS Storage Manager flexibility includes the ability to manage RAID levels, segment sizes, volume group sizes, volume characteristics, and cache policies.

The DS5000 is designed to enable from 8 up to 512 storage partitions, to allocate storage capacity, maximize storage space, and reduce hardware and storage management costs. Customers will need to select one of the storage partition options in their initial plant order, and may upgrade to increase the number of storage partitions using the appropriate activation feature. Upon activation of the optional storage partition features, the DS Storage Manager enables management of a single midrange disk storage system to function as multiple, logical storage systems to meet the needs of storage consolidation in heterogeneous environments.

The DS Storage Manager enables management of DS5000 advanced copy services features such as FlashCopy to instantaneously create capacity-efficient, point-in-time volume images, providing a logical volume for such uses as file restoration and backup. In contrast, VolumeCopy creates a complete physical copy -- or clone -- of a volume within a storage system. This unique entity can be assigned to any host and used for application testing or development, information analysis, or data mining.

The Enhanced Remote Mirroring feature consists of Global Mirror with Asynchronous Write-order Consistency (critical for mirroring multi-LUN applications), Global Copy with Asynchronous, and Metro Mirror with Synchronous (up to 128 mirror pairs with the optional DS5000 Enhanced Remote Mirror - 64-128 Mirror Upgrade).

DS5000 host kits

For attachment to host servers, at least one of the following optional host kit features must be ordered during initial order of the DS5000 disk system. The host kits for the DS5000 contain DS Storage Manager and depending upon the host kit selected, includes licensed IBM Machine Code to support attachment to host servers running Microsoft® Windows, System p running AIX®, System p running Linux , Sun/Solaris, HP/HP-UX, and other Intel-based servers.

```
                                   Feature
                                   number

 DS5000 WINDOWS HOST KIT           7720
 DS5000 LINUX/INTEL HOST KIT       7721
 DS5000 VMWARE ESX HOST KIT        7723
 DS5000 AIX / VIOS HOST KIT        7731
 DS5000 HP-UX HOST KIT             7733
 DS5000 LINUX ON POWER HOST KIT    7734
```

DS5100, DS5300, and EXP5000 model descriptions

DS5100 storage controller (1818-51A):

The DS5100 controller base model includes a 4U rack-mount enclosure, dual RAID controllers, support for up to 2048 LUNs, support for RAID 0, 1, 3, 5, 6, and 10, dual power supplies, redundant cooling, rack mounting rails, version 07.30 firmware (preloaded on controller), hardcopy documentation, and two rack PDU power cords (36L8886). Any country-specific wall outlet power cord is obtained via feature number 98xx.

DS5100 initial plant orders must include the minimum number of DS5100 plant order options or may include up to the maximum supported number of DS5100 plant order options, shown in the table below.

```
                                                Minimum      Maximum
                                                number of    supported
                                                required     number of
                                                plant order  plant order
DS5100 required initial plant order options     options      options


- Cache Memory option (#2030)                   1            1
- Two Quad 4 Gbps FC Host Port Cards (#2050)    1            1
  - Note, Host Port Card option includes
    the associated small form factor
    pluggable transceivers to populate the
    card.

- Shortwave 4Gbps SFP Transceiver Pair (#2412)  4            8
  - Note, these are used to populate the
        DS5100 disk expansion ports.

- Host Kit options (#7720 thru #7734)           1            8

- Storage Partition IPO options                 1            1
  -(#8900 thru #8906)
```

DS5300 storage controller (1818-53A):

The DS5300 controller (1818-53A) base model includes a 4U rack-mount enclosure, dual RAID controllers, support for up to 2048 LUNs, support for RAID 0, 1, 3, 5, 6, and 10, dual power supplies, redundant cooling, rack mounting rails, version 07.30 firmware (preloaded on controller), hardcopy documentation, and two rack PDU power cords (36L8886). Any country-specific wall outlet power cord is obtained via feature number 98xx.

