IBM System Storage DS8800 (Machine type 2424) high-performance, high-end disk with four-year warranty

At a glance

New capabilities for the new IBM® System Storage® DS8800 models offer greater choices in price and performance, including:

- IBM System Storage DS8800 high-performance flagship Model 951 and expansion Model 95E
- IBM POWER6+™ based processors
- High-density storage enclosure
- Configuration option improvements
- High-density frame design improvements
- 8 Gbps device adapters
- 8 Gbps host adapters
- Non-disruptive upgrade path for the DS8800 Model 951 and additional Model 95E expansion frames
- Value-based licensing

For ordering, contact your IBM representative, an IBM Business Partner, or IBM Americas Call Centers at 800-IBM-CALL (Reference: YE001).

Overview

IBM System Storage DS8000™ series is the flagship disk storage platform within the IBM System Storage portfolio. The new IBM System Storage DS8800 represents the latest in this series of high-performance, high-capacity, flexible, and resilient disk storage system. With an enterprise warranty choice option, these high-performance flagship models (DS8800 Model 951 and associated DS8800 Expansion Unit Model 95E) can be ordered with a one-year, two-year, three-year, or four-year support period. This product is provided with 1 year of standard warranty and additional years of extended warranty services to make these offerings. Customers should consult with their financial personnel on the appropriate financial treatment for this offering. This flexibility enables the best support option to be selected to addresses business and financial needs.

IBM System Storage DS8800 also designed to provide new functional capabilities for the combination of price and efficiency that is right for all application needs.

The DS8800 delivers cutting edge technology, improved efficiency, and increased performance. New capabilities include:

IBM POWER6+ processor technology

The DS8800 high-performance flagship model features IBM's POWER6+ server technology to help support high performance. Compared to the performance of the previous DS8000 system, DS8700, the new processor aids the DS8800 in achieving sequential read throughput performance improvement of up to 20% and sequential write throughput performance improvement of up to 40%. The DS8800 offers either a dual 2-way processor complex or a dual 4-way processor complex.

The DS8800 provides a non-disruptive upgrade path for the DS8800 Model 951, and additional Model 95E expansion frames allow processor, cache, and storage enhancements to be performed concurrently without disrupting applications.

High density storage enclosure

The DS8800 provides storage enclosure support for 24 small form factor (SFF, 2.5") SAS drives in 2U of rack space. This option helps improve the storage density for disk drive modules (DDMs) as compared to previous enclosures which only supported 16 DDMs in 3.5U of rack space.

Improved high density frame design

DS8800 can support a total of 1056 drives in a smaller footprint (three frames), supporting higher density and helping to preserve valuable raised floor space in datacenter environments. DS8800 designed to leverage best practices with hot/cold aisle data center design, drawing air for cooling from the front of the rack and exhausting hot air at the rear of the rack. Coupled with this improved cooling implementation, the reduced system footprint, and small form factor SAS-2 drives, a fully configured DS8800 consumes up to 40% less power than previous generations of DS8000. The DS8800 base model supports up to 240 drives, with the first expansion frame supporting up to 336 drives and second expansion frame supporting up to 480 drives.

Improved configuration options

DS8800 provides a business class configuration option in addition to the standard cabling. The business class option allows a system to be configured with more drives per device adapter, helping to reduce configuration cost and increasing adapter utilization. Business class cabling can change configuration options available.

8 Gbps host adapters

The DS8800 model offers enhanced connectivity with four-port and eight-port Fibre Channel/FICON host adapters. The DS8800 model offers 8 Gbps Fibre Channel/FICON host support designed to offer up to 100% improvement in the single-port Mbps throughput performance and up to 400% improvement in single adapter throughput performance. This can help delivers cost savings with potential reduction in the number of host ports needed.

The DS8800 8 Gbps Fibre Channel/FICON host adapter supports FICON® attachment to FICON Express8 on zEnterprise 196 (z196) and System z10® (z10™ EC, z10 BC).

8 Gbps device adapters

The DS8800 offers 8 Gbps device adapters. These adapters provide improved IOPS performance, throughput, and scalability. They are optimized for SSD technology and architected for long term support for scalability growth. These capabilities complement the Power6+ server family to provide significant performance enhancements allowing up to 400% improvement in single adapter throughput performance.

Drive support

- 146 GB 15,000 rpm SAS
- 450 GB 10,000 rpm SAS
- 600 GB 10,000 rpm SAS
- 300 GB SSD drive.

The 450 GB 10,000 rpm SAS and 600 GB 10,000 rpm SAS drives are additionally offered with Full Disk Encryption.

Value based pricing and licensing

Operating environment license will be priced based on the performance, capacity, speed, and other characteristics that provide value in customer environments.

Key prerequisites

All features and functions in this announcement are supported on the IBM System Storage DS8000 series, and require DS8000 Licensed Machine Code (LMC) 6.6.xxx.xx (bundle version 86.0.xxx.xx), or later.

Planned availability date

Limited availability - Volume restriction

October 22, 2010

November 19, 2010

Description

High-performance, reliability, and enhanced connectivity

The IBM System Storage DS8800 models feature the following hardware and technology improvements intended to enhance performance, connectivity, and reliability:

IBM POWER6+ processor technology

The DS8800 high-performance flagship model features the IBM POWER6+ server technology to help support high performance. Compared to the performance of the previous DS8000 system, DS8700, this new processor aids the DS8800 in achieving sequential read throughput performance improvement of up to 20% and sequential write throughput performance improvement of up to 40%. The DS8800 offers either a dual 2-way processor complex or a dual 4-way processor complex.

Non-disruptive upgrade path

The DS8800 also supports a non-disruptive upgrade path for the DS8800 Model 951, and additional Model 95E expansion frames allow processor, cache, and storage enhancements to be performed concurrently without disrupting applications.

High density storage enclosure

The DS8800 provides storage enclosure Gigapack support for 24 small form factor (SFF, 2.5") SAS drives in 2U of rack space. This option can help improve the storage density for disk drive modules (DDMs) as compared to the previous enclosure which only supports 16 DDMs in 3.5U of rack space. Both encryption and non-encryption drives will be supported.

Improved high density frame design

DS8800 can support a total of 1056 drives in a significantly smaller footprint (three frames), allowing higher density and preserving valuable raise floor space in datacenter environments. A single DS8800 model base frame can take up to 50% less floor space than an IBM System Storage DS8700 system (depending on configuration). The DS8800 base model supports up to 240 drives, with the first expansion frame supporting up to 336 drives and the second expansion frame supporting up to 480 drives. DS8800 leverages best practices with hot/cold aisle data center design, drawing air for cooling from the front of the rack and exhausting hot air at the rear of the rack. Combining improved cooling implementation, reduced system footprint, and small form factor SAS-2 drives, a fully configured DS8800 consumes up to 40% less power than previous generations of DS8000.

Improved configuration options

The DS8800 provides a business class configuration option in addition to the standard cabling. The business class option allows a system to be configured with more drives per device adapter, reducing configuration cost and increasing adapter utilization. Business class cabling can change configuration options available. This configuration option is intended for configurations where capacity and high resource utilization is most important. Standard cabling is optimized for performance and highly scalable configurations with large long term growth.

The DS8800 high density business class disk drive cable option is an optional feature (FC #1250).

8 Gbps host adapters

DS8800 offers enhanced connectivity with four-port and eight-port Fibre Channel/ FICON host adapters. With 8 Gbps Fibre Channel/FICON host support, the DS8800 is designed to deliver up to a 100% improvement in the single-port MBps throughput performance and up to 400% improvement in single adapter throughput performance. This delivers cost savings with potential reduction in the number of host ports needed.

The DS8800 8 Gbps Fibre Channel/FICON host adapter supports FICON attachment to FICON Express8 on zEnterprise 196 (z196) and System z10 (z10 EC, z10 BC).

Refer to the System Storage Interoperability Center for complete information on connectivity and support requirements at

   http://www.ibm.com/systems/support/storage/config/ssic/

8 Gbps device adapters

The DS8800 offers 8 Gbps device adapters. These adapters provide improved IOPS performance, throughput, and scalability. They are optimized for SSD technology and architected for long term support for scalability growth. These capabilities complement the Power6+ server family to provide significant performance enhancements, allowing up to 400% improvement in single adapter throughput performance.

Industry-standard disk drives

The DS8800 offers a selection of disk drives, including Serial Attached SCSI second generation drives (SAS-2) that communicate using a 6 Gbps interface. These drives use a 2.5" form factor for increased density and performance per frame.

- 146 GB 15,000 rpm SAS
- 450 GB 10,000 rpm SAS
- 600 GB 10,000 rpm SAS
- 300 GB SSD drive

The 450 GB 10,000 rpm SAS and 600 GB 10,000 rpm SAS drives are additionally offered with Full Disk Encryption.

Processor memory offerings

The DS8800 model with 2-way configuration offers up to 128 GB of processor memory, and the DS8800 model with 4-way configuration offers up to 384 GB of processor memory. In addition, the non-volatile storage scales to the processor memory size selected to help optimize performance.

High availability

The DS8800 model is designed and implemented with component redundancy to help avoid many potential single points of failure.

Logical unit number (LUN) and volume management

Non-disruptive LUN and volume creation and deletion are supported. When a LUN or volume is deleted, the capacity can be reformatted and reused.

LUNs and volumes can be configured to span arrays. Therefore, the size of the volume or LUN is not constrained by the size of the array. LUNs up to 2 TB are supported. CKD volumes up to 223 GB (262,668 cylinders) supported.

Dynamic Volume Expansion supporting application data growth

The IBM System Storage DS8000 series supports Dynamic Volume Expansion, allowing the size of a logical volume to be increased while it is online to a host system. This capability can simplify management by enabling easier online volume expansion to support application data growth. The maximum volume size is limited to the currently supported maximum size for DS8000:

- Open Systems (Fixed Block - FB) volumes - 2 TB
- System z® (CKD) volumes - 223 GB (262,668 cylinders)

Volumes that are expanded can be online during and after the execution of the function. Volumes may not be in Copy Services relationships (Point-in-Time Copy, FlashCopy® SE, Metro Mirror, Global Mirror, Metro/Global Mirror, and z/OS® Global Mirror functions) while expansion is taking place. The function can be managed and configured via the DS Storage Manager, DS CLI, and DS Open API. IBM System z and System p® servers support and recognize the expanded volumes within the DS8000.

All other servers may require additional steps to be put into place in order to support and recognize the expanded volumes within the DS8000. The Dynamic Volume Expansion capability is provided with the DS8000 series at no additional charge.

Addressing capabilities

Support for logical subsystems, logical devices, and logical paths defined as:

- Up to 256 logical subsystems
- Up to 65,280 logical devices
- Up to 130,560 FICON logical paths (1,280 logical paths per control unit image)
- Up to 8,000 process logins (509 per SCSI-FCP port)

Simplified storage management for System z with z/OS

For System z and z/OS environments, DS8800 models can support 223 GB (262,668 cylinders) 3390 volumes. It can help relieve addressing constraints, improve disk resource utilization, and improve storage administrator productivity by providing the ability to consolidate multiple disk volumes into a single address.

Administration and management

- Online configuration capability features a Web-based GUI designed to offer increased ease of use
- A single command line interface (CLI) supports both logical configuration and copy services
- Capabilities such as remote code distribution and e-mail notification of link failures can also improve availability

Choice of models and features

DS8800 has improved scalability over previous generations of DS8000. With a dual 4-way processor complex, the DS8800 Model 951 supports up to 240 disk drives for a maximum capacity of up to 144 TB. It also supports up to 384 GB of processor memory with up to 8 Fibre Channel/FICON adapters. With an optional Expansion Unit (DS8800 Model 95E), it scales as follows:

- With one DS8800 Model 95E Expansion Unit, the DS8800 Model 951 (4-way) supports up to 576 disk drives, for a maximum capacity of up to 346 TB, and up to 16 Fibre Channel/FICON adapters
- With two DS8800 Model 95E Expansion Units, the DS8800 Model 951 (4-way) supports up to 1056 disk drives, for a maximum capacity of up to 633 TB, and up to 16 Fibre Channel/FICON adapters

To meet performance and configuration needs, DS8800 Model 951 offers a dual 2-way or 4-way processor complex. Refer to the table below for more detail on supported drive and adapter counts with the two available cabling options.

Per frame maximum config table:

```
Model                   Physical     Disk      Processor  Host      9xE
number    Processor     capacity     drives    memory     adapters  attach

Standard Cabling Configuration:
951       2-way          86 TB       144       128 GB     4         0
951       4-way         144 TB       240       384 GB     8         1 to 2

Business Class Cabling Configuration:
951       2-way         144 TB       240       128 GB     4         0
951       4-way         144 TB       240       384 GB     4         1

Model                   Physical     Disk      Processor  Host      9xx
number    Processor     capacity     drives    memory     adapters  attach

Standard or Business Class Cabling Configuration first expansion:
95E       N/A           202 TB       336       N/A        8         951
Standard Cabling Configuration second expansion:
95E       N/A           288 TB       480       N/A        0         951
```

Variety of configuration options

Price, performance, and capacity flexibility to help address specific application and business requirements is provided through drive intermix support.

Physical capacity for the DS8000 series is purchased via disk drive sets. A disk drive set contains 16 identical disk drives with same capacity and rpm. Disk drive sets are available in many types as shown in the table below. For additional flexibility, feature conversions are available to exchange existing disk drive sets when purchasing new disk drive sets with higher capacity.

```
          Drive   Drive     Encryption  Non-encryption  RAID        Field
Size      type    speed     drive       drive           support     supported

300 GB    SSD     N/A       No          Yes             5           Yes
146 GB    SAS     15K rpm   No          Yes             5, 6, 10    Yes
450 GB    SAS     10K rpm   Yes         Yes             5, 6, 10    Yes
600 GB    SAS     10K rpm   Yes         Yes             5, 6, 10    Yes
```

IBM Standby Capacity on Demand offering

IBM Standby Capacity on Demand (Standy CoD) solutions are designed to meet the changing storage needs of rapidly growing e-businesses. IBM Standby CoD for the DS8000 offering allows inactive disk drives to be installed and easily activated as business needs require.

The Standby CoD provides the ability to tap into additional storage and is particularly attractive for rapid or unpredictable growth, or just for the knowledge that extra storage will be there when needed.

With this offering, up to six Standby CoD disk drive sets (96 disk drives) can be factory or field installed into the system. For activation, the disk drives should be logically configured. This is a non-disruptive activity that does not require intervention from IBM. Upon activation of any portion of a Standby CoD disk drive set, an order should be placed with IBM to initiate billing for the activated set. At that time, replacement Standby CoD disk drive sets may also be ordered.

This offering allows licensed functions to be purchased based upon the machine's physical capacity, excluding unconfigured Standby CoD capacity.

This offering does not have an offering fee premium. A Standby CoD disk drive set must be activated within a 12-month period from the date of installation and all activation is permanent. Contact your IBM representative to obtain additional information regarding Standby CoD offering terms and conditions.

Full disk encryption

IBM recognizes the requirement for data protection, not only from hardware or software failures, but also from physical relocation of hardware, theft, and re-tasking of existing hardware. Full disk encryption drive sets allow data encryption at rest on a DS8000 series storage controller, helping to mitigate the threat of theft, mismanagement, or loss of business critical data.

The DS8000 series allows installation of encrypted 450 GB 10,000 rpm, and 600 GB 10,000 rpm SAS drives with key management services supported by Tivoli® Key Lifecycle Manager software. The full disk encryption disk drive sets are optional to the DS8000 series and are available with feature numbers 5xxx. Encryption drive set support must also be ordered via feature number 1751.

The full disk encryption support feature is available only as plant order. Plant configured encryption supporting systems will be allowed to increase the number of drive sets installed at an existing location.

Intermixing of drives is not supported, thus the entire subsystem is either encrypted drives (feature numbers 5xxx) or intermixed devices of SAS and SSD devices (feature numbers 2xxx and 6xxx).

Additionally, an environment verification process must be completed to support best practice configuration of the encryption solution. This verification can be requested from IBM Lab Based Services (recommended), or completed by the customer, but is a prerequisite of the encryption solution activation process.

z/OS support of Disk Encryption is available on z/OS V1.8, or later.

Solid state drives (SSD)

To improve data transfer rate (IOPS) and response time, IBM DS8000 series provides support for SSD. SSDs have improved I/O transaction-based performance over traditional platter-based drives. IBM DS8000 series will initially offer SSDs in 300 GB capacities with enhanced response time performance. SSDs are a high-IOPS class enterprise storage device targeted at Tier 0 applications that can use a high level of fast-access storage. SSDs offer a number of potential benefits over hard disk drives, including better IOPS performance, lower power consumption, less heat

generation, and lower acoustical noise. The SSDs are optional to the DS8000 series and are available with feature numbers 6xxx.

SSDs will be limited to 384 drives per DS8800 system. Additionally, RAID-6 and RAID-10 are not supported for SSD arrays.

Flexibility with support for RAID-5, RAID-6, and RAID-10

Physical capacity on the DS8000 series can be configured as RAID-5, RAID-6, RAID-10, or a combination of the three. RAID-5 can offer excellent performance for most applications, while RAID-10 can offer better performance for selected applications, in particular for high random write content applications in an open systems environment.

The decision to configure capacity as RAID-6, RAID-5, or RAID-10, as well as the amount of capacity to configure for each type, can be made at any time. RAID-6, RAID-5, and RAID-10 arrays can be intermixed within a single system and the physical capacity can be logically reconfigured at a later date (for example, RAID-6 arrays can be reconfigured into RAID-5 arrays).

