

IBM System Storage DS8870 (machine type 2421, 2422, 2423, and 2424) delivers advanced Easy Tier capabilities, enhanced resiliency, and business continuity functions

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At a glance

New features for IBM® System Storage® DS8870 offer a greater choice in price and performance, including:

- Fifth-generation Easy Tier® enhancements
 - Easy Tier Server
 - Easy Tier Application
 - Easy Tier Heat Map Transfer
- Resiliency improvement
 - Improved FlashCopy® handling of volume reservations
 - z/OS® HyperSwap® Soft Fence
 - Timestamp synchronization for Sysplex and DS8000®
- VMware vStorage API for Array Integration (VAAI) support
 - WRITE SAME
 - SRM 5.1
 - IBM Storage Management Console for VMware vCenter
- Support for IBM i variable LUN sizes
- Support for Symantec space reclamation (RPQ only)
- Low cost entry class configuration option
- Field model conversion from DS8800 to DS8870

Overview

IBM System Storage DS8870 systems (machine types 2421, 2422, 2423, and 2424) are now available with new fifth-generation Easy Tier enhancements that enable more flash optimization choices with the DS8870, and include advanced features for improved resiliency in z/OS environments. New options include:

- Fifth-generation Easy Tier enhancements
 - Easy Tier Server is a unified storage caching and tiering capability that can be used when attaching to AIX® servers with any supported direct attached flash. Easy Tier can manage the data placement across direct attached flash within

scale-out servers and DS8870 storage tiers by placing a copy of the "hottest" data on the direct attached flash, while maintaining the persistent copy of data on DS8870 and supporting DS8870 advanced functions.

- Easy Tier Application is an application-aware storage application programming interface (API) to help deploy storage more efficiently through enabling applications and middleware to direct more optimal placement of data by communicating important information about current workload activity and application performance requirements. In this release, the new Easy Tier Application feature also enables clients to assign distinct application volumes to a particular tier in the Easy Tier pool, disregarding Easy Tier's advanced data migration function. This provides a flexible option for clients that want certain applications to remain on a particular tier to meet performance and cost requirements.
- Easy Tier Heat Map Transfer is able to provide whatever the data placement algorithm is on the Metro Mirror/Global Copy/Global Mirror (MM/GC/GM) primary site and reapply it on the MM/GC/GM secondary site through the Easy Tier Heat Map Transfer utility. With this capability, DS8000 systems can maintain application-level performance at an application secondary site when it takes over in supporting a workload after a failover from the primary to secondary site.
- Resiliency improvements
 - Improved FlashCopy handling of volume reserves provides the capability to detect and ignore a volume reservation of a FlashCopy target volume that was inadvertently left reserved.
 - Prevention of accidental loss of data when initializing a z/OS volume with ICKDSF INIT or REFORMAT.
 - Ability to determine what z/OS Systems a volume is online to.
 - Ability to invoke a nondisruptive statesave via a z/OS command. Diagnostic data is gathered by the DS8870 without causing a warmstart during the data collection.
 - Simplified management of synchronous and asynchronous replication in four-site configuration using the Global Mirror Pause technology.
 - Ability to prevent accessing of data from the old primary PPRC site with z/OS Soft Fence when an unplanned recovery occurs.
 - Timestamp synchronization for Sysplex and DS8000 allows consistency between Global Mirror timestamp and Sysplex timestamp.
- VMware VAAI
 - Support for WRITE SAME command to zero out virtual disk space or LUNs.
 - Site Recovery Manager (SRM) 5.1 supports reprotect and failback with vSphere Replication.
 - IBM Storage Management Console for VMware vCenter enables VMware administrators to manage the DS8870 the within the VMware management environment.
- Support for IBM i variable LUN sizes
 - Adds flexibility for volume sizes and can increase capacity utilization for IBM i environments.
 - Clients are allowed to add LUN sizes by increments of 1 GB, in the range of 1 GB up to 2,000 GB.
- Support for Symantec space reclamation (RPQ only)
 - Symantec Storage Foundation provides the ability to reclaim unused space on thin-provisioned arrays. The unused space is released back into the DS8000 storage pool and can be used for other volumes, which increases capacity efficiency.
 - Symantec Storage Foundation provides a user interface to trigger reclamation at a disk, disk group, or enclosure granularity.
- Low cost entry class configuration options
 - The DS8870 will provide a low cost entry class configuration option in addition to the business and enterprise class.

- The low cost entry class option allows a system to be configured with more drives per device adapter, reducing configuration cost and increasing adapter utilization.

The field model conversion from DS8800 to DS8870 is available for existing customers. For details, refer to the [Model conversions](#) section for further information.