DS5300 initial plant orders must include the minimum number of DS5300 plant order options or may include up to the maximum supported number of DS5300 plant order options, shown in the table below.

```
                                                Minimum      Maximum
                                                number of    supported
                                                required     number of
                                                plant order  plant order
DS5300 Required Initial Plant Order Options     options      options
```

```
- Cache Memory option (#2030 or #2031)      1            1
- Two Quad 4 Gbps FC Host Port Cards (#2050) 1            2
  - Note, Host Port Card option includes
    the associated small form factor
    pluggable transceivers to populate the
    card.

- Shortwave 4Gbps SFP Transceiver Pair (#2412) 4         8
  - Note, these are used to populate the
       DS5300 disk expansion ports.

- Host Kit options (#7720 thru #7734)        1           8

- Storage Partition IPO options              1           1
  -(#8900 thru #8906)
```

EXP5000 Storage Expansion Unit (1818-D1A):

The EXP5000 Expansion Unit (1818-D1A) base model includes a 3U, rack-mount 16-bay disk enclosure, two SW SFP transceivers, dual power supplies, redundant cooling, rack mounting rails, softcopy documentation, and two rack PDU power cords (36L8886). Any country-specific wall outlet power cord is obtained via feature number 98xx.

Accessibility by people with disabilities

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

   http://www-03.ibm.com/able/product_accessibility/index.html

Product number

```
                               Machine          Feature
Description                    type    Model    number

DS5100 Midrange Disk           1818    51A
(Dual controllers)

DS5300 Midrange Disk           1818    53A
(Dual controllers)

EXP5000 Expansion Unit         1818    D1A
Incomplete System Unit         1818    51A,53A  0002

8 GB Cache Memory              1818    51A,53A  2030
16 GB Cache Memory             1818    53A      2031
DS5300 Cache Memory Upgrde     1818    53A      2040

2-Quad 4Gbps Host Pt Cards     1818    51A,53A  2050


SW 4 Gbps SFP transcvr pair    1818    51A,53A, 2412
                                       D1A
750 GB/7.2K SATA DDM           1818    D1A      4710
1000 GB/7.2K SATA DDM          1818    D1A      4711

4 Gbps FC, 146.8 GB/15K DDM    1818    D1A      5510
4 Gbps FC, 300 GB/15K DDM      1818    D1A      5511
4 Gbps FC, 450 GB/15K DDM      1818    D1A      5512


16-Pak 146.8 GB/15K DDM        1818    D1A      5530
16-Pak 300 GB/15K DDM          1818    D1A      5531
16-Pak 450 GB/15K DDM          1818    D1A      5532

Bulk Ordering Feature Ind.     1818    51A,53A, 5555
                                       D1A

1m Fiber Optic Cable LC-LC     1818    51A,53A, 5601
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				D1A
5m Fiber Optic Cable LC-LC	1818	51A,53A,	5605	D1A
25m Fiber Optic Cable LC-LC	1818	51A,53A,	5625	D1A
DS5000 Flash/VolumeCopy	1818	51A,53A	7350	
DS5000 Enh. Remote Mirror	1818	51A,53A	7353	
DS5000 E.RMr 64-128 Mr Upg	1818	51A,53A	7356	
DS5100 Performance Upgrade	1818	51A	7370	
EXP5000 49-96 SATA Disk Att	1818	51A,53A	7390	
EXP5000 97-160 SATA Disk Att	1818	51A,53A	7391	
EXP5000 161-256 SATA Disk At	1818	51A,53A	7392	
DS5000 Windows Host Kit	1818	51A,53A	7720	
DS5000 Linux/Intel Host Kit	1818	51A,53A	7721	
DS5000 VMware ESX Host Kit	1818	51A,53A	7723	
DS5000 AIX/VIOS Host Kit	1818	51A,53A	7731	
DS5000 HPUX Host Kit	1818	51A,53A	7733	
DS5000 Linux for Power Host	1818	51A,53A	7734	
DS5000 8 Stg Partit. IPO	1818	51A,53A	8900	
DS5000 16 Stg Partit. IPO	1818	51A,53A	8901	
DS5000 32 Stg Partit. IPO	1818	51A,53A	8902	
DS5000 64 Stg Partit. IPO	1818	51A,53A	8903	
DS5000 128 Stg Partit. IPO	1818	51A,53A	8904	
DS5000 256 Stg Partit. IPO	1818	51A,53A	8905	
DS5000 512 Stg Partit. IPO	1818	51A,53A	8906	
DS5000 8-16 Stg Part. MES	1818	51A,53A	8930	
DS5000 8-32 Stg Part. MES	1818	51A,53A	8931	
DS5000 16-32 Stg Part. MES	1818	51A,53A	8932	
DS5000 16-64 Stg Part. MES	1818	51A,53A	8933	
DS5000 32-64 Stg Part. MES	1818	51A,53A	8934	
DS5000 32-128 Stg Prt. MES	1818	51A,53A	8935	
DS5000 64-128 Stg Prt. MES	1818	51A,53A	8936	