Connectivity with four/eight-port Fibre Channel/FICON host adapters

The DS8000 series is designed to offer enhanced connectivity with the availability of four-port or eight-port Fibre Channel/FICON host adapters. The 8 Gb Fibre Channel/ FICON host adapters, offered in longwave and shortwave, auto-negotiate to either 8 Gb, 4 Gb, or 2 Gb link speeds. This flexibility enables exploitation of the potential benefits offered by higher performance, 8 Gb SAN-based solutions, while also maintaining compatibility with existing 2 Gb and 4 Gb infrastructures. In addition, the individual ports on the adapter can be configured with Fibre Channel Protocol (FCP) or FICON. This protects investment in Fibre Channel adapters and increases the ability to migrate to new servers. A DS8800 Model 951 can support up to a maximum of 16 host adapters, which equates to a maximum of 128 Fibre Channel ports.

DS8800 models offer extensive connectivity support, including Fibre Channel or FICON, across a broad range of server environments, such as IBM System z, System p, System i®, and System x® servers, as well as servers from Sun and Hewlett-Packard, and non-IBM Intel-based servers. This rich support of heterogeneous environments and attachments, along with the flexibility to easily partition the DS8000 series storage capacity among the attached environments, can help support storage consolidation requirements and dynamic, changing environments.

Improved performance with storage pool striping (rotate extents)

The storage pool striping (rotate extents) function, by default, stripes new volumes across all ranks of an extent pool to help reduce the administration required to balance system loads. With multiple rank allocation support, the system can automatically perform close to the highest efficiency, requiring little or no performance administration. The effectiveness of performance management is enhanced as imbalances tend to occur as isolated problems. The storage pool striping function can help automate hotspot avoidance for improved performance and response time without special tuning.

This function can be managed and configured via the DS Storage Manager, DS CLI, and DS Open API. All host systems supported by the DS8000 today are supported with storage pool striping. The storage pool striping function is provided with the DS8000 series at no additional charge.

Rich set of business continuance solutions

The DS8800 models support a rich set of copy service functions and management tools that can be used to build solutions to help address business continuance requirements.

Point-in-time copy solutions

The FlashCopy advanced function is designed to provide a point-in-time copy capability for logical volumes. The FlashCopy function creates a physical point-in-time copy of the data, with minimal interruption to applications, and makes it possible to access both the source and target copies immediately.

FlashCopy supports many advanced capabilities, including:

- **Data Set FlashCopy:** Allows a FlashCopy of a data set in a System z environment.
- **Multiple Relationship FlashCopy:** Allows a source to have FlashCopy relationships with multiple targets simultaneously. This flexibility allows you to initiate up to 12 FlashCopy establishes on a given LUN, volume, or data set without needing to first wait for or cause previous relationships to end.
- **Incremental FlashCopy:** Provides the capability to refresh a LUN or volume involved in a FlashCopy relationship. When a subsequent FlashCopy Establish is initiated, only the data required to bring the target current to the source's newly established point-in-time is copied. The direction of the refresh can also be reversed, in which case the LUN or volume previously defined as the target becomes the source for the LUN or volume previously defined as the source (and now defined as the target).
- **Remote Mirror Primary FlashCopy:** Allows a FlashCopy relationship to be established where the target is also a remote mirror primary volume. This enables a full or incremental point-in-time copy to be created at a local site, and then use remote mirroring commands to copy the data to the remote site.
- **Consistency Group Commands:** Allows DS8800 model systems to hold off I/O activity to a LUN or volume until the FlashCopy Consistency Group command is issued. Consistency groups can be used to help create a consistent point-in-time copy across multiple LUNs or volumes, and even across multiple DS8800s.
- **Inband Commands Over Remote Mirror Link:** A remote mirror environment allows commands to manage FlashCopy at the remote site to be issued from the local or intermediate site and transmitted over the remote mirror Fibre Channel links. This helps eliminate the need for a network connection to the remote site solely for the management of FlashCopy. FlashCopy is an optional feature of the DS8800 models, and is available with the point-in-time indicator feature numbers 72xx and 0720 and corresponding DS8000 series function authorization (2396-LFA feature number 72xx).

IBM FlashCopy SE offers price and efficiency options

The DS8000 Point-in-Time Copy (IBM FlashCopy) function requires space to be set aside equal to the size of the volumes that are to be copied. The IBM System Storage DS8000 series provides support for IBM FlashCopy SE (space efficient snapshot capability) which is intended to use only the amount of storage needed by the copy. This capability can lower the amount of storage needed by many DS8000 clients today, and help lower costs by significantly reducing disk capacity needed for copies. Reducing capacity in the DS8000 can also mean fewer drives and less power required for the overall system.

IBM FlashCopy SE can be managed and configured via the DS Storage Manager, DS CLI, and DS Open API. All host systems supported by the DS8000 today are supported with FlashCopy SE (IBM System z servers require z/OS 1.7, or later, for this support). For more information on implementation of this function, please refer to the *IBM System Storage DS8000 FlashCopy SE Implementation Considerations and Recommendations* document located at

http://www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/FLASH10617

IBM FlashCopy SE is an optional feature on the DS8000 series, available with the SE indicator feature numbers 0730 and 735x-736x and corresponding DS8000 series function authorization (2396-LFA SE feature numbers 735x-736x).

Remote mirror and copy solutions

DS8800 models support several hardware-based remote mirror and copy solutions:

- **IBM System Storage Metro Mirror:** This solution is designed to provide real-time mirroring of logical volumes between two systems that can be located up to 300 km from each other. It is a synchronous copy solution where write operations are completed on both copies (local and remote site) before they are considered to be done.
- **IBM System Storage Global Copy:** This is a non-synchronous long-distance copy option for data migration and backup.
- **IBM System Storage Global Mirror:** Global Mirror is a long-distance remote copy solution across two sites using asynchronous technology and is designed to provide the following:
  - Support for virtually unlimited distance between the local and remote sites, with the distance typically limited only by the capabilities of the network and channel extension technology being used. This can better enable you to choose your remote site location based on business needs and enables site separation to add protection from localized disasters.
  - A consistent and restartable copy of the data at the remote site, created with little impact to applications at the local site.
  - Data currency where, for many environments, the remote site lags behind the local site as little as 3 to 5 seconds, helping to minimize the amount of data exposure in the event of an unplanned outage. The actual lag in data currency experienced will depend upon a number of factors, including specific workload characteristics and bandwidth between the local and remote sites.
  - Dynamic selection of the desired Recovery Point Objective (RPO) based upon business requirements and optimization of available bandwidth.
  - Session support whereby data consistency at the remote site is internally managed across up to eight systems located across the local and remote sites.
  - Efficient synchronization of the local and remote sites with support for failover and failback modes, helping to reduce the time required to switch back to the local site after a planned or unplanned outage.

Interoperability with existing and previous generations of DS8000 series

All of the above remote mirroring solutions use Fibre Channel as the communications link between the primary and secondary machines. The Fibre Channel ports used for remote mirror and copy can be configured as either a dedicated remote mirror link or as a shared port between remote mirroring and Fibre Channel Protocol (FCP) data traffic.

The remote mirror and copy solutions listed above are optional capabilities of the DS8800 Model 951 and are compatible with previous generations of DS8000. They are available as follows:

- Metro Mirror indicator feature numbers 75xx and 0744 and corresponding DS8000 series function authorization (2396-LFA MM feature numbers 75xx).
- Global Mirror indicator feature numbers 75xx and 0746 and corresponding DS8000 series function authorization (2396-LFA GM feature numbers 75xx).

DS8000 series systems can also participate in global copy solutions with the IBM TotalStorage® ESS Model 750, IBM TotalStorage ESS Model 800, and IBM System Storage DS6000™ series systems for data migration. For more information on data migration and migration services contact IBM or a Business Partner representative.

Global Copy is a non-synchronous long distance copy option for data migration and backup, and is available under Metro Mirror and Global Mirror licenses or Remote Mirror and Copy license on older DS8000, ESS, or DS6000 systems.

Three-site Metro/Global Mirror

The DS8000 series supports three-site Metro/Global Mirror configurations. The Metro Mirror and Global Mirror functions utilize synchronous mirroring (Metro Mirror) from a local A-site to a metro-distance B-site, and asynchronous mirroring (Global Mirror) from an intermediate B-site to a remote C-site. This function, referred to as Metro/Global Mirror, is designed to provide planned and unplanned outage three-site enterprise disk data replication to meet rigorous three-site business resiliency needs of the enterprise data center. Metro/Global Mirror can support synchronous replication at distances up to 303 km using IBM System Storage Metro Mirror, and can maintain the asynchronous third site for out of region recovery, at a data currency that can be within 3 to 5 seconds (bandwidth permitting) using IBM System Storage Global Mirror.

Metro/Global Mirror is designed to provide:

- Fast failover/failback to any site
- Fast reestablishment of three-site recovery without production outages
- Quick resynchronization to any site with incremental changes only

Metro/Global Mirror supports planned and unplanned switches from a local A-site to a remote B-site. With the cascading nature of Metro/Global Mirror, during and after the metro-distance switch, this function can provide continuous asynchronous disaster recovery protection to the out of region remote C-site without the necessity of additional reconfiguration. In the event of a loss of access to the B-site, Metro/Global Mirror is designed to provide incremental resynchronization from the local A-site to the remote C-site. The B-site can be brought back into the three-site configuration without a production outage, and with full failover and failback.

The Metro/Global Mirror solution uses Fibre Channel as the communications link between the primary, secondary, and tertiary machines. The Fibre Channel ports used for remote mirror and copy can be configured as either a dedicated remote mirror link or as a shared port between remote mirroring and FCP data traffic.

The Metro/Global Mirror solution is an optional capability of the DS8000 series and is available with the Metro/Global Mirror indicator feature numbers 74xx and 0742 and corresponding DS8000 series function authorization (2396-LFA MGM feature numbers 74xx).

Remote mirror and copy solutions for z/OS

The following are three remote mirror and copy solutions for the z/OS environment for the DS8800 models:

- **IBM System Storage z/OS Global Mirror:** This is a combined hardware and software business continuance solution for the System z environment providing asynchronous mirroring between systems at two sites located global distances apart. z/OS Global Mirror is an optional capability of the DS8000 series and is available with the remote mirror for z/OS indicator feature numbers 76xx and 0760 and corresponding DS8000 series Function Authorization (2396-LFA RMZ feature numbers 76xx). z/OS Global Mirror also requires the purchase of the FICON attachment licensed feature.
- **z/OS Metro/Global Mirror (three-site z/OS Global Mirror and Metro Mirror):** This mirroring capability utilizes z/OS Global Mirror to mirror primary-site data to a location that is a long distance away and also uses Metro Mirror to mirror primary-site data to a location within the metropolitan area. This enables a three-site high availability and disaster recovery z/OS solution for even greater protection from unplanned outages. z/OS Metro/Global Mirror is an optional capability of the DS8000 series and is available with the remote mirror for z/OS indicator feature numbers 76xx and 0760 and corresponding DS8000 series Function Authorization (2396-LFA RMZ feature numbers 76xx) Mirror and/or Global Mirror features. z/OS Metro/Global Mirror also requires the purchase of a FICON attachment licensed feature.

- **Three-site z/OS Metro/Global Mirror Incremental Resync:** This capability can eliminate the need for a full copy after a HyperSwap™ situation in three-site z/OS Metro/Global Mirror configurations. The z/OS Metro/Global Mirror Incremental Resync capability is intended to enhance Remote Mirror for z/OS by enabling resynchronization of data between sites using only the changed data from the Metro Mirror target to the z/OS Global Mirror target after a GDPS® HyperSwap. This can significantly reduce the amount of data to be copied after a Hyperswap situation and improve the resilience of an overall three-site disaster recovery solution by reducing resync times. z/OS Metro/Global Mirror Incremental Resync is an optional feature of the DS8800 Model 951 and is available with the RMZ resync licensed feature indicator feature numbers 0763 and 76xx and DS8000 series Function Authorization (2396-LFA RMZ resync feature numbers 76xx). z/OS Metro/Global Mirror also requires the purchase of the FICON attachment licensed feature.

IBM performance innovations for System Z environments

FICON extends the ability of DS8000 series system to help deliver high bandwidth potential to the logical volumes needing it, when they need it. Older technologies are limited by the bandwidth of a single disk drive, but FICON, working together with other DS8000 series functions, provides a high-speed pipe supporting multiplexed operation.

Support for FICON attachment is an optional feature of DS8800 Model 951 and is available with the FICON attachment licensed feature indicator feature numbers 7091 and 0703 and corresponding DS8000 series function authorization (2396-LFA FICON attachment feature number 7091).

Parallel Access Volumes (PAV) enable a single System z server to simultaneously process multiple I/O operations to the same logical volume to significantly reduce device queue delays by defining multiple addresses per volume. With Dynamic PAV, the assignment of addresses to volumes can be automatically managed to help meet performance objectives and reduce overall queuing. PAV is an optional feature on the DS8000 series and is available with the PAV indicator feature numbers 78xx and 0780 and corresponding DS8000 series function authorization (2396-LFA PAV feature numbers 78xx). PAV also requires the purchase of the FICON attachment licensed feature.

HyperPAV allows an alias address to be used to access any base on the same control unit image per I/O base. This capability also allows different HyperPAV hosts to use one alias to access different bases, reducing the number of alias addresses required to support a set of bases in a System z environment with no latency in targeting an alias to a base. This functionality is designed to enable applications to achieve equal or better performance than possible with the original PAV feature alone while using the same or fewer z/OS resources.

HyperPAV is an optional feature on the DS8000 series and is available with the HyperPAV indicator feature numbers 7899 and 0782 and corresponding DS8000 series function authorization (2396-LFA HyperPAV feature number 7899). HyperPAV also requires the purchase of PAV licensed feature(s) and the FICON attachment licensed feature.

The Extended Address Volumes (EAV) function provides support for volumes that can scale up to approximately 223 GB (262,668 cylinders), helping to relieve address constraints to support large storage capacity needs in System z environments. Larger devices can help simplify storage management by managing fewer large volumes as opposed to many small volumes. The HyperPAV function complements EAV by allowing scaling of I/O rates against a single, larger volume. Dynamic Volume Expansion allows non-disruptive migration to the larger volume sizes now available. The function is supported on DS8000 series systems running on IBM System z servers with z/OS V1.10, or later. The EAV capability is provided with the DS8000 series at no additional charge.

Multiple allegiance expands the simultaneous logical volume access capability across multiple System z servers. This function, along with PAV, enables the DS8000 series

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to process more I/Os in parallel, helping to improve performance and enable greater use of large volumes.

z/OS Global Mirror Multiple Reader (Enhanced Reader) allows automatic load balancing over multiple readers in a z/OS Global Mirror (XRC) environment. This function provides increased parallelism through multiple SDM readers and improved throughput for z/OS remote mirroring configurations. z/OS Global Mirror can also help maintain constant data consistency between mirrored sites and enable achievement of lower recovery point objectives. The function is supported on DS8000 series systems running on IBM System z servers with z/OS 1.7, or later.

z/OS Global Mirror Multiple Reader requires the purchase of z/OS Global Mirror which is an optional capability of the DS8000 series (RMZ indicator feature numbers 0760 and 76xx and corresponding DS8000 series function authorization - 2396-LFA feature numbers 76xx). z/OS Global Mirror also requires the purchase of the FICON attachment feature. The z/OS Global Mirror Multiple Reader function has no additional charge beyond the z/OS Global Mirror and FICON attachment feature charges.

High performance FICON multi-track for System z improves performance

IBM now provides High Performance FICON for System z (zHPF). Previously, FICON working together with other DS8000 series functions provided a high-speed connection supporting multiplexed operation. High Performance FICON takes advantage of the hardware available today with enhancements that are designed to reduce the overhead associated with supported commands. Enhancements have been made to the z/Architecture® and the FICON interface architecture to deliver improvements for online transaction processing workloads. zHPF is designed to help reduce overhead and improve performance when exploited by the FICON channel, the z/OS operating system, and the control unit. Additionally, the changes to the architectures offer end-to-end system enhancements to improve reliability, availability, and serviceability. Existing adapters will be able to handle an intermix of transactions using FCP, FICON, and High Performance FICON protocols.

High Performance FICON can support more than one track's worth of data in a single transfer. Applications using Media Manager for I/O with large data transfers are expected to benefit those using zFS, HFS, PDSE, and striped extended format data sets. This function is available on z/OS V1.9 and z/OS V1.10 with the PTFs for APARs OA26084 and OA29017.

This function is a modification to the FICON I/O architecture and is being worked on for inclusion into the Fibre Channel Standard by the INCITS Fibre Channel (T11) Technical Committee's FC-SB-4 project.

Support for High Performance FICON multi-track is an optional feature of DS8800 Model 951 and is available with the High Performance FICON licensed feature indicator feature numbers 7092 and 0709 and corresponding DS8000 series function authorization (2396-LFA High Performance FICON feature number 7092).

I/O priority queuing

I/O priority queuing allows the DS8000 series to use I/O priority information provided by the z/OS Workload Manager to manage the processing sequence of I/O operations.

IPV6 Support

IBM System Storage DS8000 has been qualified as meeting the requirements of the IPv6 Ready Logo program, indicating its implementation of IPv6 mandatory core protocols and the ability to interoperate with other IPv6 implementations. IBM DS8000 Systems can be configured in native IPv6 environments.

Licensing capabilities for copy functions

With DS8800 models, licensing options are available for users of FlashCopy (point-in-time copy indicator feature), Metro Mirror, and Global Mirror indicator features as follows:

- If the function is used with open systems data only, a license is required for only the total physical capacity configured as Fixed Block (FB).
- If the function will be used with System z data only, a license is required for only the total physical capacity configured as Count Key Data (CKD).
- If the function is used with both open systems and System z data, a license is required for the total physical capacity of DS8000 series system.

In addition, the license scope (FB, CKD, or entire machine) client is managed through an IBM Web-based application to change the license scope on a given machine as business requirements change.