Key prerequisites

All announced features and functions are supported on the IBM System Storage DS8000 series and require DS8000 Licensed Machine Code (LMC) 7.7.10.xx.xx (bundle version 87.10.xxx.xx), or later.

Planned availability date

- June 7, 2013: All features and conversions, except feature number 0601
- September 30, 2013: Low-cost Entry Class configuration offering (feature number 0601)

Description

New Easy Tier capabilities improve application performance for integration between DS8870 and the application server. Several existing functions are enhanced to improve resiliency for open and System z® environments.

Easy Tier Server

IBM System Storage Easy Tier Server is designed to improve the time for the application to access data that is stored on the attached servers or a DS8870 system. Easy Tier is designed to copy the frequently accessed data from the DS8870 storage tier to any supported direct attached flash connected to either a POWER7® or POWER7+™ server, while maintaining the enterprise reliability, replication, and synchronization the DS8870 already supports. This capability can provide increased transaction throughput by up to five times and supports all advanced functions enabled on the DS8870 transparently to the application. This function is supported only on POWER® servers running AIX operating systems.

Easy Tier Server solution is an optional capability of the DS8000 series, and is available with the Easy Tier Server indicator feature numbers 0715 and 7084, and corresponding DS8000 series Function Authorization (2396-LFA Easy Tier Server indicator feature number 7084).

Easy Tier Application

Easy Tier now allows administrators and applications to direct data placement in the underlying storage system through the Easy Tier Application. With this feature, Easy Tier now expands its automatic data placement framework to help improve storage performance based on application and business knowledge.

Easy Tier Application is the next evolution in the Easy Tier technology roadmap. Explicit data placement requests through the Easy Tier Application interface will be prioritized by Easy Tier in conjunction with its knowledge of measured data heat, storage device health, and the available capacity of a target tier. Easy Tier then generates migration plans based on these data placement requests and automatic tier management algorithms. In this way, Easy Tier Application adds to Easy Tier by supporting a user-controlled way to optimize the placement of individual volumes that are in a DS8000 extent pool containing multiple tiers of disk drives.

Below is a description of what can be done with Easy Tier Application.

1. Easy Tier Application - data placement control

- a. *Assign a volume to a storage device tier (SSD, ENT, nearline) by the heat order.* On request, Easy Tier Application generates migration plans for extents within the requested volume and prioritizes hotter extents to be migrated first to the specified tier. After the execution, Easy Tier Application will keep the migrated data in the target tier as appropriate until the volume is unassigned.
- b. *Assign a volume to a storage device tier (SSD, ENT, nearline) by the access order.* On request, Easy Tier Application does not immediately generate a migration plan for the specified volume until actual I/O access to the volume takes place. When it does, Easy Tier Application generates a migration plan for the extents that are accessed. After the execution, Easy Tier Application will keep the migrated data in the target tier until the volume is unassigned.
- c. *Unassign a volume.* On request, Easy Tier Application clears the assign status of the volume and lets Easy Tier manage it based on the existing automatic tier management algorithms.
- d. *Unassign all volumes in an extent pool.* On request, Easy Tier clears the assign status for all the volumes in the specified extent pool, and lets Easy Tier manage them based on the existing automatic tier management algorithms.

2. Easy Tier Application - data placement query

- a. *Query volume assign state.* Returns the assign status (assigned/in-progress/none) and the completion percentage if a request is still in progress.
- b. *Query extent pool tier distribution.* Returns the total capacity of each storage tier (SSD, ENT, nearline), as well as the used capacity and assigned capacity of each tier.
- c. *Query volume tier distribution.* Returns the capacity used by a volume on each storage tier (SSD, ENT, nearline). Easy Tier Application can be disabled, and this new function will not have any effect on the existing design and implementation of the current Easy Tier functionality.

Easy Tier Heat Map Transfer

Easy Tier now has the ability to transfer the heat map, also known as learning data, from the MM/GC/GM primary site and reapply it to the secondary site periodically through the Easy Tier Heat Map Transfer utility. Upon receiving a heat map, Easy Tier running on the DS8000 located at the secondary site uses the heat map to relocate the data to the appropriate storage tiers on a scheduled basis. With this capability, DS8000 can maintain the application-level performance at the MM/GC/GM secondary site assuming it has a similar configuration as the primary site. The goal is for a replication secondary to keep up with its primary in terms of data placement. This way, when the secondary has to take over supporting a production workload after a failover from the primary to the secondary site, there would be little to no impact to storage performance.

Easy Tier Heat Map Transfer utility provides a command line interface. It requires a WindowsTM or LinuxTM server with an IP network connected to the managed DS8000 systems on both primary sites and secondary sites. It can be installed and deployed in existing servers in a customer environment. After identifying the managed DS8000 systems to the Easy Tier Heat Map Transfer utility, it will detect the replication relationships and automatically schedule heat map transfers.