DS5000 64-256 Stg Prt. MES	1818	51A,53A	8937	
DS5000 128-256 Stg Pt. MES	1818	51A,53A	8938	
DS5000 128-512 Stg Pt. MES	1818	51A,53A	8939	
DS5000 256-512 Stg Pt. MES	1818	51A,53A	8940	
Attach to DS5000	1818	D1A	9019	
Plant Integrate in 2101-200	1818	51A,53A,	9201	D1A
Field Integrate	1818	51A,53A,	9202	D1A
Power Cord, Group #1	1818	51A,53A,	9800	D1A
Power Cord, Group #2	1818	51A,53A,	9820	D1A
Power Cord, Denmark	1818	51A,53A,	9821	D1A
Power Cord, Group #3	1818	51A,53A,	9825	D1A
Power Cord, Israel	1818	51A,53A,	9827	D1A
Power Cord, Switzerland	1818	51A,53A,	9828	D1A
Power Cord, Group #4	1818	51A,53A,	9829	D1A
Power Cord, Group #5	1818	51A,53A,	9830	D1A
Power Cord, Australia, NZ	1818	51A,53A,	9831	D1A
Power Cord, Uruguay	1818	51A,53A,	9834	D1A
Power Cord, Pr China	1818	51A,53A,	9840	

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                                       D1A
       Power Cord, Taiwan            1818    51A,53A,  9841
                                       D1A
       Power Cord, Brazil            1818    51A,53A,  9842
                                       D1A
       Power Cord, India             1818    51A,53A,  9843
                                       D1A
       Power Cord, Japan             1818    51A,53A,  9844
                                       D1A
       Power Cord, Korea             1818    51A,53A,  9845
                                       D1A
       Power Cord, U.S./Chicago      1818    51A,53A,  9986
                                       D1A
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Publications

A CD-ROM that contains a softcopy version (PDF format) of the product documentation is shipped with the hardware product.

In addition, the most up-to-date product documentation is available and downloadable from the following DS5000 support site

http://www-304.ibm.com/systems/support/supportsite.wss/allproducts?
brandind=5000028&taskind=1&ui=gc

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, implement, migrate, manage, or optimize your IT infrastructure to be an On Demand Business. They can help you integrate your high-speed networks, storage systems, including the DS5000, 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/index.html

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

Technical information

Specified operating environment

Physical specifications

IBM System Storage DS5100 Disk System (1818-51A)

- Height: 174.50 mm (6.87 in)
- Width: 481.75 mm (18.97 in)
- Depth: 634.92 mm (25.0 in)
- Weight: 40.90 kg (90.0 lb)

IBM System Storage DS5300 Disk System (1818-53A)

- Height: 174.50 mm (6.87 in)
- Width: 481.75 mm (18.97 in)
- Depth: 634.92 mm (25.0 in)
- Weight: 40.90 kg (90.0 lb)

IBM System Storage EXP5000 Expansion Unit (1818-D1A)

- Height: 132.10 mm (5.20 in)
- Width: 482.60 mm (19.00 in)
- Depth: 558.80 mm (22.0 in)
- Weight:
  - Drive-ready (without drive modules installed): 31.30 kg (69 lb)
  - Fully configured (16 drive modules installed): 38.56 kg (85 lb)

Operating environment

IBM System Storage DS5100 (1818-51A) and DS5300 (1818-53A) Disk Systems

- Temperature (operating):
  - 10 to 35 degrees C (50 to 95 degrees F) at 0 to 914 m (0-3,000 ft)
  - 10 to 32 degrees C (50 to 90 degrees F) at 914 to 2,133 m (3,000-7,000 ft)
- Relative humidity (operating):
  - 8% to 80%
- Relative humidity (storage):
  - 5% to 80%
- Electrical power (per power supply, system rating):
  - Voltage range: 100-240 V ac
  - Operating current: 5.4 - 2.25 amperes
  - Power: 580 watts
  - Frequency: 50/60 Hz
- Heat dissipation: 804 BTU per hour
- Noise level (normal operation): 6.75 bels

IBM System Storage EXP5000 (1818-D1A) Expansion Unit

- Temperature (operating):
  - 10 to 35 degrees C (50 to 95 degrees F) at 0 to 914 m (0-3,000 ft)
  - 10 to 32 degrees C (50 to 90 degrees F) at 914 to 2,133 m (3,000-7,000 ft)

- Relative humidity (operating):
  - 8% to 80%
- Relative humidity (storage):
  - 5% to 80%
- Electrical power (per power supply, system rating):
  - Voltage range: 100-240 V ac
  - Operating current: 5.4 - 2.25 amperes
  - Power: 580 watts
  - Frequency: 50/60 Hz
- Heat dissipation: 1570 BTU per hour (fully configured)
- Noise level (normal operation): 6.75 bels

Hardware requirements