Additional DS8000 functions

- **End-to-end I/O priorities:** The DS8000 series host adapter allows preferential treatment to higher priority I/O and provides improved response time in the overall system operation while running in IBM System p AIX® and DB2® operating environments.
- **Cooperative caching:** The storage facility uses a cache hint to manage the retention period of cached data and provides improved overall system performance through more efficient use of the aggregate memory resources while running in IBM System p AIX and DB2 operating environments.
- **Intelligent write caching:** Write caches using fast, non-volatile storage are now widely used in modern storage controllers since they help reduce latency on writes. Intelligent write caching utilizes a newly developed algorithm for write management to boost performance through improving utilization of both temporal locality (data most recently modified) and spatial locality (data located physically together). To increase aggregate throughput and reduce aggregate response times, the IBM DS8000 series now provides enterprise storage controllers utilizing the Intelligent Write Caching algorithm.
- **Long busy wait host tolerance:** Provides new protocol that allows a target to specify that it is busy and how long the initiator should wait before retrying. This avoids the initiator from failing I/O after numerous retries and receiving busy responses and avoids the initiator retrying too soon while running in the IBM System p AIX operating environments.
- **Audit logging:** DS8000 supports audit logging and viewing of an exported log file. The DS8000 audit logging capability includes information such as a list of users who have logged in and what the user did during their session. A separate log entry is added each time a resource is created, deleted, or modified providing enhanced administrator ease-of-use and additional security.

The above functions are provided with the DS8000 series at no additional charge.

Management tools and utilities for administrator productivity

The DS8000 series models support the following management tools and utilities:

- **IBM System Storage management console:** The management console is the focal point for maintenance activities and is a dedicated laptop that is physically located (installed) inside your DS8800 and can proactively monitor the state of your system, notifying you and IBM when service is required. It can also be connected to your network to enable centralized management of your system using the IBM System Storage DS® Command Line Interface or storage management software utilizing the IBM System Storage DS Open API. An external Management Console is available as a optional feature and can be used as a redundant management console for environments with high-availability requirements.
- **Support for System Storage productivity center (SSPC):** SSPC provides the capability to consolidate a storage management infrastructure with a center-of-

the-room management console. DS8000 will support the SSPC, allowing clients to simply and quickly configure their systems as well as manage multiple DS8000 systems within a datacenter. The SSPC provides preloaded software including IBM Tivoli Storage Productivity Center (previously known as TotalStorage Productivity Center) Basic Edition and the enhanced DS Storage Manager. The enterprise edition of the SSPC also supports the option to install the IBM Tivoli Storage Productivity Center for Replication. Tivoli Storage Productivity Center for Replication is designed to support hundreds of replication sessions across thousands of volumes, supporting both open and z/OS attached volumes. In addition, it helps monitor performance of all copy session types and reports on the amount of data exposed at the disaster recovery site (not in synchronization with the source site). The Tivoli Storage Productivity Center for Replication Three-Site BC feature optionally provides three-site recovery management, supporting the IBM System Storage DS8000 Metro Global Mirror feature. The three-site feature is designed to support fast failover and failback, fast reestablishment of three-site mirroring, data currency at the remote site with minimal lag behind the local site, and quick resynchronization of mirrored sites using incremental changes only. The SSPC is a separately purchased product (using Machine type 2805) for the DS8000, and is required for all new DS8000 machine orders. Clients with currently installed DS8000 machines are not required to purchase the SSPC.

- **IBM System Storage DS command line interface (CLI):** The DS CLI is a single CLI that has the ability to perform a wide range of commands for both configuration and copy services activities. The application has three modes of execution:

  - Single shot mode will connect, issue a single command, and then return to the user.
  - Script mode will connect, execute a predefined customer script, and then return to the user.
  - Interactive mode will place the user in a shell environment with a static connection to the storage subsystem so the user can execute multiple commands.

  The CLI has the ability to dynamically invoke copy services functions. This can help enhance your productivity since it eliminates the previous requirement for you to create and save a task using the GUI. The DS CLI can also issue copy services commands to an ESS Model 750, ESS Model 800, or DS6000 series system. The DS CLI is available with the DS8800 models at no additional charge. The DS CLI client is available for the AIX, HP-UX, Linux®, Novell NetWare, Sun Solaris, and Microsoft® Windows® operating system environments.

- **IBM System Storage DS open API:** DS Open API supports routine LUN management activities, such as LUN creation, mapping and masking, and the management of point-in-time copy and remote mirroring. It supports these activities through the use of a standard interface as defined by the Storage Networking Industry Association (SNIA) Storage Management Initiative Specification (SMI-S). DS Open API is implemented through the IBM System Storage Common Information Model Agent (CIM Agent) for the DS Open API, a middleware application designed to provide a CIM-compliant interface. The interface is designed to allow Tivoli and third-party CIM-compliant software management tools to discover, monitor, and control DS8000 series systems. The DS Open API and CIM Agent are provided with the DS8800 models at no additional charge.

- **IBM System Storage multi-path subsystem device driver (SDD):** SDD is designed to provide load balancing and enhanced data availability capability in configurations with more than one I/O path between the host server and the DS8000 series system. Load balancing can help reduce or eliminate I/O bottlenecks that occur when many I/O operations are directed to common devices via the same I/O path. SDD also helps eliminate a potential single point of failure by automatically rerouting I/O operations when a path failure occurs, thereby supporting enhanced data availability capability. SDD is provided with the DS8800 models at no additional charge.

Statement of direction

It is IBM's current plan and direction to release a single version of machine code that can be used with either the DS8700 or the DS8800. Both products will then support the same functionality and have a common machine code base. IBM is also planning to offer an option for 8Gb host adapters within the DS8700 to support increased host server bandwidth. This is in response to the increased adoption of 8Gb Host/ SAN environments in enterprise datacenters. IBM intends this release to be available in the first half of 2011.

The foregoing represents IBM's current plans and direction only. Such plans and direction are subject to change or withdrawal without notice.

The following limited availability date applies worldwide except for the countries of Korea and Taiwan.

Limited availability - Volume restriction - October 22,2010

- New DS8800 Models 951 and 95E
- Model 9xE position indicators
- Cache and processor options
- HD disk enclosure
- PCIe I/O enclosure pair
- PCIe HD cable groups
- 8 Gbps PCIe based host adapters
- 8 Gbps device adapters
- SAS 10k and 15k Disk drive sets
- Initial System Capacity indicators
- Value based pricing and licensing
- AF Tiers
- DS8000 LMC R6.0
- High Performance FICON multi-track support

The following plant availability and field availability dates apply worldwide.

Plant availability - November 19, 2010

- New DS8800 Models 951 and 95E
- Model 9xE position indicators
- Cache and processor options
- HD disk enclosure
- PCIe I/O enclosure pair
- PCIe HD cable groups
- 8 Gbps PCIe based host adapters
- 8 Gbps device adapters
- SAS 10k and 15k Disk drive sets
- Initial System Capacity indicators
- Value based pricing and licensing
- AF Tiers
- DS8000 LMC R6.0
- High Performance FICON multi-track support

Field availability - November 19, 2010

- Value based pricing and licensing

- AF Tiers
- 8 Gbps PCIe based host adapters

Plant availability - December 10, 2010

- SSD Disk drive sets

Field availability - December 10, 2010

- Model 9xE position indicators
- Field merge of expansion frames
- Cache and processor options
- HD disk enclosure
- PCIe I/O enclosure pair
- PCIe HD cable groups
- 8 Gbps device adapters
- Disk drive sets
- SSD Disk drive sets
- High Performance FICON multi-track support

Accessibility by people with disabilities

A U.S. 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

Section 508 of the U.S. Rehabilitation Act

The IBM System Storage DS8800 and IBM System Storage DS8800 Expansion Unit are capable, as of October 22, 2010, when used in accordance with IBM's associated documentation, of satisfying the applicable requirements of Section 508 of the Rehabilitation Act, provided that any assistive technology used with the product properly interoperates with it. A US Section 508 Voluntary Product Accessibility Template (VPAT) can be requested at

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

Statement of general direction

It is IBM's current plan and direction to release a single version of machine code that can be used with either the DS8700 or the DS8800. Both products will then support the same functionality and have a common machine code base. IBM is also planning to offer an option for 8Gb host adapters within the DS8700 to support increased host server bandwidth. This is in response to the increased adoption of 8Gb Host/ SAN environments in enterprise datacenters. IBM intends this release to be available in the first half of 2011.

The foregoing represents IBM's current plans and direction only. Such plans and direction are subject to change or withdrawal without notice.

All statements regarding IBM's plans, directions, and intent are subject to change or withdrawal without notice. Any reliance on these statements of general direction is at the relying party's sole risk and will not create liability or obligation for IBM.

Reference information

For more information, refer to the following announcements:

- Hardware Announcement 109-757, dated October 20, 2009 (IBM System Storage DS8700 series (Machine types 2424) high-performance Flagship high-end disk, four-year warranty model addresses your business And financial needs)
- Hardware Announcement 109-749, dated October 20, 2009 (IBM System Storage DS8700 series - (M/T 239x) high-performance Flagship - Function Authorizations)

For IBM statement on compliance with European Union Directive on Restriction of the use of certain Hazardous Substances in Electrical and Electronic Equipment (2002/95/EC) (RoHS), visit

http://www.ibm.com/ibm/environment/products/rohs.shtml

Product number

```
Description                              Machine   Model   Feature

DS8800                                   2424      951

Model 9xE Merge Indicator:
- 9xE Factory Merge                                        0001

DoD Indicator                                              0020

JEMT indicator                                             0021

Eligible for EU Shipment                                   0100

Shipping Weight Reduction                                  0200

Model 9xE Position Indicators:
- 951 - 95E position 1                                     0351
- 951 - 95E position 2                                     0352



Licensed Function Indicators:
- OEL indicator                                            0700
- FICON attach indicator                                   0703
- High Performance FICON indicator                         0709
- PTC indicator                                            0720
- SE indicator                                             0730
- MGM indicator                                            0742
- MM indicator                                             0744
- GM indicator                                             0746
- RMZ indicator                                            0760
- RMZ resync indicator                                     0763
- PAV indicator                                            0780
- HyperPAV indicator                                       0782

Initial System Capacity:
- Up to 2.0 TB capacity                                    0800
- 2.1 to 5.0 TB capacity                                   0802
- 5.1 to 10.0 TB capacity                                  0805
- 10.1 to 25.0 TB capacity                                 0810
- 25.1 to 50.0 TB capacity                                 0815
- 50.1 to 75.0 TB capacity                                 0820
- 75.1 to 100.0 TB capacity                                0825
- 100.1 to 150.0 TB capacity                               0830
- 150.1 to 200.0 TB capacity                               0835
- 200.1 to 250.0 TB capacity                               0840
- 250.1 to 300.0 TB capacity                               0845
- 300.1 to 350.0 TB capacity                               0850
- 350.1 to 400.0 TB capacity                               0855
- 400.1 to 450.0 TB capacity                               0860
- 450.1 to 500.0 TB capacity                               0865
- 500.1 to 550.0 TB capacity                               0870
- 550.1 to 600.0 TB capacity                               0871
- 600.1 to 700.0 TB capacity                               0872
```

```
Standby CoD Indicators:
- Non-Standby CoD                                     0900
- Standby CoD Indicator                               0901
- Standby CoD Indicator                               0902
- Standby CoD Indicator                               0903
- Standby CoD Indicator                               0904

Administrative Indicators:
- IBM/Openwave Alliance                               0930
- IBM System i Indicator                              0931
- IBM System p Indicator                              0932
- IBM System x Indicator                              0933
- IBM System z Indicator                              0934
- Linux Indicator                                     0940
- Global Mirror Indicator                             0950

Power:
- Remote Power Control                                1000
- Battery Assembly                                    1050
- Extended PLD                                        1055

Single Phase Power Cords:
- SPP cord group 1                                    1060
- SPP cord group 3                                    1067

Line Cords:
- Line Cord (US/LA/AP/Canada)                         1090
- Line Cord (EMEA)                                    1091
- Line Cord (Japan)                                   1092

Management Console:
- Mgmt console - English Laptop internal              1120
- Mgmt console - English Laptop external              1130

External Management Console - Line Cords:
- MC Line Cord Standard Rack                          1170
- MC Line Cord Group 1                                1171
- MC Line Cord Group 2                                1172

Disk Enclosure:
- HD Disk Enclosure Pair                              1241

Disk Cable:
- HD Disk Drive Cable Group 1                         1246
- HD BC Disk drive cable group                        1250

I/O enclosure pair PCIE                               1301

I/O cables:
- PCIe cable group 1                                  1320
- PCIe cable group 2                                  1321

Fibre Channel/FICON Cables:
- 50 um Fibre Cable (LC)                              1410
- 50 um Fibre Cable (LC/SC)                           1411
- 50 um Fibre Cable (Jumper)                          1412
- 9 um Fibre Cable (LC)                               1420
- 9 um Fibre Cable (LC/SC)                            1421
- 9 um Fibre Cable (Jumper)                           1422

DS8000 Licensed Machine Code:
- DS8000 LMC R6.0                                     1721

Encryption Support:
- Encrypted Drive Set Support                         1751

Earthquake Kit                                        1906

Hardware Installation MES                             1999

Disk Drive Sets:
- 146 GB 15k Drive Set                                2208
- 450 GB 10k Drive Set                                2608
- 600 GB 10k Drive Set                                2708
```

```
Standby CoD Disk Drive Sets:
- 146 GB 15k CoD Drive Set                              2209
- 450 GB 10k CoD Drive Set                              2609
- 600 GB 10k CoD Drive Set                              2709


Disk Enclosure Filler Set                               2999


Device Adapters:
- Device Adapter Pair I                                 3053


Host Adapters:
- 8 Gb 4 port SW FCP/FICON Adapter PCIE                 3153
- 8 Gb 8 port SW FCP/FICON Adapter PCIE                 3157
- 8 Gb 4 port LW FCP/FICON Adapter PCIE                 3253
- 8 Gb 8 port LW FCP/FICON Adapter PCIE                 3257


Processor Memory:
- 32 GB Processor Memory (2-Way only)                   4212
- 64 GB Processor Memory (2-Way only)                   4213
- 128 GB Processor Memory (2-Way only)                  4214
- 32 GB Processor Memory (4-Way only)                   4222
- 64 GB Processor Memory (4-Way only)                   4223
- 128 GB Processor Memory (4-Way only)                  4224
- 256 GB Processor Memory (4-Way only)                  4225
- 384 GB Processor Memory (4-Way only)                  4226


Processor Cards:
- 2 Way Processor Card                                  4301
- 4 Way Processor Card                                  4302


Encryption Disk Drive Sets:
- 450 GB 10k FDE Drive Set                              5608
- 600 GB 10k FDE Drive Set                              5708


Encryption Standby CoD Disk Drive Sets:
- 450 GB 10k FDE CoD Drive Set                          5609
- 600 GB 10k FDE CoD Drive Set                          5709


SSD Disk Drive Sets:
- 300 GB SSD Drive Set                                  6008


Function Authorization Indicators:
- OEL - inactive                                        7030
- OEL - 1 TB unit                                       7031
- OEL - 5 TB unit                                       7032
- OEL - 10 TB unit                                      7033
- OEL - 25 TB unit                                      7034
- OEL - 50 TB unit                                      7035
- OEL - 100 TB unit                                     7040
- OEL - 200 TB unit                                     7045

- OEL - Value Unit inactive                             7050
- OEL - 1 Value Unit                                    7051
- OEL - 5 Value Unit                                    7052
- OEL - 10 Value Unit                                   7053
- OEL - 25 Value Unit                                   7054
- OEL - 50 Value Unit                                   7055
- OEL - 100 Value Unit                                  7060
- OEL - 200 Value Unit                                  7065
- FICON indicator                                       7091
- zHPF indicator                                        7092
- PTC - inactive indicator                              7250
- PTC - 1 TB indicator                                  7251
- PTC - 5 TB indicator                                  7252
- PTC - 10 TB indicator                                 7253
- PTC - 25 TB indicator                                 7254
- PTC - 50 TB indicator                                 7255
- PTC - 100 TB indicator                                7260
- SE - inactive indicator                               7350
- SE - 1 TB indicator                                   7351
- SE - 5 TB indicator                                   7352
- SE - 10 TB indicator                                  7353
- SE - 25 TB indicator                                  7354
```

```
- SE - 50 TB indicator                              7355
- SE - 100 TB indicator                             7360
- MGM - inactive indicator                          7480
- MGM - 1 TB indicator                              7481
- MGM - 5 TB indicator                              7482
- MGM - 10 TB indicator                             7483
- MGM - 25 TB indicator                             7484
- MGM - 50 TB indicator                             7485
- MGM - 100 TB indicator                            7490
- MM - inactive indicator                           7500
- MM - 1 TB indicator                               7501
- MM - 5 TB indicator                               7502
- MM - 10 TB indicator                              7503
- MM - 25 TB indicator                              7504
- MM - 50 TB indicator                              7505
- MM - 100 TB indicator                             7510
- GM - inactive indicator                           7520
- GM - 1 TB indicator                               7521
- GM - 5 TB indicator                               7522
- GM - 10 TB indicator                              7523
- GM - 25 TB indicator                              7524
- GM - 50 TB indicator                              7525
- GM - 100 TB indicator                             7530
- RMZ - inactive indicator                          7650
- RMZ - 1 TB indicator                              7651
- RMZ - 5 TB indicator                              7652
- RMZ - 10 TB indicator                             7653
- RMZ - 25 TB indicator                             7654
- RMZ - 50 TB indicator                             7655
- RMZ - 100 TB indicator                            7660
- RMZ resync - inactive indicator                   7680
- RMZ resync - 1 TB indicator                       7681
- RMZ resync - 5 TB indicator                       7682
- RMZ resync - 10 TB indicator                      7683
- RMZ resync - 25 TB indicator                      7684
- RMZ resync - 50 TB indicator                      7685
- RMZ resync - 100 TB indicator                     7690
- PAV - inactive indicator                          7820
- PAV - 1 TB indicator                              7821
- PAV - 5 TB indicator                              7822
- PAV - 10 TB indicator                             7823
- PAV - 25 TB indicator                             7824
- PAV - 50 TB indicator                             7825
- PAV - 100 TB indicator                            7830
- HyperPAV indicator                                7899

IGF Transaction:
- IGF transaction indicator                         7999


Description                        Machine   Model   Feature

DS8800  Expansion Unit             2424      95E

Model 9xE Merge Indicator:
- 9xE Factory Merge                                 0001
- 9xE Field Merge                                   0002

DoD Indicator                                       0020

JEMT indicator                                      0021

Eligible for EU Shipment                            0100

Shipping Weight Reduction                           0200

Model 9xE Position Indicators:
- 951 - 95E position 1                              0351
- 951 - 95E position 2                              0352


Initial System Capacity:
- Up to 2.0 TB capacity                             0800
```

```
- 2.1 to 5.0 TB capacity                                   0802
- 5.1 to 10.0 TB capacity                                  0805
- 10.1 to 25.0 TB capacity                                 0810
- 25.1 to 50.0 TB capacity                                 0815
- 50.1 to 75.0 TB capacity                                 0820
- 75.1 to 100.0 TB capacity                                0825
- 100.1 to 150.0 TB capacity                               0830
- 150.1 to 200.0 TB capacity                               0835
- 200.1 to 250.0 TB capacity                               0840
- 250.1 to 300.0 TB capacity                               0845
- 300.1 to 350.0 TB capacity                               0850
- 350.1 to 400.0 TB capacity                               0855
- 400.1 to 450.0 TB capacity                               0860
- 450.1 to 500.0 TB capacity                               0865
- 500.1 to 550.0 TB capacity                               0870
- 550.1 to 600.0 TB capacity                               0871
- 600.1 to 700.0 TB capacity                               0872

Administrative Indicators:
- IBM/Openwave Alliance                                    0930
- IBM System i Indicator                                   0931
- IBM System p Indicator                                   0932
- IBM System x Indicator                                   0933
- IBM System z Indicator                                   0934
- Linux Indicator                                          0940

Power:
- Battery Assembly                                         1050
- Extended PLD                                             1055

Single Phase Power Cords:
- SPP cord group 1                                         1060
- SPP cord group 3                                         1067

Line Cords:
- Line Cord (US/LA/AP/Canada)                              1090
- Line Cord (EMEA)                                         1091
- Line Cord (Japan)                                        1092

Disk Enclosure:
- HD Disk Enclosure Pair                                   1241

Disk Cable:
- HD Disk Drive Cable Group 2                              1247
- HD Disk Drive Cable Group 4                              1248

I/O enclosure pair PCIE                                    1301

I/O cables:
- PCIe cable group 3                                       1322

Fibre Channel/FICON Cables:
- 50 um Fibre Cable (LC)                                   1410
- 50 um Fibre Cable (LC/SC)                                1411
- 50 um Fibre Cable (Jumper)                               1412
- 9 um Fibre Cable (LC)                                    1420
- 9 um Fibre Cable (LC/SC)                                 1421
- 9 um Fibre Cable (Jumper)                                1422

Earthquake Kit                                             1906

Hardware Installation MES                                  1999

Disk Drive Sets:
- 146 GB 15k Drive Set                                     2208
- 450 GB 10k Drive Set                                     2608
- 600 GB 10k Drive Set                                     2708

Standby CoD Disk Drive Sets:
- 146 GB 15K CoD Drive Set                                 2209
- 450 GB 10k CoD Drive Set                                 2609
- 600 GB 10k CoD Drive Set                                 2709

Disk Enclosure Filler Set                                  2999
```

```
Device Adapters:
- Device Adapter Pair I                                    3053

Host Adapters:
- 8 Gb 4 port SW FCP/FICON Adapter PCIE                    3153
- 8 Gb 8 port SW FCP/FICON Adapter PCIE                    3157
- 8 Gb 4 port LW FCP/FICON Adapter PCIE                    3253
- 8 Gb 8 port LW FCP/FICON Adapter PCIE                    3257

Encryption Disk Drive Sets:
- 450 GB 10k FDE Drive Set                                 5608
- 600 GB 10k FDE Drive Set                                 5708

Encryption Standby CoD Disk Drive Sets:
- 450 GB 10k FDE CoD Drive Set                             5609
- 600 GB 10k FDE CoD Drive Set                             5709

SSD Disk Drive Sets:
- 300 GB SSD Drive Set                                     6008
```