Easy Tier Heat Map Transfer utility provides the flexibility of managing up to 30 DS8000 systems with copy service relationships among them with a single software instance. It allows the combination of automatic heat map transfer done every 12 hours and manual data transfers initiated by the user as needed. It also provides a monitor interface to query the transfer results.

Easy Tier Heat Map Transfer utility communicates with the managed DS8000s using the same protocol as the DSCLI and users can apply the same authentication and secure methods as DSCLI for the Easy Tier Heat map transfer utility.

The Easy Tier Heat Map Transfer utility is also integrated with TPC-R and all the functions are available through TPC-R 5.1.1.1 release.

Improved FlashCopy handling of volume reservations

Previously, for a FlashCopy establish operation to a SCSI LUN, the target volume could not be reserved by a host. If the target volume was reserved, the Establish FlashCopy command would fail. There was no mechanism for a user to identify the server that has the volume reserved. The DS8870 now supports the capability to report the reserve information via a DSCLI command. In addition, the Establish FlashCopy command is being modified to add a parameter which allows the target device to be reserved.

For CKD volumes, a new function (VERIFYOFFLINE) was added to check if the volume is online to another z/OS host before performing the INIT or REFORMAT function. If the INIT or REFORMAT fails due to the volume online, the ICKDSF ANALYZE HOSTACCESS command or DEVSERV QDASD QHA command can be used to determine which z/OS hosts the volume is online to. This will prevent an accidental erase or rewrite of a volume by ICKDSF INIT and REFORMAT.

z/OS HyperSwap soft fence

This DS8000 capability prevents a host from reading or writing data on the previous primary storage system after a HyperSwap occurs. IBM System z servers require z/OS V2.1, or later, and GDPS® V3.9, or later to support z/OS HyperSwap Soft Fence. Refer to the [Statement of general direction](#) section for more information.

Timestamp synchronization for Sysplex and DS8000

The DS8000 Global Mirror feature will keep a record in the Global Mirror secondary system of the time the most recent consistency group was formed. The recorded time is based on the value of the associated System z Sysplex Timer® that is communicated by z/OS to the primary site DS8000 Global Mirror master session. This time can be retrieved from the secondary Global Mirror system following an unplanned failover to allow the time the last consistency group was formed to be correlated to other Sysplex events.

Support for VMware VAAI, vCenter, and SRM

VMware vSphere Storage APIs - Array Integration (VAAI) was first introduced with vSphere 4.1 enabling offloading specific tasks to storage arrays. The purpose is to consume less CPU, memory, and bandwidth on the host. VAAI defines a set of operations (or primitives) in terms of standard SCSI commands. DS8870 supports the following primitives:

1. Hardware Assisted Locking of files
2. Full Copy enables the storage array to make full copies of data within the array (allows VMware to invoke DS8000 FlashCopy)
3. Block zeroing enables the array to zero out large numbers of blocks

In October 2012, DS8000 introduced support for Full Copy and Hardware Assisted Locking. In this release, support for Block Zero is being added which greatly reduces the number of SCSI (WRITE SAME) commands to be sent from the ESX host to the array when it needs to allocate previously used blocks to a new virtual machine image, freeing host resources to perform more important tasks.

IBM Storage Management Console for VMware vCenter for ESX 4 support

This plugin enables VMware administrators to manage their DS8000s from within the VMware management environment, including the VAAI primitives.

VMware SRM v5.0/5.1 certification

This provides simplified disaster recovery management for DS8000 VMware environments. Specifically, SRM provides methods to simplify and automate disaster recovery processes. Vendors provide a "Site Replication Adapter" (SRA) to communicate between SRM and the adapter. DS8000 support for SRM 4.1 has been

provided with the current release of the IBM adapter, and support for SRM 5.0/5.1 includes the following, additional new features:

- Planned migration
- Reprotection
- Failback

Support for IBM i variable LUN sizes

Support for IBM i variable LUN adds flexibility for volume sizes and can increase capacity utilization for IBM i environments. Now clients are allowed to add LUN sizes by increments of 1 GB, in the range of 1 GB up to 2,000 GB, providing more flexibility with larger volumes.

Maximum volume size supported is 2,000 GB and volume types supported are standard, Track Space Efficient (TSE), and Extent Space Efficient (ESE).

This function is supported on existing Power Systems™ machine type models that support the IBM i operating system.

Support for Symantec space reclamation (RPQ only)

The thin reclamation facility uses Symantec Storage Foundation to release unused space on a thin provisioned volume. Thin reclamation analyzes a thin provisioned volume to:

1. Identify the allocated extents on a thin provisioned volume.
2. Determine which of these extents are not in use.
3. Release the allocated extents that are not being used.