For a list of hardware requirements, refer to product documentation or visit

http://www-304.ibm.com/systems/support/supportsite.wss/allproducts?
brandind=5000028&taskind=1@ui=gc

Software requirements

For a list of software requirements, refer to product documentation or visit

http://www-304.ibm.com/systems/support/supportsite.wss/allproducts?
brandind=5000028&taskind=1&ui=gc

Compatibility

For compatibility information, refer to product documentation or visit

http://www-304.ibm.com/systems/support/supportsite.wss/allproducts?
brandind=5000028&taskind=1&ui=gc

Limitations

Before powering up the EXP5000 Storage Expansion Unit, follow the installation and setup instructions provided with the unit. The EXP5000 requires a minimum number of disk drive modules be installed in the unit before powering up. Refer to the EXP5000 Storage Expansion Unit installation and setup instructions shipped with the machine for details.

Customers must submit an RPQ Request using the normal RPQ Request process to gain support for attaching EXP810s to the DS5000 controllers.

Planning information

You are responsible for downloading or obtaining from IBM, and installing designated Machine Code (microcode, basic input/output system code (called "BIOS"), utility programs, device drivers, and diagnostics delivered with an IBM machine) and other software updates in a timely manner from an IBM Internet Web site or from other electronic media, and following the instructions that IBM provides. You may request IBM to install Machine Code changes; however, you may be charged for that service.

Cable orders

Fiber optic cables

You can order fiber optic cables with the DS5000 series or supply your own. The DS5100 and DS5300 controllers and EXP5000 expansion units require fiber optic cables for attachment to host systems and each other. The fiber optic cables must be multimode (shortwave) 50.0/125 micrometers for distances up to 150 meters at 4 Gbps performance for attachment with the shortwave SFP transceivers.

The DS5000 uses the small form factor duplex LC-type connector. This connector is required on the end of all fiber optic cables that plug into the DS5000 series host and drive ports. The following shortwave fiber optic cables with duplex LC-type connectors on each end (LC-LC type) can be ordered with the DS5000 series products.

- 1-m cable (#5601)
- 5-m cable (#5605)
- 25-m cable (#5625)

Security, auditability, and control

This product uses the security and auditability features of the host hardware, software, and application software.

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

IBM Electronic Services

IBM has transformed its delivery of hardware and software support services to help you achieve higher system availability. Electronic Services is a Web-enabled solution that offers an exclusive, no-additional-charge enhancement to the service and support available for IBM servers. These services are designed to provide the opportunity for greater system availability with faster problem resolution and preemptive monitoring. Electronic Services comprises two separate, but complementary, elements: Electronic Services news page and Electronic Services Agent.

The Electronic Services news page is a single Internet entry point that replaces the multiple entry points traditionally used to access IBM Internet services and support. The news page enables you to gain easier access to IBM resources for assistance in resolving technical problems.

The Electronic Service Agent™ is no-additional-charge software that resides on your server. It monitors events and transmits system inventory information to IBM on a periodic, client-defined timetable. The Electronic Service Agent automatically reports hardware problems to IBM. Early knowledge about potential problems enables IBM to deliver proactive service that may result in higher system availability and performance. In addition, information collected through the Service Agent is made available to IBM service support representatives when they help answer your questions or diagnose problems. Installation and use of IBM Electronic Service Agent for problem reporting enables IBM to provide better support and service for your IBM server.

To learn how Electronic Services can work for you, visit