Model conversions

There are no new model conversions with this announcement. This is a reminder
that model conversions are disruptive. In addition, data may not be preserved
during the model conversion.

Feature conversions (Machine type 2424 Model 941)

```
I/O Cables:

Feature      Returned
From    To   Parts *     Description

1320   1321     Yes      I/O cable conversion

Disk Drive Sets:

Feature      Returned
From   To    Parts *     Description

2208   2608     Yes      Disk drive set conversion
2208   2708     Yes      Disk drive set conversion
2608   2708     Yes      Disk drive set conversion

Standby CoD Disk Drive Sets:

Feature      Returned
From    To   Parts(5)    Description

2209   2208     No       CoD disk drive conversion
2609   2608     No       CoD disk drive conversion
2709   2708     No       CoD disk drive conversion

Host Adapters:

Feature      Returned
From   To    Parts *     Description

3153   3157     Yes      Host adapter conversion
3153   3253     Yes      Host adapter conversion
3153   3257     Yes      Host adapter conversion

3157   3153     Yes      Host adapter conversion
3157   3253     Yes      Host adapter conversion
3157   3257     Yes      Host adapter conversion

3253   3153     Yes      Host adapter conversion
3253   3157     Yes      Host adapter conversion
3253   3257     Yes      Host adapter conversion
```

```
3257   3153    Yes      Host adapter conversion
3257   3157    Yes      Host adapter conversion
3257   3253    Yes      Host adapter conversion
```

Processor Memory:

```
Feature       Returned
From   To     Parts *      Description

4212   4213    Yes      Processor memory conversion
4212   4214    Yes      Processor memory conversion
4212   4222    Yes      Processor memory conversion

4213   4214    Yes      Processor memory conversion
4213   4223    Yes      Processor memory conversion

4214   4224    Yes      Processor memory conversion

4222   4223    No       Processor memory conversion
4222   4224    Yes      Processor memory conversion
4222   4225    Yes      Processor memory conversion
4222   4226    Yes      Processor memory conversion

4223   4224    Yes      Processor memory conversion
4223   4225    Yes      Processor memory conversion
4223   4226    No       Processor memory conversion

4224   4225    Yes      Processor memory conversion
4224   4226    Yes      Processor memory conversion

4225   4226    No       Processor memory conversion
```

Processor Cards:

```
Feature       Returned
From   To     Parts *      Description

4301   4302    Yes      Processor card conversion
```

Encryption Disk Drive Sets:

```
Feature       Returned
From    To    Parts *      Description

5608   5708    Yes      Encryption disk drive set conversion
```

Encryption Standby CoD Disk Drive Sets:

```
Feature       Returned
From    To    Parts *      Description

5609   5608    No       Encryption CoD disk drive conversion

5709   5708    No       Encryption CoD disk drive conversion
```

Feature conversions (Machine type 2424 Model 95E)

Disk Drive Sets:

```
Feature       Returned
From   To     Parts *      Description

2208   2608    Yes      Disk drive set conversion
2208   2708    Yes      Disk drive set conversion
2608   2708    Yes      Disk drive set conversion
```

Standby CoD Disk Drive Sets:

```
Feature       Returned
From    To    Parts(5)     Description
```

```
2209  2208   No       CoD disk drive conversion

2609  2608   No       CoD disk drive conversion

2709  2708   No       CoD disk drive conversion

Host Adapters:

Feature    Returned
From  To   Parts *      Description

3153  3157   Yes       Host adapter conversion
3153  3253   Yes       Host adapter conversion

3157  3153   Yes       Host adapter conversion
3157  3253   Yes       Host adapter conversion

3253  3153   Yes       Host adapter conversion
3253  3257   Yes       Host adapter conversion

3257  3153   Yes       Host adapter conversion
3257  3253   Yes       Host adapter conversion

Encryption Disk Drive Sets:

Feature    Returned
From   To  Parts *      Description

5608  5708   Yes       Encryption disk drive set conversion

Encryption Standby CoD Disk Drive Sets:

Feature    Returned
From   To  Parts *      Description

5609  5608   No        Encryption CoD disk drive conversion

5709  5708   No        Encryption CoD disk drive conversion
```

* Parts removed or replaced become the property of IBM and must be returned.

Publications

The following publication has been updated to reflect this announcement and will be available by November 19, 2010.

```
Title                                     Order number

IBM System Storage DS8800 Introduction    GC27-2297
 and Planning Guide
```

The following publications are shipped with the DS8000 series:

```
Title                                     Order number

IBM System Storage DS8000 Series          LCD8-1642-00
 Documentation CDROM
```

The CD contains the following documents and are not shipped hardcopy:

```
Title                                     Order number

IBM System Storage DS8800 Introduction and    GC27-2297
 Planning Guide

IBM System Storage DS8000 Host Systems        GC27-2298
 Attachment Guide

IBM System Storage DS Command-Line            GC53-1127
```

```
    Interface User's Guide

IBM System Storage DS Open Application        GC35-0516
 Programming Interface Reference

IBM System Storage Licensed Machine           GC26-7918
 Code Agreement

IBM System Storage Multipath Subsystem        GC52-1309
 Device driver User's Guide
```

The following documents are on the CD and are also shipped hardcopy:

- IBM CIM Agent for DS Open Application Programming Interface, GC26-7929
- IBM System Storage DS Storage Manager License, GC26-7928
- IBM Warranty Information, GC26-7919
- IBM System Storage DS8000 Licensed Machine Code Agreement, GC26-7918

DS8000 publications are available at

   http://www.ibm.com/shop/publications/order/

The DS8000 information center is designed to provide comprehensive, browser-based information. It can help provide easy access to tasks, concepts, reference information, tutorials, code samples, scenarios, and other product information. It contains assistance for the tasks that users must perform and links to additional information. To find information, users can search, browse the contents, use the index, follow links from one topic to related topics, and print the topics they want to read offline.

The information center is available at

   http://www.ibm.com/support/publications/us/library/

The IBM System Storage DS8000 Information Center allows you to browse and search documentation for the DS8000 series.

The IBM System Storage DS8000 Information Center is at

   http://publib.boulder.ibm.com/infocenter/dsichelp/ds8000ic/index.jsp

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

Refer to the *IBM System Storage DS8800 Introduction and Planning Guide*
(GC27-2297). This publication is available by visiting

Operating environment
Disk drive systems

Model 951 (2-Way):

- Maximum physical storage capacity: 144 TB
- Power consumption: 6.7 KW

Model 951 (4-Way):

- Maximum physical storage capacity: 144 TB
- Power consumption: 7.5 KW

Model 95E with I/O:

- Maximum physical storage capacity: 201.6 TB
- Power consumption: 7.1 KW

Model 95E without I/O:

- Maximum physical storage capacity: 288 TB
- Power consumption: 7.3 KW

Limitations

Conversions between warranty machine types are not supported.

Management limitations

- For the Dynamic Volume Expansion function, volumes that are expanded may
  not be in Copy Services relationships (Point-in-Time Copy, FlashCopy SE,
  Metro Mirror, Global Mirror, Metro/Global Mirror, and z/OS Global Mirror) while
  expansion is taking place
- SSPC is required for remote GUI access

Disruptive activities

- Removal of an expansion unit model from the base unit model. Data may not be
  preserved during this activity.
- Converting a system utilizing Business Class cabling (FC #1250) to standard
  cabling (FC #1246)

The deactivation of an activated licensed function, or a lateral change or reduction
in the license scope, is a non-disruptive activity which will occur at the next machine
IML.

- A lateral change is defined as changing the license scope from FB to CKD or from
  CKD to FB.

- A reduction is defined as changing the license scope from ALL to FB or from ALL to CKD.
- The amount of physical capacity within a 2424 system that can be logically configured for use will be enforced by the 2424 Licensed Machine Code to maintain compliance with the extent of IBM authorization established for licensed functions activated on the machine.

Encryption limitations

Plant configured systems with Encryption Drive Set support (feature #1751) can support field installation of encrypted drives. Existing DS8000 systems or systems lacking the Encryption Drive Set support feature will not support encryption drive sets.

Only FDE (Full disk Encryption) drives can be supported in a Encryption enabled system

Encryption deadlock recovery disable key is not supported.

SSD limitations

SSD drive sets are not supported in RAID-6 or RAID-10 configurations. Intermixing of drives is not supported the entire system.

Model conversion/upgrade limitations

- No brand model conversion from 921/931/9A2/9B2/92E/9AE/922/932/941/94E to 951/95E
- IBM Global Financing DEX program is the only model conversion offering available
- FC #1250 HD Business Class Cabling reduces the total number of drives per system to 576. This restriction can be removed by converting to standard cabling (FC #1246), which is disruptive. This conversion is only available via RPQ.

Planning information

Customer responsibilities

Physical configuration planning

Physical configuration planning is a customer responsibility. A marketing specialist can help plan and select the DS8000 series physical configuration and features. Introductory information, including required and optional features, can be found in the *IBM System Storage DS8800 Introduction and Planning Guide* (GC27-2297).

Capacity and performance planning assistance is also available. Through the use of Disk Magic, a disk marketing specialist can help plan and anticipate performance characteristics for specific workloads by modeling proposed configurations.

Installation planning

Installation planning is a customer responsibility. Information about planning the installation of a DS8000 series, including equipment, site, and power requirements, can be found in the *IBM System Storage DS8800 Introduction and Planning Guide* (GC27-2297).

Logical configuration planning and application

Logical configuration planning is a customer responsibility. Logical configuration refers to the creation of RAID ranks, volumes, and/or LUNs, and the assignment of the configured capacity to servers.

Application of the initial logical configuration and all subsequent modifications to the logical configuration is a customer responsibility. The logical configuration can be created, applied, and modified using the DS Storage Manager, DS CLI, or DS Open API.

IBM Global Services (IGS) will also apply and/or modify the logical configuration (fee-based services).

Licensed Machine Code planning and application

IBM may release changes to the DS8000 series Licensed Machine Code. IBM plans to make most DS8000 series Licensed Machine Code changes available for download by the DS8000 series system from the IBM System Storage technical support worldwide Web. Not all Licensed Machine Code changes may be available via the support Web site. If the machine does not function as warranted and a problem can be resolved through the application of downloadable Licensed Machine Code, the customer is responsible for downloading and installing these designated Licensed Machine Code changes as IBM specifies. IBM has responsibility for installing changes that IBM does not make available for you to download. The DS8000 series includes many enhancements to make the Licensed Machine Code change process simpler, quicker and more automated. A request can be made for IBM to install downloadable Licensed Machine Code changes, however there may be a charge for that service.

Calculating physical and effective capacity

Refer to the *IBM System Storage DS8800 Introduction and Planning Guide* (GC27-2297) for capacity calculation guidelines.

Encryption planning

Encryption planning is a customer responsibility. There are three major planning components to the implementation of an encryption environment. Review all planning requirements and include them in the installation considerations.

- Key server planning
- Tivoli Key Lifecycle Manager (TKLM) planning
- Full Disk Encryption Activation review planning

Key server planning

Key server planning is a customer responsibility. Introductory information, including required and optional features, can be found in the *IBM System Storage DS8800 Introduction and Planning Guide* (GC27-2297).

DS8800 requires at least two key servers and associated software for each site which has one or more encryption-enabled DS8000 systems, according to the encryption best practices. One server must be isolated and the others can be of any supported key server configuration. Any site that operates independently of other sites must have key servers for the encryption enabled DS8000 systems at that site.

- DS8000 Encryption environments are recommended to configure external Laptop HMC for high availability (feature #1130).

- It is the customer's responsibility to replicate any key labels across all key servers attached to a given encryption-enabled DS8000 before configuring that key label on the DS8000.

Dual platform key server planning

DS8000 supports the ability to configure two independent key labels for each encryption-enabled DS8000. This capability allows the use of two independent key server platforms when one or both key server platforms are using secure-key mode key stores, allowing the isolated key server platform to be used in conjunction with a second key server platform that is operating with a secure-key mode key store.

For customers needing dual platform key server support on DS8000, the installation of TKLM IFIX 2 (TKLM Version 1.0.0.2) is recommended to support displaying both key labels in the GUI. Additionally, for customers who intend to replicate keys between separate zSeries® Sysplexes using ICSF with the JCECCARACFKS key store in secure key mode and with the secure key configuration flag set in TKLM, TKLM Fix Pack 3 (TKLM Version 1.0.0.3) is required.

Tivoli Key Lifecycle Manager planning

The DS8000 series supports IBM Tivoli Key Lifecycle Manager V1.0 and V2.0

```
Program
number      VRM    Program name

5724-T60    1.0.0/ IBM Tivoli Key Lifecycle Manager
            2.0.0
5608-A91    1.0.0  IBM Tivoli Key Lifecycle Manager (distributed
                    for non-Passport Advantage)
                   IBM Tivoli Key Lifecycle Manager for z/OS V1.0


Program
number      VRM    Program name

5698-B35    1.0.0  IBM Tivoli Key Lifecycle Manager for z/OS
```

Isolated Key Server Ordering Options:

- **Machine type 2805 Model MC3 or MC4 feature code #0021**

  This isolated key server will have a Linux operating system and TKLM software preinstalled.

- **DS8000 RPQ 8S1139**

  This isolated key server will have a Linux operating system and TKLM software preinstalled. Additionally, ordering this RPQ will schedule the Full Disk Encryption Activation review planning with IBM lab based services.

- **Customer Acquired Isolated Key Server**

  Please refer to the *IBM Tivoli Key Lifecycle Manager Installation and Configuration Guide* (SC27-2741) for hardware and operating system requirements.

Note: Regardless of the ordering method, customers will need to acquire a TKLM license for use of the TKLM software, ordered separately from the standalone server hardware.