To efficiently reclaim the unused extents, periodically defragment thin provisioned volumes to localize data, and then run the thin reclamation facility on the volumes to release the unused space.

- Space reclamation is supported on DS8000 thin provisioned (ESE) volumes only
- DS8000 currently supports AIX and Linux operating systems

Low cost entry class configuration options

The DS8870 is designed to provide a low cost entry class configuration option in addition to the business and enterprise class. This option alters the standard device adapter pair to drive fill pattern and provides a lower cost system solution with a balanced trade off in performance. The low cost entry class configuration is capable of achieving similar system performance to the standard offering when in large configurations. This option can only be applied in the factory and cannot be converted back to the standard configuration in the field.

Refer to the following table for more detail on supported drives and device adapters required with the low cost entry class configuration option.

Low Cost Entry Class Configuration table:

Description	DS8870 2 or 4 core	DS8870 8 or 16 core
Number of drives supported	16-192	16-192
Device adapter pairs required	1	1
Number of drives supported	208-240	208-384
Device adapter	2	2

pairs required	
Number of drives supported	400-576
Device adapter pairs required	3
Number of drives supported	592-768
Device adapter pairs required	4
Number of drives supported	784-960
Device adapter pairs required	5
Number of drives supported	976-1056
Device adapter pairs required	6

Preview

IBM System Storage DS8870 plans include new hardware updates and enhanced system microcode to further exploit the exceptional performance and economic benefits of flash storage while maintaining the proven enterprise-class reliability, as well as all the advanced functions and security capabilities that are the hallmarks of IBM enterprise storage.

Preview announcements provide insight into IBM plans and directions. General availability, prices, ordering information, and terms and conditions will be provided when the product is announced.

Accessibility by people with disabilities

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

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

Statement of general direction

The current plan and direction of IBM is to release z/OS V2.1 to support z/OS HyperSwap Soft Fence and other various functions running on IBM System z servers.

IBM intends this release to be available in the third quarter of 2013.

IBM's statements regarding its plans, directions, and intent are subject to change or withdrawal without notice at IBM's sole discretion. Information regarding potential future products is intended to outline our general product direction and it should not be relied on in making a purchasing decision. The information mentioned regarding potential future products is not a commitment, promise, or legal obligation to deliver any material, code, or functionality. Information about potential future products may not be incorporated into any contract. The development, release, and timing of any future features or functionality described for our products remains at our sole discretion.

Reference information

For more information, refer to the following announcements:

- Hardware Announcement [AG12-0166](#), dated October 03, 2012 , IBM System Storage DS8870 (Machine type 2421) high-performance flagship high-end disk, one-year warranty model addresses your business and financial needs
- Hardware Announcement [AG12-0190](#), dated October 03, 2012 , IBM System Storage DS8870 (Machine type 2422) high-performance flagship high-end disk, two-year warranty model addresses your business and financial needs
- Hardware Announcement [AG12-0188](#), dated October 03, 2012 , IBM System Storage DS8870 (Machine type 2423) high-performance flagship high-end disk, three-year warranty model addresses your business and financial needs
- Hardware Announcement [AG12-0189](#), dated October 03, 2012 , IBM System Storage DS8870 (Machine type 2424) high-performance flagship high-end disk, four-year warranty model addresses your business and financial needs
- Hardware Announcement [AG12-0169](#), dated October 03, 2012 , IBM System Storage DS8000 series high-performance flagship - Function Authorizations for machine type 239x

For IBM's statement on compliance with the 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 type	Model	Feature
DS8870	2421	961	
Low cost Entry Class indicator			0601
Licensed Function indicators:			
- Easy Tier Server indicator			0715
Model conversion kits:			
- Model conversion kit for RPC			1010
- Model conversion kit for EPLD			1011
- Model conversion kit for bracket			1012
- Model conversion for Earthquake kit			1013
Three phase line cords:			
- Three phase high voltage, 380-415V, 30A, 5-pin connector			1080
- Top exit three phase high voltage, 380-415V, 30A, 5-pin connector			1085
DS8000 Licensed Machine Code:			
- DS8000 LMC R7.1			1732
Disk drive sets:			
- 146 GB 15K drive set			2208
- 300 GB 15K SAS drive set			2308
- 600 GB 10K drive set			2708
- 900 GB 10K SAS drive set			2758
- 3 TB 7.2K SAS half drive set			2858
Standby CoD disk drive sets:			
- 146 GB 15K CoD drive set			2209
- 300 GB 15K SAS CoD drive set			2309
- 600 GB 10K CoD drive set			2709
- 900 GB 10K SAS CoD drive set			2759
- 3 TB 7.2K SAS CoD half drive set			2859