http://www.ibm.com/support/electronic

Terms and conditions

Volume orders: Contact your IBM representative.

Warranty period
One year

Warranty service

If required, IBM provides repair or exchange service depending on the types of warranty service specified for the machine. IBM will attempt to resolve your problem over the telephone, or electronically via an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability. If applicable to your product, parts considered Customer Replaceable Units (CRUs) will be provided as part of the machine's standard warranty service.

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 products in this announcement are covered by the following types of service.

Customer Replaceable Unit Service and On-Site for other selected parts

IBM provides replacement CRUs to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM upon your request. CRUs are designated as being either a Tier 1 or a Tier 2 CRU.

Tier 1 CRU

Installation of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.

Tier 2 CRU

You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge.

Based upon availability, CRUs 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, 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:

• None

On-site Service

IBM 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.

Service level is 24 hours per day, 7 days a week, 6-hour average, same-day response. Same-day service level includes the installation of Tier 1 CRUs at no additional charge.

Warranty service upgrades

During the warranty period, warranty service upgrades provide an enhanced level of On-site Service for an additional charge. Service levels are response-time objectives and are not guaranteed. See the Warranty services section for additional details.

IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability.

On-site Service

IBM 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. The following on-site response-time objectives are available as warranty service upgrades for your machine. Available offerings are:

• 24 hours per day, 7 days a week, 6-hour average, same-day response.

ESA and SSU customers: 2-hour coverage extension at no additional charge, 9 hours per day, Monday through Friday, excluding holidays, same-business-day response. Calls must be received by 12:00 local time in order to qualify for same-business-day response.

Customer Replaceable Units (CRUs) may be provided as part of the machine's standard warranty CRU Service except that you may install a CRU yourself or request IBM installation, at no additional charge, under one of the On-site Service levels specified above. For additional information on the CRU Service, see the warranty information.

Maintenance services

If required, IBM provides repair or exchange service depending on the types of maintenance service specified for the machine. IBM will attempt to resolve your problem over the telephone or electronically, via an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability. Service levels are response-time objectives and are not guaranteed. The specified level of maintenance 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 following service selections are available as maintenance options for your machine type.

On-site Service

IBM 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.

Service levels are:

- 9 hours per day, Monday through Friday, excluding public or national holidays, next-business-day response. Calls must be received by 15:00 local time in order to qualify for next-business-day response.
- 9 hours per day, Monday through Friday, excluding public or national holidays, same-business-day response. Calls must be received by 12:00 local time in order to qualify for same-business-day response.
- 18 hours per day, Monday through Saturday, excluding public or national holidays, same-business-day response. Calls must be received by 18:00 local time in order to qualify for same-business-day response.
- 24 hours per day, 7 days a week, 6-hour average, same-day response.
- ESA and SSU customers: 2-hour coverage extension at no additional charge, 9 hours per day, Monday through Friday, excluding holidays, next-business-day response. Calls must be received by 15:00 local time in order to qualify for next-business-day response.