Refer to the following publications:

- IBM Tivoli Key Lifecycle Manager Quick Start Guide (GI11-8738-01)
- IBM Tivoli Key Lifecycle Manager Installation and Configuration Guide (SC27-2741)
- IBM Tivoli Key Lifecycle Manager Program Directory (for z/OS) (GI11-4300)

Full Disk Encryption Activation review planning

Full Disk Encryption Activation is a customer responsibility. IBM Full Disk Encryption offerings must be activated prior to use. This activation is part of the installation and configuration steps required for use of the technology. This installation and activation review is performed by the IBM Systems and Technology Lab Services group.

Send e-mail to

storsvcs@us.ibm.com

Visit the Web site below and click on "Contact now" to submit your inquiry or request.

http://www.ibm.com/systems/services/labservices/labservices_storage.html

Model conversion planning

DS8100, DS8300, and DS8700 to DS8800 model conversions can only be done using the DEX program. With this program, disruptive upgrades are avoidable. Data migration can be done side by side to minimize implementation time and reduce cost. Returned hardware will be assigned value according to condition.

For more information on the DEX offering, visit

http://www-03.ibm.com/financing/us/lifecycle/acquire/diskx.html

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

Cables are required to connect DS8000 series 8 Gb FCP/FICON host adapters ports to server or fabric ports.

Cables can be purchased using DS8000 series feature numbers. Additional cable options, along with product support services such as installation, is offered by IBM Global Services' Networking Services.

Fibre Channel/FICON (shortwave)

Shortwave Fibre Channel and FICON ports on the DS8000 series require a 50 micron (multimode) fiber optic cable terminated with an LC connector. Fibre Channel cables can be purchased using feature numbers 141x for 50 micron cables.

Fibre Channel/FICON (longwave)

Longwave Fibre Channel and FICON ports on the DS8000 series require either a 9 micron (singlemode) or 50 micron (multimode) fiber optic cable terminated with an LC connector. A 50 micron cable is required when the longwave port is operating at a 4Gb per second transfer rate. Fibre Channel cables can be purchased using feature numbers 141x for 50 micron cables and numbers 142x for 9 micron cables.

Security, auditability, and control

This product uses the security and auditability features of the host hardware, host software, and/or application software to which it is attached.

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.

IBM Global Financing

Yes

Warranty period

Four years

This product is provided with 1 year of standard warranty and additional years of extended warranty services to make these offerings. Consult about the appropriate financial treatment for this offering.

Warranty service

IBM On-Site Repair (IOR) 24 hours a day, 7 days a week, same-day response.

Warranty service upgrades

Usage plan machine

No

IBM hourly service rate classification

Three

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

Yes

Machine installation

Installation is performed by IBM. IBM will install the machine in accordance with the IBM installation procedures for the Machine. In the United States, contact IBM at 1-800-IBM-SERV (426-7378), in other countries contact the local IBM office.

The following activities are a customer responsibility:

- Installation planning
- Retrieval and installation of feature activation codes
- Logical configuration planning and application

Refer to the Customer responsibilities section for more information.

Graduated program license charges apply

No

Licensed internal code

IBM Licensed Internal Code is licensed for use by a customer on a specific machine, designated by serial number, under the terms and conditions of the IBM License Agreement for Machine Code, to enable a specific 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/systems/support/machine_warranties/machine_code.html

Specific machine Licensed Internal Code type model

- 2424-951
- 2424-95E

IBM may release changes to the Licensed Internal Code. IBM plans to make the Licensed Internal Code changes available for download from the IBM DS8000 Code Bundle Information Web site

http://www-01.ibm.com/support/docview.wss?rs=1114&context=HW2C2&dc=500&q1=ssg1*&uid=ssg1S1002949&loc=en_US&cs=utf-8&lang=en

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

Educational allowance

A reduced charge is available to qualified education customers. The educational allowance may not be added to any other discount or allowance.

The educational allowance is 15% for the products in this announcement.

Pricing

Product charges

Description	Machine type	Model	Feature number	Minimum monthly maintenance charge
System Storage DS8800	2424	951		
Model 9xE Merge Indicator:				
– 9xE Factory Merge			0001	NC
DoD Indicator			0020	NC
JEMT indicator			0021	NC
Eligible for EU Shipment			0100	NC
Shipping Weight Reduction			0200	NC
Model 9xE Position Indicator:				
– 951 – 95E position 1			0351	NC
– 951 – 95E position 2			0352	NC
Licensed Function Indicators:				
– OEL indicator			0700	NC
– FICON attach indicator			0703	NC
– High Performance FICON indicator			0709	NC
– PTC indicator			0720	NC
– SE indicator			0730	NC
– MGM indicator			0742	NC
– MM indicator			0744	NC
– GM indicator			0746	NC
– RMZ indicator			0760	NC
– RMZ resync indicator			0763	NC
– PAV indicator			0780	NC
– HyperPAV indicator			0782	NC
Initial System Capacity:				
– Up to 2.0 TB capacity			0800	NC
– 2.1 to 5.0 TB capacity			0802	NC
– 5.1 to 10.0 TB capacity			0805	NC
– 10.1 to 25.0 TB capacity			0810	NC
– 25.1 to 50.0 TB capacity			0815	NC
– 50.1 to 75.0 TB capacity			0820	NC
– 75.1 to 100.0 TB capacity			0825	NC
– 100.1 to 150.0 TB capacity			0830	NC
– 150.1 to 200.0 TB capacity			0835	NC
– 200.1 to 250.0 TB capacity			0840	NC
– 250.1 to 300.0 TB capacity			0845	NC
– 300.0 to 350.0 TB capacity			0850	NC
– 350.1 to 400.0 TB capacity			0855	NC
– 400.1 to 450.0 TB capacity			0860	NC
– 450.1 to 500.0 TB capacity			0865	NC
– 500.1 to 550.0 TB capacity			0870	NC
– 550.1 to 600.0 TB capacity			0871	NC
– 600.1 to 700.0 TB capacity			0872	NC
Standby CoD Indicators:				
– Non-Standby CoD			0900	NC
– Standby CoD Indicator			0901	NC
– Standby CoD Indicator			0902	NC
– Standby CoD Indicator			0903	NC

```
- Standby CoD Indicator                      0904      NC

Administrative Indicators:
- IBM/Openwave Alliance                       0930      NC
- IBM System i Indicator                      0931      NC
- IBM System p Indicator                      0932      NC
- IBM System x Indicator                      0933      NC
- IBM System z Indicator                      0934      NC
- Linux Indicator                            0940      NC
- Global Mirror Indicator                     0950      NC

Power:
- Remote Power Control                        1000      NC
- Battery Assembly                           1050      NC
- Extended PLD                               1055      NC

Single Phase Power Cords:
- SPP cord group 1                           1060      NC
- SPP cord group 3                           1067      NC

Line Cords:
- Line Cord (US/LA/AP/Canada)                 1090      NC
- Line Cord (EMEA)                           1091      NC
- Line Cord (Japan)                          1092      NC

Management Console:
- Mgmt console - English Laptop internal      1120
- Mgmt console - English Laptop external      1130

External Management Console - Line Cords:
- MC Line Cord Standard Rack                  1170      NC
- MC Line Cord Group 1                        1171      NC
- MC Line Cord Group 2                        1172      NC

Disk Enclosure:
- HD Disk Enclosure Pair                      1241      NC

Disk Cable:
- HD Disk Drive Cable Group 1                 1246      NC
- HD BC Disk drive cable group                1250      NC

I/O enclosure pair PCIe                       1301

I/O cables:
- PCIe cable group 1                          1320      NC
- PCIe cable group 2                          1321      NC

Fibre Channel/FICON Cables:
- 50 um Fibre Cable (LC)                      1410      NC
- 50 um Fibre Cable (LC/SC)                   1411      NC
- 50 um Fibre Cable (Jumper)                  1412      NC
- 9 um Fibre Cable (LC)                       1420      NC
- 9 um Fibre Cable (LC/SC)                    1421      NC
- 9 um Fibre Cable (Jumper)                   1422      NC

DS8000 Licensed Machine Code:
- DS8000 LMC R6.0                             1721      NC

Encryption Support:
- Encrypted Drive Set Support                 1751      NC

Earthquake Kit                               1906      NC

Hardware Installation MES                     1999      NC

Disk Drive Sets:
- 146 GB 15k Drive Set                        2208
- 450 GB 10k Drive Set                        2608
- 600 GB 10k Drive Set                        2708

Standby CoD Disk Drive Sets:
- 146 GB 15k CoD Drive Set                    2209
- 450 GB 10k CoD Drive Set                    2609
- 600 GB 10k CoD Drive Set                    2709
```

```
Disk Enclosure Filler Set                      2999     NC

Device Adapter:
- Device Adapter Pair I                        3053     NC

Host Adapters:
- 8 Gb 4 port SW FCP/FICON Adapter PCIe        3153
- 8 Gb 8 port SW FCP/FICON Adapter PCIe        3157
- 8 Gb 4 port LW FCP/FICON Adapter PCIe        3253
- 8 Gb 8 port LW FCP/FICON Adapter PCIe        3257

Processor Memory:
- 32 GB Processor Memory (2-Way only)          4212
- 64 GB Processor Memory (2-Way only)          4213
- 128 GB Processor Memory (2-Way only)         4214
- 32 GB Processor Memory (4-Way only)          4222
- 64 GB Processor Memory (4-Way only)          4223
- 128 GB Processor Memory (4-Way only)         4224
- 256 GB Processor Memory (4-Way only)         4225
- 384 GB Processor Memory (4-Way only)         4226

Processor Cards:
- 2 Way Processor Card                         4301
- 4 Way Processor Card                         4302

Encryption Disk Drive Sets:
- 450 GB 10k FDE Drive Set                     5608
- 600 GB 10k FDE Drive Set                     5708

Encryption Standby CoD Disk Drive Sets:
- 450 GB 10k FDE CoD Drive Set                 5609
- 600 GB 10k FDE CoD Drive Set                 5709

SSD Disk Drive Sets:
- 300 GB SSD Drive Set                         6008

Function Authorization Indicators:
- OEL - inactive                               7030     NC
- OEL - 1 TB unit                              7031     NC
- OEL - 5 TB unit                              7032     NC
- OEL - 10 TB unit                             7033     NC
- OEL - 25 TB unit                             7034     NC
- OEL - 50 TB unit                             7035     NC
- OEL - 100 TB unit                            7040     NC
- OEL - 200 TB unit                            7045     NC

- OEL - Value Unit inactive                    7050     NC
- OEL - 1 Value Unit                           7051     NC
- OEL - 5 Value Unit                           7052     NC
- OEL - 10 Value Unit                          7053     NC
- OEL - 25 Value Unit                          7054     NC
- OEL - 50 Value Unit                          7055     NC
- OEL - 100 Value Unit                         7060     NC
- OEL - 200 Value Unit                         7065     NC
- FICON indicator                              7091
- zHPF indicator                               7092
- PTC - inactive indicator                     7250
- PTC - 1 TB indicator                         7251
- PTC - 5 TB indicator                         7252
- PTC - 10 TB indicator                        7253
- PTC - 25 TB indicator                        7254
- PTC - 50 TB indicator                        7255
- PTC - 100 TB indicator                       7260
- SE - inactive indicator                      7350
- SE - 1 TB indicator                          7351
- SE - 5 TB indicator                          7352
- SE - 10 TB indicator                         7353
- SE - 25 TB indicator                         7354
- SE - 50 TB indicator                         7355
- SE - 100 TB indicator                        7360
- MGM - inactive indicator                     7480
- MGM - 1 TB indicator                         7481
- MGM - 5 TB indicator                         7482
```

```
- MGM - 10 TB indicator                        7483
- MGM - 25 TB indicator                        7484
- MGM - 50 TB indicator                        7485
- MGM - 100 TB indicator                       7490
- MM - inactive indicator                      7500
- MM - 1 TB indicator                          7501
- MM - 5 TB indicator                          7502
- MM - 10 TB indicator                         7503
- MM - 25 TB indicator                         7504
- MM - 50 TB indicator                         7505
- MM - 100 TB indicator                        7510
- GM - inactive indicator                      7520
- GM - 1 TB indicator                          7521
- GM - 5 TB indicator                          7522
- GM - 10 TB indicator                         7523
- GM - 25 TB indicator                         7524
- GM - 50 TB indicator                         7525
- GM - 100 TB indicator                        7530
- RMZ - inactive indicator                     7650
- RMZ - 1 TB indicator                         7651
- RMZ - 5 TB indicator                         7652
- RMZ - 10 TB indicator                        7653
- RMZ - 25 TB indicator                        7654
- RMZ - 50 TB indicator                        7655
- RMZ - 100 TB indicator                       7660
- RMZ resync - inactive indicator              7680
- RMZ resync - 1 TB indicator                  7681
- RMZ resync - 5 TB indicator                  7682
- RMZ resync - 10 TB indicator                 7683
- RMZ resync - 25 TB indicator                 7684
- RMZ resync - 50 TB indicator                 7685
- RMZ resync - 100 TB indicator                7690

- PAV - inactive indicator                     7820
- PAV - 1 TB indicator                         7821
- PAV - 5 TB indicator                         7822
- PAV - 10 TB indicator                        7823
- PAV - 25 TB indicator                        7824
- PAV - 50 TB indicator                        7825
- PAV - 100 TB indicator                       7830
- HyperPAV indicator                           7899

IGF Transaction:
- IGF transaction indicator                    7999     NC
```

Description	Machine type	Model	Feature number	Minimum monthly maintenance charge
System Storage DS8800 Expansion Unit	2424	95E		
Model 9xE Merge Indicator:				
- 9xE Factory Merge			0001	NC
- 9xE Field Merge			0002	NC
DoD Indicator			0020	NC
JEMT indicator			0021	NC
Eligible for EU Shipment			0100	NC
Shipping Weight Reduction			0200	NC
Model 9xE Position Indicators:				
- 951 - 95E position 1			0351	NC
- 951 - 95E position 2			0352	NC
Initial System Capacity:				
- Up to 2.0 TB capacity			0800	NC
- 2.1 to 5.0 TB capacity			0802	NC
- 5.1 to 10.0 TB capacity			0805	NC
- 10.1 to 25.0 TB capacity			0810	NC

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- 25.1 to 50.0 TB capacity                      0815        NC
- 50.1 to 75.0 TB capacity                      0820        NC
- 75.1 to 100.0 TB capacity                     0825        NC
- 100.1 to 150.0 TB capacity                    0830        NC
- 150.1 to 200.0 TB capacity                    0835        NC
- 200.1 to 250.0 TB capacity                    0840        NC
- 250.1 to 300.0 TB capacity                    0845        NC
- 300.0 to 350.0 TB capacity                    0850        NC
- 350.1 to 400.0 TB capacity                    0855        NC
- 400.1 to 450.0 TB capacity                    0860        NC
- 450.1 to 500.0 TB capacity                    0865        NC
- 500.1 to 550.0 TB capacity                    0870        NC
- 550.1 to 600.0 TB capacity                    0871        NC
- 600.1 to 700.0 TB capacity                    0872        NC

Administrative Indicators:
- IBM/Openwave Alliance                         0930        NC
- IBM System i Indicator                        0931        NC
- IBM System p Indicator                        0932        NC
- IBM System x Indicator                        0933        NC
- IBM System z Indicator                        0934        NC
- Linux Indicator                               0940        NC

Power:
- Battery Assembly                              1050        NC
- Extended PLD                                  1055        NC

Single Phase Power Cords:
- SPP cord group 1                              1060        NC
- SPP cord group 3                              1067        NC

Line Cords:
- Line Cord (US/LA/AP/Canada)                   1090        NC
- Line Cord (EMEA)                              1091        NC
- Line Cord (Japan)                             1092        NC

Disk Enclosure:
- HD Disk Enclosure Pair                        1241        NC

Disk Cable:
- HD Disk Drive Cable Group 2                   1247        NC
- HD Disk Drive Cable Group 4                   1248        NC

I/O enclosure pair PCIe                         1301

I/O cables:
- PCIe cable group 3                            1322        NC

Fibre Channel/FICON Cables:
- 50 um Fibre Cable (LC)                        1410        NC
- 50 um Fibre Cable (LC/SC)                     1411        NC
- 50 um Fibre Cable (Jumper)                    1412        NC
- 9 um Fibre Cable (LC)                         1420        NC
- 9 um Fibre Cable (LC/SC)                      1421        NC
- 9 um Fibre Cable (Jumper)                     1422        NC

Earthquake Kit                                  1906        NC

Hardware Installation MES                       1999        NC

Disk Drive Sets:
- 146 GB 15k Drive Set                          2208
- 450 GB 10k Drive Set                          2608
- 600 GB 10k Drive Set                          2708

Standby CoD Disk Drive Sets:
- 146 GB 15k CoD Drive Set                      2209
- 450 GB 10k CoD Drive Set                      2609
- 600 GB 10k CoD Drive Set                      2709

Disk Enclosure Filler Set                       2999        NC

Device Adapters:
- Device Adapter Pair I                         3053        NC
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Host Adapters:
- 8 Gb 4 port SW FCP/FICON Adapter PCIe        3153
- 8 Gb 8 port SW FCP/FICON Adapter PCIe        3157
- 8 Gb 4 port LW FCP/FICON Adapter PCIe        3253
- 8 Gb 8 port LW FCP/FICON Adapter PCIe        3257

Encryption Disk Drive Sets:
- 450 GB 10k FDE Drive Set                     5608
- 600 GB 10k FDE Drive Set                     5708

Encryption Standby CoD Disk Drive Sets:
- 450 GB 10k FDE CoD Drive Set                 5609
- 600 GB 10k FDE CoD Drive Set                 5709

SSD Disk Drive Sets:
- 300 GB SSD Drive Set                         6008

NC = No Charge
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MT	Model	Description	List Price
2424	951	System Storage DS8800	$81,938
2424	95E	DS8800 Expansion Unit	$75,000