- Customer supplied drive set	2990
SSD half drive sets:	
- 400 GB SSD half drive set	6106
SSD disk drive sets:	
- 400 GB SSD drive set	6108
Function Authorization indicators:	
- Easy Tier Server indicator	7084

Description	Machine type	Model	Feature
DS8870	2421	96E	

Model conversion kits:	
- Model conversion kit for EPLD	1011
- Model conversion kit for bracket	1012
- Model conversion for Earthquake kit	1013

Three phase line cords:	
- Three phase high voltage, 380-415V, 30A, 5-pin connector	1080
- Top exit three phase high voltage, 380-415V, 30A, 5-pin connector	1085

DS8000 Licensed Machine Code:	
- DS8000 LMC R7.1 indicator	1832

Disk drive sets:	
- 146 GB 15K drive set	2208
- 300 GB 15K SAS drive set	2308
- 600 GB 10K drive set	2708
- 900 GB 10K SAS drive set	2758
- 3 TB 7.2K SAS half drive set	2858

Standby CoD disk drive sets:	
- 146 GB 15K CoD drive set	2209
- 300 GB 15K SAS CoD drive set	2309
- 600 GB 10K CoD drive set	2709
- 900 GB 10K SAS CoD drive set	2759
- 3 TB 7.2K SAS CoD half drive set	2859
 - Customer supplied drive set	2990

SSD half drive sets:	
- 400 GB SSD half drive set	6106

SSD disk drive sets:	
- 400 GB SSD drive set	6108

Description	Machine type	Model	Feature
DS8870	2422	961	

Low cost Entry Class indicator	0601
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Licensed Function indicators:	
- Easy Tier Server indicator	0715

Model conversion kits:	
- Model conversion kit for RPC	1010
- Model conversion kit for EPLD	1011
- Model conversion kit for bracket	1012
- Model conversion for Earthquake kit	1013

Three phase line cords:	
- Three phase high voltage, 380-415V, 30A, 5-pin connector	1080
- Top exit three phase high voltage, 380-415V, 30A, 5-pin connector	1085

DS8000 Licensed Machine Code:

- DS8000 LMC R7.1	1732
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Disk drive sets:

- 146 GB 15K drive set	2208
- 300 GB 15K SAS drive set	2308
- 600 GB 10K drive set	2708
- 900 GB 10K SAS drive set	2758
- 3 TB 7.2K SAS half drive set	2858

Standby CoD disk drive sets:

- 146 GB 15K CoD drive set	2209
- 300 GB 15K SAS CoD drive set	2309
- 600 GB 10K CoD drive set	2709
- 900 GB 10K SAS CoD drive set	2759
- 3 TB 7.2K SAS CoD half drive set	2859
- Customer supplied drive set	2990

SSD half drive sets:

- 400 GB SSD half drive set	6106
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SSD disk drive sets:

- 400 GB SSD drive set	6108
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Function Authorization indicators:

- Easy Tier Server indicator	7084
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Description	Machine type	Model	Feature
DS8870	2422	96E	

Model conversion kits:

- Model conversion kit for EPLD	1011
- Model conversion kit for bracket	1012
- Model conversion for Earthquake kit	1013

Three phase line cords:

- Three phase high voltage, 380-415V, 30A, 5-pin connector	1080
- Top exit three phase high voltage, 380-415V, 30A, 5-pin connector	1085

DS8000 Licensed Machine Code:

- DS8000 LMC R7.1 indicator	1832
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Disk drive sets:

- 146 GB 15K drive set	2208
- 300 GB 15K SAS drive set	2308
- 600 GB 10K drive set	2708
- 900 GB 10K SAS drive set	2758
- 3 TB 7.2K SAS half drive set	2858

Standby CoD disk drive sets:

- 146 GB 15K CoD drive set	2209
- 300 GB 15K SAS CoD drive set	2309
- 600 GB 10K CoD drive set	2709
- 900 GB 10K SAS CoD drive set	2759
- 3 TB 7.2K SAS CoD half drive set	2859

- Customer supplied drive set	2990
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SSD half drive sets:

- 400 GB SSD half drive set	6106
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SSD disk drive sets:

- 400 GB SSD drive set	6108
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Description	Machine type	Model	Feature
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DS8870	2423	961
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Low cost Entry Class indicator 0601

Licensed Function indicators:

- Easy Tier Server indicator 0715

Model conversion kits:

- Model conversion kit for RPC	1010
- Model conversion kit for EPLD	1011
- Model conversion kit for bracket	1012
- Model conversion for Earthquake kit	1013

Three phase line cords:

- Three phase high voltage, 380-415V, 30A, 5-pin connector	1080
- Top exit three phase high voltage, 380-415V, 30A, 5-pin connector	1085