    or
- ESA and SSU customers: 2-hour coverage extension at no additional charge, 9 hours per day, Monday through Friday, excluding holidays, same-business-day response. Calls must be received by 12:00 local time in order to qualify for same-business-day response.

Customer Replaceable Unit (CRU) Service

If your problem can be resolved with a CRU (for example, keyboard, mouse, speaker, memory, or hard disk drive), and depending upon the maintenance service offerings in your geography, IBM will ship the CRU to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM upon your request.

Based upon availability, CRUs will be shipped for next-business-day delivery. IBM specifies, in the materials shipped with a replacement CRU, whether a defective CRU must be returned to IBM. When return is required, 1) return instructions and a container are shipped with the replacement CRU and 2) 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.

CRUs are designated as being either a Tier 1 or a Tier 2 CRU.

Tier 1 CRUs: Installation of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.

For machines with On-site Same-day Response Service, IBM will replace a Tier 1 CRU part at your request, at no additional charge.

Tier 2 CRUs: You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge.

The following parts have been designated as Tier 1 CRUs:

• None

Service levels are:

• Customer Carry-in Repair, fourth-business-day turnaround time, 9 hours per day, Monday through Friday, excluding public or national holidays
• Courier Exchange, next-business-day on-site response time, latest call registration 15:00, 9 hours per day, Monday through Friday, excluding public or national holidays
• Customer On-site Exchange, next-business-day parts arrival time, call registration 15:00, 9 hours per day, Monday through Friday, excluding public or national holidays

Committed Services (CS) for Europe

For service options with a committed level of service or any other special service option, contact your local business representative.

Additional reference for Europe

Refer to the following documents:

• Announcement Letter ZS03-0150 for IBM Customer Agreement (ICA)
• Announcement Letter ZS04-0135 for Enterprise Agreement Contract
• Announcement Letter ZS98-0118 for ServiceSuite™ Contract
• HW Operations Guide and Service Level Description Table available at

    http://www-5.ibm.com/services/europe/maintenance/

Usage plan machine

No

IBM hourly service rate classification

One

Maintenance service offerings

These machines are eligible under Terms and Conditions of the IBM ServiceSuite, the IBM Enterprise Service Agreement (ESA) or the IBM Maintenance Agreement. Consult your IBM representative for details.

When a type of service involves the exchange of a machine part, the replacement may not be new, but will be in good working order.

Field-installable features

Yes

Model conversions

No

Machine installation

The DS5000 series is classified as Customer Setup (CSU) and installation is performed by the user. The machine installation and user documentation specifies site preparation, physical requirements, operating environment, and any cabling included in the installation.

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 at

  http://www.ibm.com/servers/eserver/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 Storage technical support Web site

  http://www-304.ibm.com/systems/support/supportsite.wss/allproducts?
  brandind=5000028&taskind=1&ui=gc

You may also obtain updated code by contacting your IBM representative.

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.

Business Partner terms and conditions

Category: The products are added to the discount categories A.

Prices

For all local charges, contact your IBM representative.

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  http://www.ibm.com/financing

Announcement countries

All European, Middle Eastern and African countries.

Corrections

(Corrected on September 23, 2008)

Various text updates were made in the Description section because of a modification to the name of three DS5000 features (#7390, #7391 and #7392). A new paragraph was added to the Limitations section.