MT	Model	Feature	Description	List Price
2424	951	0001	Model 9XE Factory Merge Ind	$0
2424	951	0020	DoD Indicator	$0
2424	951	0021	JEMT indicator	$0
2424	951	0100	Eligible for EU Shipment	$0
2424	951	0200	Shipping Weight Reduction	$0
2424	951	0351	951 - 95E position 1	$0
2424	951	0352	951 - 95E position 2	$0
2424	951	0700	OEL indicator	$0
2424	951	0703	FICON attach indicator	$0
2424	951	0709	High Performance FICON ind	$0
2424	951	0720	PTC indicator	$0
2424	951	0730	SE indicator	$0
2424	951	0742	MGM indicator	$0
2424	951	0744	MM indicator	$0

2424	951	0746	GM indicator	$0
2424	951	0760	RMZ indicator	$0
2424	951	0763	RMZ resync indicator	$0
2424	951	0780	PAV indicator	$0
2424	951	0782	HyperPAV indicator	$0
2424	951	0800	Up to 2.0 TB capacity	$0
2424	951	0802	2.1 to 5.0 TB capacity	$0
2424	951	0805	5.1 to 10.0 TB capacity	$0
2424	951	0810	10.1 to 25.0 TB capacity	$0
2424	951	0815	25.1 to 50.0 TB capacity	$0
2424	951	0820	50.1 to 75.0 TB capacity	$0
2424	951	0825	75.1 to 100.0 TB capacity	$0
2424	951	0830	100.1 to 150.0 TB capacity	$0
2424	951	0835	150.1 to 200.0 TB capacity	$0
2424	951	0840	200.1 to 250.0 TB capacity	$0
2424	951	0845	250.1 to 300.0 TB capacity	$0
2424	951	0850	300.0 to 350.0 TB capacity	$0
2424	951	0855	350.1 to 400.0 TB capacity	$0
2424	951	0860	400.1 to 450.0 TB capacity	$0
2424	951	0865	450.1 to 500.0 TB capacity	$0
2424	951	0870	500.1 to 550.0 TB capacity	$0

2424	951	0871	550.1 to 600.0 TB capacity	$0
2424	951	0872	600.1 to 700.0 TB capacity	$0
2424	951	0900	Non-Standby CoD	$0
2424	951	0901	Standby CoD Indicator	$0
2424	951	0902	Standby CoD Indicator	$0
2424	951	0903	Standby CoD Indicator	$0
2424	951	0904	Standby CoD Indicator	$0
2424	951	0930	IBM/ Openwave Alliance	$0
2424	951	0931	IBM System i Indicator	$0
2424	951	0932	IBM System p Indicator	$0
2424	951	0933	IBM System x Indicator	$0
2424	951	0934	IBM System z Indicator	$0
2424	951	0940	Linux Indicator	$0
2424	951	0950	Global Mirror Indicator	$0
2424	951	1000	Remote Power Control	$1,100
2424	951	1050	Battery Assembly	$1,700
2424	951	1055	Extended PLD	$7,800
2424	951	1060	SPP cord group 1	$1,900
2424	951	1067	SPP cord group 3	$1,900
2424	951	1090	Line Cord (US/ LA/AP/ Canada)	$1,900
2424	951	1091	Line Cord (EMEA)	$500

2424	951	1092	Line Cord (Japan)	$1,100
2424	951	1120	Mgmt Console - English Int	$10,000
2424	951	1130	Mgmt Console - English Ext	$10,000
2424	951	1170	MC Line Cord Standard Rack	$100
2424	951	1171	MC Line Cord Group 1	$100
2424	951	1172	MC Line Cord Group 2	$100
2424	951	1241	HD Disk Enclosure Pair	$20,000
2424	951	1246	HD Disk Drive Cable Group 1	$7,000
2424	951	1250	HD BC Disk drive cable group	$3,000
2424	951	1301	I/O enclosure pair PCIe	$12,500
2424	951	1320	PCIe cable group 1	$3,000
2424	951	1321	PCIe cable group 2	$4,100
2424	951	1410	50 um Fibre Cable (LC)	$100
2424	951	1411	50 um Fibre Cable (LC/SC)	$100
2424	951	1412	50 um Fibre Cable (Jumper)	$100
2424	951	1420	9 um Fibre Cable (LC)	$100
2424	951	1421	9 um Fibre Cable (LC/SC)	$100
2424	951	1422	9 um Fibre Cable (Jumper)	$100

2424	951	1721	DS8000 LMC R6.0	$40,000
2424	951	1751	Encrypted Drive Set Support	$0
2424	951	1906	Earthquake Kit	$22,000
2424	951	1999	Hardware Installation MES	$20,000
2424	951	2208	146 GB 15k Drive Set	$48,500
2424	951	2608	450 GB 10k Drive Set	$121,030
2424	951	2708	600 GB 10k Drive Set	$154,700
2424	951	2209	146 GB 15k CoD Drive Set	$4,850
2424	951	2609	450 GB 10k CoD Drive Set	$12,103
2424	951	2709	600 GB 10k CoD Drive Set	$15,470
2424	951	2999	Disk Enclosure Filler Set	$100
2424	951	3053	Device Adapter Pair I	$15,000
2424	951	3153	8Gb 4port SW FCP/ FICON PCIe	$38,500
2424	951	3157	8Gb 8port SW FCP/ FICON PCIe	$61,250
2424	951	3253	8Gb 4port LW FCP/ FICON PCIe	$38,500
2424	951	3257	8Gb 8port LW FCP/ FICON PCIe	$61,250
2424	951	4212	32 GB Processor Memory (2w)	$50,000
2424	951	4213	64 GB Processor	$200,000

			Memory (2w)	
2424	951	4214	128 GB Processor Memory (2w)	$400,000
2424	951	4222	32 GB Processor Memory (4w)	$50,000
2424	951	4223	64 GB Processor Memory (4w)	$200,000
2424	951	4224	128 GB Processor Memory (4w)	$400,000
2424	951	4225	256 GB Processor Memory (4w)	$800,000
2424	951	4226	384 GB Processor Memory (4w)	$1,200,000
2424	951	4301	2 Way Processor Card	$0
2424	951	4302	4 Way Processor Card	$81,938
2424	951	5608	450 GB 10k FDE Drive Set	$141,605
2424	951	5708	600 GB 10k FDE Drive Set	$180,999
2424	951	5609	450 GB 10k FDE CoD Drive Set	$14,161
2424	951	5709	600 GB 10k FDE CoD Drive Set	$18,100
2424	951	6008	300 GB SSD Drive Set	$719,000
2424	951	7030	OEL - inactive	$0
2424	951	7031	OEL - 1 TB unit	$0
2424	951	7032	OEL - 5 TB unit	$0
2424	951	7033	OEL - 10 TB unit	$0
2424	951	7034	OEL - 25 TB unit	$0
2424	951	7035	OEL - 50 TB unit	$0

2424	951	7040	OEL - 100 TB unit	$0
2424	951	7045	OEL - 200 TB unit	$0
2424	951	7050	OEL - Value Unit inactive	$0
2424	951	7051	OEL - 1 Value Unit	$0
2424	951	7052	OEL - 5 Value Unit	$0
2424	951	7053	OEL - 10 Value Unit	$0
2424	951	7054	OEL - 25 Value Unit	$0
2424	951	7055	OEL - 50 Value Unit	$0
2424	951	7060	OEL - 100 Value Unit	$0
2424	951	7065	OEL - 200 Value Unit	$0
2424	951	7091	FICON indicator	$0
2424	951	7092	zHPF indicator	$0
2424	951	7250	PTC - inactive indicator	$0
2424	951	7251	PTC - 1 TB indicator	$0
2424	951	7252	PTC - 5 TB indicator	$0
2424	951	7253	PTC - 10 TB indicator	$0
2424	951	7254	PTC - 25 TB indicator	$0
2424	951	7255	PTC - 50 TB indicator	$0
2424	951	7260	PTC - 100 TB indicator	$0
2424	951	7350	SE - inactive indicator	$0
2424	951	7351	SE - 1 TB indicator	$0
2424	951	7352	SE - 5 TB indicator	$0

2424	951	7353	SE - 10 TB indicator	$0
2424	951	7354	SE - 25 TB indicator	$0
2424	951	7355	SE - 50 TB indicator	$0
2424	951	7360	SE - 100 TB indicator	$0
2424	951	7480	MGM - inactive indicator	$0
2424	951	7481	MGM - 1 TB indicator	$0
2424	951	7482	MGM - 5 TB indicator	$0
2424	951	7483	MGM - 10 TB indicator	$0
2424	951	7484	MGM - 25 TB indicator	$0
2424	951	7485	MGM - 50 TB indicator	$0
2424	951	7490	MGM - 100 TB indicator	$0
2424	951	7500	MM - inactive indicator	$0
2424	951	7501	MM - 1 TB indicator	$0
2424	951	7502	MM - 5 TB indicator	$0
2424	951	7503	MM - 10 TB indicator	$0
2424	951	7504	MM - 25 TB indicator	$0
2424	951	7505	MM - 50 TB indicator	$0
2424	951	7510	MM - 100 TB indicator	$0
2424	951	7520	GM - inactive indicator	$0
2424	951	7521	GM - 1 TB indicator	$0
2424	951	7522	GM - 5 TB indicator	$0
2424	951	7523	GM - 10 TB indicator	$0
2424	951	7524	GM - 25 TB indicator	$0

2424	951	7525	GM - 50 TB indicator	$0
2424	951	7530	GM - 100 TB indicator	$0
2424	951	7650	RMZ - inactive indicator	$0
2424	951	7651	RMZ - 1 TB indicator	$0
2424	951	7652	RMZ - 5 TB indicator	$0
2424	951	7653	RMZ - 10 TB indicator	$0
2424	951	7654	RMZ - 25 TB indicator	$0
2424	951	7655	RMZ - 50 TB indicator	$0
2424	951	7660	RMZ - 100 TB indicator	$0
2424	951	7680	RMZ resync - inactive ind	$0
2424	951	7681	RMZ resync - 1 TB indicator	$0
2424	951	7682	RMZ resync - 5 TB indicator	$0
2424	951	7683	RMZ resync - 10 TB indicator	$0
2424	951	7684	RMZ resync - 25 TB indicator	$0
2424	951	7685	RMZ resync - 50 TB indicator	$0
2424	951	7690	RMZ resync - 100 TB indicator	$0
2424	951	7820	PAV - inactive indicator	$0
2424	951	7821	PAV - 1 TB indicator	$0
2424	951	7822	PAV - 5 TB indicator	$0
2424	951	7823	PAV - 10 TB indicator	$0

2424	951	7824	PAV - 25 TB indicator	$0
2424	951	7825	PAV - 50 TB indicator	$0
2424	951	7830	PAV - 100 TB indicator	$0
2424	951	7899	HyperPAV indicator	$0
2424	951	7999	IGF transaction indicator	$0
2424	95E	0001	Model 9XE Factory Merge Ind	$0
2424	95E	0002	Model 9XE Field Merge Ind	$0
2424	95E	0020	DoD Indicator	$0
2424	95E	0021	JEMT indicator	$0
2424	95E	0100	Eligible for EU Shipment	$0
2424	95E	0200	Shipping Weight Reduction	$0
2424	95E	0351	951 - 95E position 1	$0
2424	95E	0352	951 - 95E position 2	$0
2424	95E	0800	Up to 2.0 TB capacity	$0
2424	95E	0802	2.1 to 5.0 TB capacity	$0
2424	95E	0805	5.1 to 10.0 TB capacity	$0
2424	95E	0810	10.1 to 25.0 TB capacity	$0
2424	95E	0815	25.1 to 50.0 TB capacity	$0
2424	95E	0820	50.1 to 75.0 TB capacity	$0
2424	95E	0825	75.1 to 100.0 TB capacity	$0
2424	95E	0830	100.1 to 150.0 TB capacity	$0

2424	95E	0835	150.1 to 200.0 TB capacity	$0
2424	95E	0840	200.1 to 250.0 TB capacity	$0
2424	95E	0845	250.1 to 300.0 TB capacity	$0
2424	95E	0850	300.0 to 350.0 TB capacity	$0
2424	95E	0855	350.1 to 400.0 TB capacity	$0
2424	95E	0860	400.1 to 450.0 TB capacity	$0
2424	95E	0865	450.1 to 500.0 TB capacity	$0
2424	95E	0870	500.1 to 550.0 TB capacity	$0
2424	95E	0871	550.1 to 600.0 TB capacity	$0
2424	95E	0872	600.1 to 700.0 TB capacity	$0
2424	95E	0930	IBM/ Openwave Alliance	$0
2424	95E	0931	IBM System i Indicator	$0
2424	95E	0932	IBM System p Indicator	$0
2424	95E	0933	IBM System x Indicator	$0
2424	95E	0934	IBM System z Indicator	$0
2424	95E	0940	Linux Indicator	$0
2424	95E	1050	Battery Assembly	$1,700
2424	95E	1055	Extended PLD	$7,800
2424	95E	1060	SPP cord group 1	$1,900

2424	95E	1067	SPP cord group 3	$1,900
2424	95E	1090	Line Cord (US/ LA/AP/ Canada)	$1,900
2424	95E	1091	Line Cord (EMEA)	$500
2424	95E	1092	Line Cord (Japan)	$1,100
2424	95E	1241	HD Disk Enclosure Pair	$20,000
2424	95E	1247	HD Disk Drive Cable Group 2	$9,000
2424	95E	1248	HD Disk Drive Cable Group 4	$12,000
2424	95E	1301	I/O enclosure pair PCIe	$12,500
2424	95E	1322	PCIe cable group 3	$5,000
2424	95E	1410	50 um Fibre Cable (LC)	$100
2424	95E	1411	50 um Fibre Cable (LC/SC)	$100
2424	95E	1412	50 um Fibre Cable (Jumper)	$100
2424	95E	1420	9 um Fibre Cable (LC)	$100
2424	95E	1421	9 um Fibre Cable (LC/SC)	$100
2424	95E	1422	9 um Fibre Cable (Jumper)	$100
2424	95E	1906	Earthquake Kit	$22,000
2424	95E	1999	Hardware Installation MES	$20,000
2424	95E	2208	146 GB 15k Drive Set	$48,500
2424	95E	2608	450 GB 10k Drive Set	$121,030

2424	95E	2708	600 GB 10k Drive Set	$154,700
2424	95E	2209	146 GB 15k CoD Drive Set	$4,850
2424	95E	2609	450 GB 10k CoD Drive Set	$12,103
2424	95E	2709	600 GB 10k CoD Drive Set	$15,470
2424	95E	2999	Disk Enclosure Filler Set	$100
2424	95E	3053	Device Adapter Pair I	$15,000
2424	95E	3153	8Gb 4port SW FCP/ FICON PCIe	$38,500
2424	95E	3157	8Gb 8port SW FCP/ FICON PCIe	$61,250
2424	95E	3253	8Gb 4port LW FCP/ FICON PCIe	$38,500
2424	95E	3257	8Gb 8port LW FCP/ FICON PCIe	$61,250
2424	95E	5608	450 GB 10k FDE Drive Set	$141,605
2424	95E	5708	600 GB 10k FDE Drive Set	$180,999
2424	95E	5609	450 GB 10k FDE CoD Drive Set	$14,161
2424	95E	5709	600 GB 10k FDE CoD Drive Set	$18,100
2424	95E	6008	300 GB SSD Drive Set	$719,000

Type	Model	Description	TP(A M L)	IOR24
2424	951	System Storage DS8800	M	$970
2424	95E	DS8800 Expansion Unit	M	$135

Type	Model	Description	TP(A M)	SLCC	REF	OS24x7
2424	951	System Storage DS8800	M	1000	24X7	$900
2424	95E	DS8800 Expansion Unit	M	1000	24X7	$125

Type	Model	Feature	Description	TP(A M L)	IOR24
2424	951	1120	Mgmt Console - English Int	M	$76
2424	951	1130	Mgmt Console - English Ext	M	$76
2424	951	1301	I/O enclosure pair PCIe	M	$65
2424	951	2208	146 GB 15k Drive Set	M	$219
2424	951	2608	450 GB 10k Drive Set	M	$462
2424	951	2708	600 GB 10k Drive Set	M	$612
2424	951	2209	146 GB 15k CoD Drive Set	M	$219
2424	951	2609	450 GB 10k CoD Drive Set	M	$462
2424	951	2709	600 GB 10k CoD Drive Set	M	$612
2424	951	3153	8Gb 4port SW FCP/ FICON PCIe	M	$115
2424	951	3157	8Gb 8port SW FCP/ FICON PCIe	M	$183
2424	951	3253	8Gb 4port LW FCP/	M	$115

2424	951	3257	FICON PCIe 8Gb 8port LW FCP/ FICON PCIe	M	$183
2424	951	4212	32 GB Processor Memory (2w)	M	$174
2424	951	4213	64 GB Processor Memory (2w)	M	$348
2424	951	4214	128 GB Processor Memory (2w)	M	$696
2424	951	4222	32 GB Processor Memory (4w)	M	$174
2424	951	4223	64 GB Processor Memory (4w)	M	$348
2424	951	4224	128 GB Processor Memory (4w)	M	$696
2424	951	4225	256 GB Processor Memory (4w)	M	$1,392
2424	951	4226	384 GB Processor Memory (4w)	M	$2,784
2424	951	4301	2 Way Processor Card	M	$0
2424	951	4302	4 Way Processor Card	M	$326
2424	951	5608	450 GB 10k FDE Drive Set	M	$462
2424	951	5708	600 GB 10k FDE Drive Set	M	$642
2424	951	5609	450 GB 10k FDE CoD Drive Set	M	$462
2424	951	5709	600 GB 10k FDE CoD Drive Set	M	$642
2424	951	6008	300 GB SSD Drive Set	M	$5,309
2424	951	7091	FICON indicator	M	$36
2424	951	7092		M	$18

			zHPF indicator		
2424	951	7250	PTC - inactive indicator	M	$0
2424	951	7251	PTC - 1 TB indicator	M	$15
2424	951	7252	PTC - 5 TB indicator	M	$73
2424	951	7253	PTC - 10 TB indicator	M	$147
2424	951	7254	PTC - 25 TB indicator	M	$367
2424	951	7255	PTC - 50 TB indicator	M	$734
2424	951	7260	PTC - 100 TB indicator	M	$1,468
2424	951	7350	SE - inactive indicator	M	$0
2424	951	7351	SE - 1 TB indicator	M	$15
2424	951	7352	SE - 5 TB indicator	M	$73
2424	951	7353	SE - 10 TB indicator	M	$147
2424	951	7354	SE - 25 TB indicator	M	$367
2424	951	7355	SE - 50 TB indicator	M	$734
2424	951	7360	SE - 100 TB indicator	M	$1,468
2424	951	7480	MGM - inactive indicator	M	$0
2424	951	7481	MGM - 1 TB indicator	M	$3
2424	951	7482	MGM - 5 TB indicator	M	$15
2424	951	7483	MGM - 10 TB indicator	M	$30
2424	951	7484	MGM - 25 TB indicator	M	$75
2424	951	7485	MGM - 50 TB indicator	M	$150
2424	951	7490	MGM - 100 TB indicator	M	$299
2424	951	7500	MM - inactive indicator	M	$0
2424	951	7501		M	$20