DS8000 Licensed Machine Code:

- DS8000 LMC R7.1	1732
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Disk drive sets:

- 146 GB 15K drive set	2208
- 300 GB 15K SAS drive set	2308
- 600 GB 10K drive set	2708
- 900 GB 10K SAS drive set	2758
- 3 TB 7.2K SAS half drive set	2858

Standby CoD disk drive sets:

- 146 GB 15K CoD drive set	2209
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SSD half drive sets:

- 400 GB SSD half drive set	6106
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SSD disk drive sets:

- 400 GB SSD drive set	6108
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Function Authorization indicators:

- Easy Tier Server indicator	7084
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Description	Machine type	Model	Feature
DS8870	2423	96E	

Model conversion kits:

- Model conversion kit for EPLD	1011
- Model conversion kit for bracket	1012
- Model conversion for Earthquake kit	1013

Three phase line cords:

- Three phase high voltage, 380-415V, 30A, 5-pin connector	1080
- Top exit three phase high voltage, 380-415V, 30A, 5-pin connector	1085

DS8000 Licensed Machine Code:

- DS8000 LMC R7.1 indicator	1832
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Disk drive sets:

- 146 GB 15K drive set	2208
- 300 GB 15K SAS drive set	2308
- 600 GB 10K drive set	2708
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- 3 TB 7.2K SAS half drive set	2858

Standby CoD disk drive sets:

- 146 GB 15K CoD drive set	2209
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- 300 GB 15K SAS CoD drive set	2309
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- 900 GB 10K SAS CoD drive set	2759
- 3 TB 7.2K SAS CoD half drive set	2859
- Customer supplied drive set	2990
SSD half drive sets:	
- 400 GB SSD half drive set	6106
SSD disk drive sets:	
- 400 GB SSD drive set	6108

Description	Machine type	Model	Feature
DS8870	2424	961	
Low cost Entry Class indicator			0601
Licensed Function indicators:			
- Easy Tier Server indicator			0715
Model conversion kits:			
- Model conversion kit for RPC			1010
- Model conversion kit for EPLD			1011
- Model conversion kit for bracket			1012
- Model conversion for Earthquake kit			1013
Three phase line cords:			
- Three phase high voltage, 380-415V, 30A, 5-pin connector			1080
- Top exit three phase high voltage, 380-415V, 30A, 5-pin connector			1085
DS8000 Licensed Machine Code:			
- DS8000 LMC R7.1			1732
Disk drive sets:			
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- Customer supplied drive set			2990
SSD half drive sets:			
- 400 GB SSD half drive set			6106
SSD disk drive sets:			
- 400 GB SSD drive set			6108
Function Authorization indicators:			
- Easy Tier Server indicator			7084

Description	Machine type	Model	Feature
DS8870	2424	96E	
Model conversion kits:			
- Model conversion kit for EPLD			1011
- Model conversion kit for bracket			1012
- Model conversion for Earthquake kit			1013

Three phase line cords:				
- Three phase high voltage, 380-415V, 30A, 5-pin connector				1080
- Top exit three phase high voltage, 380-415V, 30A, 5-pin connector				1085
DS8000 Licensed Machine Code:				
- DS8000 LMC R7.1 indicator				1832
Disk drive sets:				
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SSD half drive sets:				
- 400 GB SSD half drive set				6106
SSD disk drive sets:				
- 400 GB SSD drive set				6108

Model conversions

From		To		
Type	Model	Type	Model	Description
2421	951	2421	961	DS8870 Model 961
2422	951	2422	961	DS8870 Model 961
2423	951	2423	961	DS8870 Model 961
2424	951	2424	961	DS8870 Model 961
2421	95E	2421	96E	DS8870 Model 96E
2422	95E	2422	96E	DS8870 Model 96E
2423	95E	2423	96E	DS8870 Model 96E
2424	95E	2424	96E	DS8870 Model 96E

Note: This is a reminder that model conversions are disruptive. Customers are responsible for backing up all data on the DS8800 and restoring it when the DS8870 is ready for production. The approximate duration for the conversion is three days.

Note: Prerequisites for model conversions can be found in the *IBM System Storage DS8870 Introduction and Planning Guide (GC27-4209)* .