			MM - 1 TB indicator		
2424	951	7502	MM - 5 TB indicator	M	$98
2424	951	7503	MM - 10 TB indicator	M	$196
2424	951	7504	MM - 25 TB indicator	M	$489
2424	951	7505	MM - 50 TB indicator	M	$979
2424	951	7510	MM - 100 TB indicator	M	$1,958
2424	951	7520	GM - inactive indicator	M	$0
2424	951	7521	GM - 1 TB indicator	M	$20
2424	951	7522	GM - 5 TB indicator	M	$98
2424	951	7523	GM - 10 TB indicator	M	$196
2424	951	7524	GM - 25 TB indicator	M	$489
2424	951	7525	GM - 50 TB indicator	M	$979
2424	951	7530	GM - 100 TB indicator	M	$1,958
2424	951	7650	RMZ - inactive indicator	M	$0
2424	951	7651	RMZ - 1 TB indicator	M	$18
2424	951	7652	RMZ - 5 TB indicator	M	$90
2424	951	7653	RMZ - 10 TB indicator	M	$179
2424	951	7654	RMZ - 25 TB indicator	M	$449
2424	951	7655	RMZ - 50 TB indicator	M	$897
2424	951	7660	RMZ - 100 TB indicator	M	$1,794
2424	951	7680	RMZ resync - inactive ind	M	$0
2424	951	7681	RMZ resync - 1 TB indicator	M	$4
2424	951	7682		M	$20

			RMZ resync - 5 TB indicator		
2424	951	7683	RMZ resync - 10 TB indicator	M	$39
2424	951	7684	RMZ resync - 25 TB indicator	M	$98
2424	951	7685	RMZ resync - 50 TB indicator	M	$196
2424	951	7690	RMZ resync - 100 TB indicator	M	$392
2424	951	7820	PAV - inactive indicator	M	$0
2424	951	7821	PAV - 1 TB indicator	M	$8
2424	951	7822	PAV - 5 TB indicator	M	$42
2424	951	7823	PAV - 10 TB indicator	M	$84
2424	951	7824	PAV - 25 TB indicator	M	$211
2424	951	7825	PAV - 50 TB indicator	M	$421
2424	951	7830	PAV - 100 TB indicator	M	$843
2424	951	7899	HyperPAV indicator	M	$123
2424	95E	1301	I/O enclosure pair PCIe	M	$65
2424	95E	2208	146 GB 15k Drive Set	M	$219
2424	95E	2608	450 GB 10k Drive Set	M	$462
2424	95E	2708	600 GB 10k Drive Set	M	$612
2424	95E	2209	146 GB 15k CoD Drive Set	M	$219
2424	95E	2609	450 GB 10k CoD Drive Set	M	$462
2424	95E	2709	600 GB 10k CoD	M	$612

Type	Model	Feature	Description	TP(A M)	Ref	Pr24X7
			Drive Set			
2424	95E	3153	8Gb 4port SW FCP/FICON PCIe	M	$115	
2424	95E	3157	8Gb 8port SW FCP/FICON PCIe	M	$183	
2424	95E	3253	8Gb 4port LW FCP/FICON PCIe	M	$115	
2424	95E	3257	8Gb 8port LW FCP/FICON PCIe	M	$183	
2424	95E	5608	450 GB 10k FDE Drive Set	M	$462	
2424	95E	5708	600 GB 10k FDE Drive Set	M	$642	
2424	95E	5609	450 GB 10k FDE CoD Drive Set	M	$462	
2424	95E	5709	600 GB 10k FDE CoD Drive Set	M	$642	
2424	95E	6008	300 GB SSD Drive Set	M	$5,309	
Type	Model	Feature	Description	TP(A M)	Ref	Pr24X7
2424	951	1120	Mgmt Console - English Int	M	24X7	$70
2424	951	1130	Mgmt Console - English Ext	M	24X7	$70
2424	951	1301	I/O enclosure pair PCIe	M	24X7	$60
2424	951	2208	146 GB 15k Drive Set	M	24X7	$202
2424	951	2608	450 GB 10k Drive Set	M	24X7	$400
2424	951	2708	600 GB 10k	M	24X7	$556

			Drive Set			
2424	951	2209	146 GB 15k CoD Drive Set	M	24X7	$202
2424	951	2609	450 GB 10k CoD Drive Set	M	24X7	$400
2424	951	2709	600 GB 10k CoD Drive Set	M	24X7	$556
2424	951	3153	8Gb 4port SW FCP/ FICON PCIe	M	24X7	$99
2424	951	3157	8Gb 8port SW FCP/ FICON PCIe	M	24X7	$158
2424	951	3253	8Gb 4port LW FCP/ FICON PCIe	M	24X7	$99
2424	951	3257	8Gb 8port LW FCP/ FICON PCIe	M	24X7	$158
2424	951	4212	32 GB Processor Memory (2w)	M	24X7	$160
2424	951	4213	64 GB Processor Memory (2w)	M	24X7	$320
2424	951	4214	128 GB Processor Memory (2w)	M	24X7	$640
2424	951	4222	32 GB Processor Memory (4w)	M	24X7	$160
2424	951	4223	64 GB Processor Memory (4w)	M	24X7	$320
2424	951	4224	128 GB Processor Memory (4w)	M	24X7	$640
2424	951	4225	256 GB Processor Memory (4w)	M	24X7	$1,280
2424	951	4226	384 GB Processor Memory (4w)	M	24X7	$2,560
2424	951	4301	2 Way Processor Card	M	24X7	$0
2424	951	4302		M	24X7	$300

			4 Way Processor Card			
2424	951	5608	450 GB 10k FDE Drive Set	M	24X7	$400
2424	951	5708	600 GB 10k FDE Drive Set	M	24X7	$556
2424	951	5609	450 GB 10k FDE CoD Drive Set	M	24X7	$400
2424	951	5709	600 GB 10k FDE CoD Drive Set	M	24X7	$556
2424	951	6008	300 GB SSD Drive Set	M	24X7	$4,600
2424	951	7091	FICON indicator	M	24X7	$33
2424	951	7092	zHPF indicator	M	24X7	$17
2424	951	7250	PTC - inactive indicator	M	24X7	$0
2424	951	7251	PTC - 1 TB indicator	M	24X7	$14
2424	951	7252	PTC - 5 TB indicator	M	24X7	$68
2424	951	7253	PTC - 10 TB indicator	M	24X7	$135
2424	951	7254	PTC - 25 TB indicator	M	24X7	$338
2424	951	7255	PTC - 50 TB indicator	M	24X7	$675
2424	951	7260	PTC - 100 TB indicator	M	24X7	$1,350
2424	951	7350	SE - inactive indicator	M	24X7	$0
2424	951	7351	SE - 1 TB indicator	M	24X7	$14
2424	951	7352	SE - 5 TB indicator	M	24X7	$68
2424	951	7353	SE - 10 TB indicator	M	24X7	$135
2424	951	7354	SE - 25 TB indicator	M	24X7	$338
2424	951	7355	SE - 50 TB indicator	M	24X7	$675
2424	951	7360		M	24X7	$1,350

			SE - 100 TB indicator			
2424	951	7480	MGM - inactive indicator	M	24X7	$0
2424	951	7481	MGM - 1 TB indicator	M	24X7	$3
2424	951	7482	MGM - 5 TB indicator	M	24X7	$14
2424	951	7483	MGM - 10 TB indicator	M	24X7	$28
2424	951	7484	MGM - 25 TB indicator	M	24X7	$69
2424	951	7485	MGM - 50 TB indicator	M	24X7	$138
2424	951	7490	MGM - 100 TB indicator	M	24X7	$275
2424	951	7500	MM - inactive indicator	M	24X7	$0
2424	951	7501	MM - 1 TB indicator	M	24X7	$18
2424	951	7502	MM - 5 TB indicator	M	24X7	$90
2424	951	7503	MM - 10 TB indicator	M	24X7	$180
2424	951	7504	MM - 25 TB indicator	M	24X7	$450
2424	951	7505	MM - 50 TB indicator	M	24X7	$900
2424	951	7510	MM - 100 TB indicator	M	24X7	$1,800
2424	951	7520	GM - inactive indicator	M	24X7	$0
2424	951	7521	GM - 1 TB indicator	M	24X7	$18
2424	951	7522	GM - 5 TB indicator	M	24X7	$90
2424	951	7523	GM - 10 TB indicator	M	24X7	$180
2424	951	7524	GM - 25 TB indicator	M	24X7	$450
2424	951	7525	GM - 50 TB indicator	M	24X7	$900
2424	951	7530	GM - 100 TB indicator	M	24X7	$1,800
2424	951	7650	RMZ - inactive indicator	M	24X7	$0

2424	951	7651	RMZ - 1 TB indicator	M	24X7	$16
2424	951	7652	RMZ - 5 TB indicator	M	24X7	$82
2424	951	7653	RMZ - 10 TB indicator	M	24X7	$165
2424	951	7654	RMZ - 25 TB indicator	M	24X7	$412
2424	951	7655	RMZ - 50 TB indicator	M	24X7	$825
2424	951	7660	RMZ - 100 TB indicator	M	24X7	$1,650
2424	951	7680	RMZ resync - inactive ind	M	24X7	$0
2424	951	7681	RMZ resync - 1 TB indicator	M	24X7	$4
2424	951	7682	RMZ resync - 5 TB indicator	M	24X7	$18
2424	951	7683	RMZ resync - 10 TB indicator	M	24X7	$36
2424	951	7684	RMZ resync - 25 TB indicator	M	24X7	$90
2424	951	7685	RMZ resync - 50 TB indicator	M	24X7	$180
2424	951	7690	RMZ resync - 100 TB indicator	M	24X7	$360
2424	951	7820	PAV - inactive indicator	M	24X7	$0
2424	951	7821	PAV - 1 TB indicator	M	24X7	$8
2424	951	7822	PAV - 5 TB indicator	M	24X7	$39
2424	951	7823	PAV - 10 TB indicator	M	24X7	$78
2424	951	7824	PAV - 25 TB indicator	M	24X7	$194
2424	951	7825	PAV - 50 TB indicator	M	24X7	$388
2424	951	7830	PAV - 100 TB indicator	M	24X7	$775
2424	951	7899	HyperPAV indicator	M	24X7	$113

2424	95E	1301	I/O enclosure pair PCIe	M	24X7	$60
2424	95E	2208	146 GB 15k Drive Set	M	24X7	$202
2424	95E	2608	450 GB 10k Drive Set	M	24X7	$400
2424	95E	2708	600 GB 10k Drive Set	M	24X7	$556
2424	95E	2209	146 GB 15k CoD Drive Set	M	24X7	$202
2424	95E	2609	450 GB 10k CoD Drive Set	M	24X7	$400
2424	95E	2709	600 GB 10k CoD Drive Set	M	24X7	$556
2424	95E	3153	8Gb 4port SW FCP/ FICON PCIe	M	24X7	$99
2424	95E	3157	8Gb 8port SW FCP/ FICON PCIe	M	24X7	$158
2424	95E	3253	8Gb 4port LW FCP/ FICON PCIe	M	24X7	$99
2424	95E	3257	8Gb 8port LW FCP/ FICON PCIe	M	24X7	$158
2424	95E	5608	450 GB 10k FDE Drive Set	M	24X7	$400
2424	95E	5708	600 GB 10k FDE Drive Set	M	24X7	$556
2424	95E	5609	450 GB 10k FDE CoD Drive Set	M	24X7	$400
2424	95E	5709	600 GB 10k FDE CoD Drive Set	M	24X7	$556
2424	95E	6008	300 GB SSD Drive Set	M	24X7	$4,600

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Feature Change Options

                             Feature Install*    Feature     Feature Feature
     Description             Number  Type        Conversion Exchange Remove

     Model 9xE Merge Indicators:
     - 9xE Factory Merge     0001    Plant only   No          No      No
     - 9xE Field Merge       0002    Plant only   No          No      No


     DoD Indicator           0020    Plant only   No          No      No


     JEMT indicator          0021    Plant only   No          No      No


     Eligible for EU Shipment 0100   Plant only   No          No      No


     Shipping Weight Reduction 0200  Plant only   No          No      No


     Model 9xE Position Indicators:
     - 951 - 95E position 1  0351    Both         No          No      Yes
     - 951 - 95E position 2  0352    Both         No          No      Yes


     Licensed Function Indicators:
     - OEL indicator         0700    Both         No          No      Yes
     - FICON attach indicator 0703   Both         No          No      Yes
     - High Performance FICON 0709   Both         No          No      Yes
       indicator
     - PTC indicator         0720    Both         No          No      Yes
     - SE indicator          0730    Both         No          No      Yes
     - MGM indicator         0742    Both         No          No      Yes
     - MM indicator          0744    Both         No          No      Yes
     - GM indicator          0746    Both         No          No      Yes
     - RMZ indicator         0760    Both         No          No      Yes
     - RMZ resync indicator  0763    Both         No          No      Yes
     - PAV indicator         0780    Both         No          No      Yes
     - HyperPAV indicator    0782    Both         No          No      Yes


     Initial System Capacity:
     - Up to 2.0 TB capacity 0800    Plant only   No          No      Yes
     - 2.1 to 5.0 TB capacity 0802   Plant only   No          No      Yes
     - 5.1 to 10.0 TB capacity 0805  Plant only   No          No      Yes
     - 10.1 to 25.0 TB capacity 0810 Plant only   No          No      Yes
     - 25.1 to 50.0 TB capacity 0815 Plant only   No          No      Yes
     - 50.1 to 75.0 TB capacity 0820 Plant only   No          No      Yes
     - 75.1 to 100.0 TB capacity 0825 Plant only  No          No      Yes
     - 100.1 to 150.0 TB     0830    Plant only   No          No      Yes
       capacity
     - 150.1 to 200.0 TB     0835    Plant only   No          No      Yes
       capacity
     - 200.1 to 250.0 TB     0840    Plant only   No          No      Yes
       capacity
     - 250.1 to 300.0 TB     0845    Plant only   No          No      Yes
       capacity
     - 300.1 to 350.0 TB     0850    Plant only   No          No      Yes
       capacity
     - 350.1 to 400.0 TB     0855    Plant only   No          No      Yes
       capacity
     - 400.1 to 450.0 TB     0860    Plant only   No          No      Yes
       capacity
     - 450.1 to 500.0 TB     0865    Plant only   No          No      Yes
       capacity
     - 500.1 to 550.0 TB     0870    Plant only   No          No      Yes
       capacity
     - 550.1 to 600.0 TB     0871    Plant only   No          No      Yes
       capacity
     - 600.1 to 700.0 TB     0872    Plant only   No          No      Yes
       capacity


     Standby CoD Indicators:
     - Non-Standby CoD       0900    Both         No          No      Yes
     - Standby CoD Indicator 0901    Both         No          No      Yes
     - Standby CoD Indicator 0902    Both         No          No      Yes
     - Standby CoD Indicator 0903    Both         No          No      Yes
     - Standby CoD Indicator 0904    Both         No          No      Yes
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Administrative Indicators:
- IBM/Openwave Alliance      0930    Both        No      No      No
- IBM System i Indicator     0931    Both        No      No      No
- IBM System p Indicator     0932    Both        No      No      No
- IBM System x Indicator     0933    Both        No      No      No
- IBM System z Indicator     0934    Both        No      No      No
- Linux Indicator            0940    Both        No      No      No
- Global Mirror Indicator    0950    Both        No      No      No

Power:
- Remote Power Control        1000    Both        No      No      No
- Battery Assembly            1050    Both        No      No      No
- Extended PLD                1055    Both        No      No      No

Single Phase Power Cords:
- SPP cord group 1            1060    Plant only  No      No      No
- SPP cord group 3            1067    Plant only  No      No      No

Line Cords:
- Line Cord                   1090    Both        No      No      No
  (US/LA/AP/Canada)
- Line Cord (EMEA)            1091    Both        No      No      No
- Line Cord (Japan)           1092    Both        No      No      No

Management Console:
- Mgmt console - English      1120    Plant Only  No      No      No
  Laptop internal
- Mgmt console - English      1130    Both        No      No      No
  Laptop external

External Management Console - Line Cords:
- MC Line Cord Standard       1170    Both        No      No      No
  Rack
- MC Line Cord Group 1        1171    Both        No      No      No
- MC Line Cord Group 2        1172    Both        No      No      No

Disk Enclosures:
- HD Disk Enclosure Pair      1241    Both        No      Yes     No

Disk Cables:
- HD Disk Drive Cable         1246    Plant only  No      No      No
  Group 1
- HD Disk Drive Cable         1247    Both        No      No      Yes
  Group 2
- HD Disk Drive Cable         1248    Both        No      No      Yes
  Group 4
- HD BC Disk Drive            1250    Plant Only  No      No      No
  Cable Group

I/O Enclosure Pair PCIe       1301    Both        No      No      No

I/O Cables:
- PCIe cable group 1          1320    Both        Yes     No      No
- PCIe cable group 2          1321    Both        No      No      No
- PCIe cable group 3          1322    Both        No      No      No