Feature conversions

Feature conversions (machine types 2421, 2422, 2423, and 2424 for Model 961):

Model 9xE position indicators:

Feature	Returned		
From	To	Parts *	Description
0351	0361	No	951 - 95E position 1 to 961 - 96E position 1
0352	0362	No	951 - 95E position 2 to 961 - 96E position 2
0353	0363	No	951 - 95E position 3 to 961 - 96E position 3

Power:

Feature	Returned		
From	To	Parts *	Description

1050 1051 Yes Battery assembly

Single phase line cords:

Feature	Returned		
From	To	Parts *	
1060	1061	Yes	SPP cord, 200-240V, 60A, 3-pin connector
1067	1068	Yes	SPP cord, 200-240V, 63A, no connector
1070	1072	Yes	Top exit SPP, 200-240V, 60A, 3-pin connector
1071	1073	Yes	Top exit SPP, 200-240V, 63A, no connector

Three phase line cords:

Feature	Returned		
From	To	Parts *	
1090	1082	Yes	Three phase low voltage, 200-240V, 60A, 4-pin connector
1091	1081	Yes	Three phase high voltage, 380-415V, 32A, no connector
1092	1082	Yes	Three phase low voltage, 200-240V, 60A, 4-pin connector
1095	1084	Yes	Top exit three phase low voltage, 200-240V, 60A, 4-pin connector
1096	1083	Yes	Top exit three phase high voltage, 380-415V, 32A, no connector
1097	1084	Yes	Top exit three phase low voltage, 200-240V, 60A, 4-pin connector

Disk enclosures:

Feature	Returned		
From	To	Parts *	
1242	1244	No	HD STD enclosure indicator to 3.5" disk enclosure indicator
1242	1245	No	HD STD enclosure indicator to 400 GB SSD enclosure indicator

Disk cables:

Feature	Returned		
From	To	Parts *	
1250	1246	Yes	Business class cabling to Enterprise class cabling

DS8000 Licensed Machine Code:

Feature	Returned		
From	To	Parts *	
1721	1732	No	DS8000 LMC R7.1
1722	1732	No	DS8000 LMC R7.1
1723	1732	No	DS8000 LMC R7.1
1724	1732	No	DS8000 LMC R7.1

Encryption support:

Feature	Returned		
From	To	Parts *	
1751	1750	No	Encrypted drive set activation indicator

Disk drive sets:

Feature	Returned		
From	To	Parts *	
2208	2308	Yes	Disk drive set conversion
2208	2708	Yes	Disk drive set conversion
2208	2758	Yes	Disk drive set conversion
2208	2858	Yes	Disk drive set conversion

2308	2708	Yes	Disk drive set conversion
2308	2758	Yes	Disk drive set conversion
2308	2858	Yes	Disk drive set conversion
2708	2758	Yes	Disk drive set conversion
2708	2858	Yes	Disk drive set conversion
2758	2858	Yes	Disk drive set conversion

SAS to SSD drive sets:

Feature From	Returned To	Returned Parts *	Description
2208	6106	Yes	SAS to SSD drive conversion
2208	6108	Yes	SAS to SSD drive conversion
2308	6106	Yes	SAS to SSD drive conversion
2308	6108	Yes	SAS to SSD drive conversion
2708	6106	Yes	SAS to SSD drive conversion
2708	6108	Yes	SAS to SSD drive conversion
2758	6106	Yes	SAS to SSD drive conversion
2758	6108	Yes	SAS to SSD drive conversion

Standby CoD disk drive sets:

Feature From	Returned To	Returned Parts *	Description
2209	2208	No	CoD disk drive conversion
2309	2308	No	CoD disk drive conversion
2709	2708	No	CoD disk drive conversion
2759	2758	No	CoD disk drive conversion
2859	2858	No	CoD half drive conversion

Processor memory:

Feature From	Returned To	Returned Parts *	Description
4211	4313	Yes	64 GB Processor memory (4-core only)
4211	4314	Yes	128 GB Processor memory (8-core only)
4211	4315	Yes	256 GB Processor memory (8-core only)
4211	4316	Yes	512 GB Processor memory (16-core only)
4211	4317	Yes	1 TB Processor memory (16-core only)
4212	4313	Yes	64 GB Processor memory (4-core only)
4212	4314	Yes	128 GB Processor memory (8-core only)
4212	4315	Yes	256 GB Processor memory (8-core only)
4212	4316	Yes	512 GB Processor memory (16-core only)
4212	4317	Yes	1 TB Processor memory (16-core only)
4213	4313	Yes	64 GB Processor memory (4-core only)
4213	4314	Yes	128 GB Processor memory (8-core only)
4213	4315	Yes	256 GB Processor memory (8-core only)
4213	4316	Yes	512 GB Processor memory (16-core only)
4213	4317	Yes	1 TB Processor memory (16-core only)
4214	4314	Yes	128 GB Processor memory (8-core only)
4214	4315	Yes	256 GB Processor memory (8-core only)
4214	4316	Yes	512 GB Processor memory (16-core only)
4214	4317	Yes	1 TB Processor memory (16-core only)
4222	4315	Yes	256 GB Processor memory (8-core only)
4222	4316	Yes	512 GB Processor memory (16-core only)
4222	4317	Yes	1 TB Processor memory (16-core only)
4223	4315	Yes	256 GB Processor memory (8-core only)
4223	4316	Yes	512 GB Processor memory (16-core only)
4223	4317	Yes	1 TB Processor memory (16-core only)
4224	4315	Yes	256 GB Processor memory (8-core only)