Fibre Channel/FICON Cables:
- 50 um Fibre Cable (LC)      1410    Both        No      No      No
- 50 um Fibre Cable (LC/SC) 1411    Both        No      No      No
- 50 um Fibre Cable          1412    Both        No      No      No
  (Jumper)
- 9 um Fibre Cable (LC)       1420    Both        No      No      No
- 9 um Fibre Cable (LC/SC)  1421    Both        No      No      No
- 9 um Fibre Cable (Jumper) 1422    Both        No      No      No

DS8000 Licensed Machine Code:
- DS8000 LMC R6.0             1721    Both        No      No      Yes

Encryption Support:
- Encrypted Drive Set         1751    Plant only  No      No      Yes
  Support

Earthquake kit                1906    Both        No      No      Yes
```

```
Hardware Installation MES   1999   Field only  No      No      No


Disk Drive Sets:
- 146 GB 15k Drive Set      2208   Both        Yes     Yes     No
- 450 GB 10k Drive Set      2608   Both        Yes     Yes     No
- 600 GB 10k Drive Set      2708   Both        Yes     Yes     No


Standby CoD Disk Drive Sets:
- 146 GB 15k CoD Drive Set  2209   Both        Yes     Yes     No
- 450 GB 10k CoD Drive Set  2609   Both        Yes     Yes     No
- 600 GB 10k CoD Drive Set  2709   Both        Yes     Yes     No


Disk Enclosure Filler Set   2999   Both        No      No      Yes


Device Adapters:
- Device Adapter Pair I      3053   Both        No      No      No


Host Adapters:
- 8Gb 4 port SW FCP/FICON    3153   Both        Yes     No      No
  Adapter PCIe
- 8Gb 8 port SW FCP/FICON    3157   Both        Yes     No      No
  Adapter PCIe
- 8Gb 4 port LW FCP/FICON    3253   Both        Yes     No      No
  Adapter PCIe
- 8Gb 4 port LW FCP/FICON    3257   Both        Yes     No      No
  Adapter PCIe


Processor Memory:
- 32 GB Processor Memory     4212   Both        Yes     No      No
  (2-Way only)
- 64 GB Processor Memory     4213   Both        Yes     No      No
  (2-Way only)
- 128 GB Processor Memory    4214   Both        Yes     No      No
  (2-Way only)
- 32 GB Processor Memory     4222   Both        Yes     No      No
  (4-Way only)
- 64 GB Processor Memory     4223   Both        Yes     No      No
  (4-Way only)
- 128 GB Processor Memory    4224   Both        Yes     No      No
  (4-Way only)
- 256 GB Processor Memory    4225   Both        Yes     No      No
  (4-Way only)
- 384 GB Processor Memory    4226   Both        Yes     No      No
  (4-Way only)


Processor Cards:
- 2 Way Processor Card       4301   Plant only  Yes     No      No
- 4 Way Processor Card       4302   Both        No      No      No


Encryption Disk Drive Sets:
- 450 GB 10k FDE Drive Set   5608   Both        Yes     Yes     No
- 600 GB 10k FDE Drive Set   5708   Both        Yes     Yes     No


Encryption Standby CoD Disk Drive Sets:
- 450 GB 10k FDE CoD         5609   Both        Yes     Yes     No
  Drive Set
- 600 GB 10k FDE CoD         5709   Both        Yes     Yes     No
  Drive Set


SSD Disk Drive Sets:
- 300 GB SSD Drive Set       6008   Both        Yes     Yes     No


Function Authorization Indicators:
- OEL - inactive             7030   Both        No      No      Yes
- OEL - 1 TB unit            7031   Both        No      No      Yes
- OEL - 5 TB unit            7032   Both        No      No      Yes
- OEL - 10 TB unit           7033   Both        No      No      Yes
- OEL - 25 TB unit           7034   Both        No      No      Yes
- OEL - 50 TB unit           7035   Both        No      No      Yes
- OEL - 100 TB unit          7040   Both        No      No      Yes
- OEL - 200 TB unit          7045   Both        No      No      Yes
- OEL - Value Unit inactive  7050   Both        No      No      Yes
- OEL - 1 Value Unit         7051   Both        No      No      Yes
```

- OEL - 5 Value Unit	7052	Both	No	No	Yes
- OEL - 10 Value Unit	7053	Both	No	No	Yes
- OEL - 25 Value Unit	7054	Both	No	No	Yes
- OEL - 50 Value Unit	7055	Both	No	No	Yes
- OEL - 100 Value Unit	7060	Both	No	No	Yes
- OEL - 200 Value Unit	7065	Both	No	No	Yes
- FICON indicator	7091	Both	No	No	Yes
- zHPF indicator	7092	Both	No	No	Yes
- PTC - inactive indicator	7250	Both	No	No	Yes
- PTC - 1 TB indicator	7251	Both	No	No	Yes
- PTC - 5 TB indicator	7252	Both	No	No	Yes
- PTC - 10 TB indicator	7253	Both	No	No	Yes
- PTC - 25 TB indicator	7254	Both	No	No	Yes
- PTC - 50 TB indicator	7255	Both	No	No	Yes
- PTC - 100 TB indicator	7260	Both	No	No	Yes
- SE - inactive indicator	7350	Both	No	No	Yes
- SE - 1 TB indicator	7351	Both	No	No	Yes
- SE - 5 TB indicator	7352	Both	No	No	Yes
- SE - 10 TB indicator	7353	Both	No	No	Yes
- SE - 25 TB indicator	7354	Both	No	No	Yes
- SE - 50 TB indicator	7355	Both	No	No	Yes
- SE - 100 TB indicator	7360	Both	No	No	Yes
- MGM - inactive indicator	7480	Both	No	No	Yes
- MGM - 1 TB indicator	7481	Both	No	No	Yes
- MGM - 5 TB indicator	7482	Both	No	No	Yes
- MGM - 10 TB indicator	7483	Both	No	No	Yes
- MGM - 25 TB indicator	7484	Both	No	No	Yes
- MGM - 50 TB indicator	7485	Both	No	No	Yes
- MGM - 100 TB indicator	7490	Both	No	No	Yes
- MM - inactive indicator	7500	Both	No	No	Yes
- MM - 1 TB indicator	7501	Both	No	No	Yes
- MM - 5 TB indicator	7502	Both	No	No	Yes
- MM - 10 TB indicator	7503	Both	No	No	Yes
- MM - 25 TB indicator	7504	Both	No	No	Yes
- MM - 50 TB indicator	7505	Both	No	No	Yes
- MM - 100 TB indicator	7510	Both	No	No	Yes
- GM - inactive indicator	7520	Both	No	No	Yes
- GM - 1 TB indicator	7521	Both	No	No	Yes
- GM - 5 TB indicator	7522	Both	No	No	Yes
- GM - 10 TB indicator	7523	Both	No	No	Yes
- GM - 25 TB indicator	7524	Both	No	No	Yes
- GM - 50 TB indicator	7525	Both	No	No	Yes
- GM - 100 TB indicator	7530	Both	No	No	Yes
- RMZ - inactive indicator	7650	Both	No	No	Yes
- RMZ - 1 TB indicator	7651	Both	No	No	Yes
- RMZ - 5 TB indicator	7652	Both	No	No	Yes
- RMZ - 10 TB indicator	7653	Both	No	No	Yes
- RMZ - 25 TB indicator	7654	Both	No	No	Yes
- RMZ - 50 TB indicator	7655	Both	No	No	Yes
- RMZ - 100 TB indicator	7660	Both	No	No	Yes
- RMZ resync - inactive indicator	7680	Both	No	No	Yes
- RMZ resync - 1 TB indicator	7681	Both	No	No	Yes
- RMZ resync - 5 TB indicator	7682	Both	No	No	Yes
- RMZ resync - 10 TB indicator	7683	Both	No	No	Yes
- RMZ resync - 25 TB indicator	7684	Both	No	No	Yes
- RMZ resync - 50 TB indicator	7685	Both	No	No	Yes
- RMZ resync - 100 TB indicator	7690	Both	No	No	Yes
- PAV - inactive indicator	7820	Both	No	No	Yes
- PAV - 1 TB indicator	7821	Both	No	No	Yes
- PAV - 5 TB indicator	7822	Both	No	No	Yes
- PAV - 10 TB indicator	7823	Both	No	No	Yes
- PAV - 25 TB indicator	7824	Both	No	No	Yes
- PAV - 50 TB indicator	7825	Both	No	No	Yes
- PAV - 100 TB indicator	7830	Both	No	No	Yes
- HyperPAV indicator	7899	Both	No	No	Yes

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IGF Transaction:
- IGF transaction indicator 7999    Field only  No        No        Yes
```

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* Install type of Both designates plant and field install.
  The feature change options define the approach by which the
  feature number is removed from the machine and/or IBM
  machine-level inventory records.
```

- Feature Conversion: As necessary, IBM service personnel will remove components from the machine and/or install additional components required to complete the conversion.
- Feature Exchange: As necessary, IBM service personnel will remove components from the machine and/or install additional components required to complete the conversion.
- Feature Remove: This is an administrative transaction and only updates IBM machine and inventory records, except under the following condition:
  - IBM will remove components from the machine if the Feature Remove is ordered in conjunction with a Feature Add transaction.

ServicePac prices

For ServiceElect (ESA) maintenance service charges, contact IBM Global Services at 888-IBM-4343 (426-4343).

Model conversion purchase price

Model Conversions (Machine Type 2424)

There are no model conversions for this anouncement.

Feature conversion purchase price

```
Machine Type 2424 Model 951

Feature     Returned                       Continuous
From  To    Parts *   Description          Maintenance

1320  1321    Yes     I/O cable conversion    Yes



Feature     Returned                       Continuous
From  To    Parts *   Description          Maintenance

2208  2608    Yes     Disk drive set          Yes
                      conversion
2208  2708    Yes     Disk drive set          Yes
                      conversion
2608  2708    Yes     Disk drive set          Yes
                      conversion



Feature     Returned                       Continuous
From  To    Parts *   Description          Maintenance

2209  2208    No      CoD disk drive          Yes
                        conversion

2609  2608    No      CoD disk drive          Yes
                        conversion

2709  2708    No      CoD disk drive          Yes
                        conversion
```

```
Feature      Returned                       Continuous
From   To    Parts *   Description           Maintenance

3153   3157    Yes     Host adapter            Yes
                       conversion
3153   3253    Yes     Host adapter            Yes
                       conversion
3153   3257    Yes     Host adapter            Yes
                       conversion

3157   3153    Yes     Host adapter            Yes
                       conversion
3157   3253    Yes     Host adapter            Yes
                       conversion
3157   3257    Yes     Host adapter            Yes
                       conversion

3253   3153    Yes     Host adapter            Yes
                       conversion
3253   3157    Yes     Host adapter            Yes
                       conversion
3253   3257    Yes     Host adapter            Yes
                       conversion

3257   3153    Yes     Host adapter            Yes
                       conversion
3257   3157    Yes     Host adapter            Yes
                       conversion
3257   3253    Yes     Host adapter            Yes
                       conversion


Feature      Returned                       Continuous
From   To    Parts *   Description           Maintenance

4212   4213    Yes     Processor memory        Yes
                       conversion
4212   4214    Yes     Processor memory        Yes
                       conversion
4212   4222    Yes     Processor memory        Yes
                       conversion

4213   4214    Yes     Processor memory        Yes
                       conversion
4213   4223    Yes     Processor memory        Yes
                       conversion

4214   4224    Yes     Processor memory        Yes
                       conversion

4222   4223    No      Processor memory        Yes
                       conversion
4222   4224    Yes     Processor memory        Yes
                       conversion
4222   4225    Yes     Processor memory        Yes
                       conversion
4222   4226    Yes     Processor memory        Yes
                       conversion

4223   4224    Yes     Processor memory        Yes
                       conversion
4223   4225    Yes     Processor memory        Yes
                       conversion
4223   4226    No      Processor memory        Yes
                       conversion

4224   4225    Yes     Processor memory        Yes
                       conversion
4224   4226    Yes     Processor memory        Yes
                       conversion

4225   4226    No      Processor memory        Yes
                       conversion
```

```
Feature      Returned              Continuous
From  To     Parts *   Description   Maintenance

4301  4302   Yes       Processor card       Yes
                         conversion



Feature      Returned              Continuous
From  To     Parts *   Description   Maintenance

5608  5708   Yes       Encryption disk drive   Yes
                         set conversion

5609  5608   No        Encryption CoD disk     Yes
                         drive conversion

5709  5708   No        Encryption CoD disk     Yes
                         drive conversion



Machine Type 2424 Model 95E

Feature      Returned              Continuous
From  To     Parts *   Description   Maintenance

2208  2608   Yes       Disk drive set       Yes
                         conversion
2208  2708   Yes       Disk drive set       Yes
                         conversion
2608  2708   Yes       Disk drive set       Yes
                         conversion



Feature      Returned              Continuous
From  To     Parts *   Description   Maintenance

2209  2208   No        CoD disk drive       Yes
                         conversion

2609  2608   No        CoD disk drive       Yes
                         conversion

2709  2708   No        CoD disk drive       Yes
                         conversion



Feature      Returned              Continuous
From  To     Parts *   Description   Maintenance

3153  3157   Yes       Host adapter        Yes
                         conversion
3153  3253   Yes       Host adapter        Yes
                         conversion
3153  3257   Yes       Host adapter        Yes
                         conversion

3157  3153   Yes       Host adapter        Yes
                         conversion
3157  3253   Yes       Host adapter        Yes
                         conversion
3157  3257   Yes       Host adapter        Yes
                         conversion

3253  3153   Yes       Host adapter        Yes
                         conversion
3253  3157   Yes       Host adapter        Yes
                         conversion
```

Feature From	To	Returned Parts *	Description	Continuous Maintenance
3253	3257	Yes	Host adapter conversion	Yes
3257	3153	Yes	Host adapter conversion	Yes
3257	3157	Yes	Host adapter conversion	Yes
3257	3253	Yes	Host adapter conversion	Yes
5608	5708	Yes	Encryption disk drive set conversion	Yes
5609	5608	No	Encryption CoD disk drive conversion	Yes
5709	5708	No	Encryption CoD disk drive conversion	Yes

MT	Model	Partnumber	Description	List Price
2424	951	242413201321	I/O cable conversion	$4,100
2424	951	242422082608	Disk drive set conversion	$121,030
2424	951	242422082708	Disk drive set conversion	$154,700
2424	951	242426082708	Disk drive set conversion	$154,700
2424	951	242422092208	CoD disk drive conversion	$43,650
2424	951	242426092608	CoD disk drive conversion	$108,927
2424	951	242427092708	CoD disk drive conversion	$139,230
2424	951	242431533157	Host adapter conversion	$61,000
2424	951	242431533253	Host adapter conversion	$38,250
2424	951	242431533257	Host adapter conversion	$61,000
2424	951	242431573153	Host adapter conversion	$38,250
2424	951	242431573253	Host adapter conversion	$38,250
2424	951	242431573257	Host adapter conversion	$61,000
2424	951	242432533153	Host adapter conversion	$38,250
2424	951	242432533157	Host adapter conversion	$61,000
2424	951	242432533257	Host adapter conversion	$61,000
2424	951	242432573153	Host adapter conversion	$38,250
2424	951	242432573157	Host adapter conversion	$61,000
2424	951	242432573253	Host adapter conversion	$38,250
2424	951	242442124213	Processor memory conversion	$150,000
2424	951	242442124214	Processor memory conversion	$350,000

2424	951	242442124222	Processor memory conversion	$0
2424	951	242442134214	Processor memory conversion	$200,000
2424	951	242442134223	Processor memory conversion	$0
2424	951	242442144224	Processor memory conversion	$0
2424	951	242442224223	Processor memory conversion	$150,000
2424	951	242442224224	Processor memory conversion	$350,000
2424	951	242442224225	Processor memory conversion	$750,000
2424	951	242442224226	Processor memory conversion	$1,150,000
2424	951	242442234224	Processor memory conversion	$200,000
2424	951	242442234225	Processor memory conversion	$600,000
2424	951	242442234226	Processor memory conversion	$1,000,000
2424	951	242442244225	Processor memory conversion	$400,000
2424	951	242442244226	Processor memory conversion	$800,000
2424	951	242442254226	Processor memory conversion	$400,000
2424	951	242443014302	Processor card conversion	$81,938
2424	951	242456085708	Encryption disk set conv	$180,999
2424	951	242456095608	Encryption CoD disk conv	$127,445
2424	951	242457095708	Encryption CoD disk conv	$162,899
2424	95E	242422082608	Disk drive set conversion	$121,030
2424	95E	242422082708	Disk drive set conversion	$154,700
2424	95E	242426082708	Disk drive set conversion	$154,700
2424	95E	242422092208	CoD disk drive conversion	$43,650
2424	95E	242426092608	CoD disk drive conversion	$108,927
2424	95E	242427092708	CoD disk drive conversion	$139,230
2424	95E	242431533157	Host adapter conversion	$61,000
2424	95E	242431533253	Host adapter conversion	$38,250
2424	95E	242431533257	Host adapter conversion	$61,000

2424	95E	242431573153	Host adapter conversion	$38,250
2424	95E	242431573253	Host adapter conversion	$38,250
2424	95E	242431573257	Host adapter conversion	$61,000
2424	95E	242432533153	Host adapter conversion	$38,250
2424	95E	242432533157	Host adapter conversion	$61,000
2424	95E	242432533257	Host adapter conversion	$61,000
2424	95E	242432573153	Host adapter conversion	$38,250
2424	95E	242432573157	Host adapter conversion	$61,000
2424	95E	242432573253	Host adapter conversion	$38,250
2424	95E	242456085708	Encryption disk set conv	$180,999
2424	95E	242456095608	Encryption CoD disk conv	$127,445
2424	95E	242457095708	Encryption CoD disk conv	$162,899

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Corrections

(Corrected on October 11, 2010)
The Other limitations section has been removed from the Technical information.