4224	4316	Yes	512 GB Processor memory (16-core only)
4224	4317	Yes	1 TB Processor memory (16-core only)
4225	4315	Yes	256 GB Processor memory (8-core only)
4225	4316	Yes	512 GB Processor memory (16-core only)
4225	4317	Yes	1 TB Processor memory (16-core only)
4226	4316	Yes	512 GB Processor memory (16-core only)
4226	4317	Yes	1 TB Processor memory (16-core only)

Processor Cards:

Feature	Returned		
From	To	Parts *	Description
4301	4402	Yes	4-core Processor indicator
4301	4403	Yes	8-core Processor indicator
4301	4404	Yes	16-core Processor indicator
4302	4403	Yes	8-core Processor indicator
4302	4404	Yes	16-core Processor indicator

Encryption disk drive sets:

Feature	Returned		
From	To	Parts *	Description
5108	5858	Yes	Encryption disk drive set conversion
5308	5858	Yes	Encryption disk drive set conversion
5708	5858	Yes	Encryption disk drive set conversion
5758	5858	Yes	Encryption disk drive set conversion

SSD drive sets:

Feature	Returned		
From	To	Parts *	Description
6106	6108	No	SSD drive conversion

Feature conversions (machine types 2421, 2422, 2423, and 2424 for Model 96E):

Model 9xE position indicators:

Feature	Returned		
From	To	Parts *	Description
0351	0361	No	951 - 95E position 1 to 961 - 96E position 1
0352	0362	No	951 - 95E position 2 to 961 - 96E position 2
0353	0363	No	951 - 95E position 3 to 961 - 96E position 3

Power:

Feature	Returned		
From	To	Parts *	Description
1050	1051	Yes	Battery assembly

Single phase line cords:

Feature	Returned		
From	To	Parts *	Description
1060	1061	Yes	SPP cord, 200-240V, 60A, 3-pin connector
1067	1068	Yes	SPP cord, 200-240V, 63A, no connector
1070	1072	Yes	Top exit SPP, 200-240V, 60A, 3-pin connector
1071	1073	Yes	Top exit SPP, 200-240V, 63A, no connector

Three phase line cords:

Feature	Returned		
From	To	Parts *	Description
1090	1082	Yes	Three phase low voltage, 200-240V, 60A, 4-pin

			connector
1091	1081	Yes	Three phase high voltage, 380-415V, 32A, no connector
1092	1082	Yes	Three phase low voltage, 200-240V, 60A, 4-pin connector
1095	1084	Yes	Top exit three phase low voltage, 200-240V, 60A, 4-pin connector
1096	1083	Yes	Top exit three phase high voltage, 380-415V, 32A, no connector
1097	1084	Yes	Top exit three phase low voltage, 200-240V, 60A, 4-pin connector

Disk enclosures:

Feature	Returned		
From	To	Parts *	Description
1242	1244	No	HD STD enclosure indicator to 3.5" disk enclosure indicator
1242	1245	No	HD STD enclosure indicator to 400 GB SSD enclosure indicator

DS8000 Licensed Machine Code:

Feature	Returned		
From	To	Parts *	Description
1821	1832	No	DS8000 LMC R7.1 indicator
1822	1832	No	DS8000 LMC R7.1 indicator
1823	1832	No	DS8000 LMC R7.1 indicator
1824	1832	No	DS8000 LMC R7.1 indicator

Disk drive sets:

Feature	Returned		
From	To	Parts *	Description
2208	2308	Yes	Disk drive set conversion
2208	2708	Yes	Disk drive set conversion
2208	2758	Yes	Disk drive set conversion
2208	2858	Yes	Disk drive set conversion
2308	2708	Yes	Disk drive set conversion
2308	2758	Yes	Disk drive set conversion
2308	2858	Yes	Disk drive set conversion
2708	2758	Yes	Disk drive set conversion
2708	2858	Yes	Disk drive set conversion
2758	2858	Yes	Disk drive set conversion

SAS to SSD drive sets:

Feature	Returned		
From	To	Parts *	Description
2208	6106	Yes	SAS to SSD drive conversion
2208	6108	Yes	SAS to SSD drive conversion
2308	6106	Yes	SAS to SSD drive conversion
2308	6108	Yes	SAS to SSD drive conversion
2708	6106	Yes	SAS to SSD drive conversion
2708	6108	Yes	SAS to SSD drive conversion
2758	6106	Yes	SAS to SSD drive conversion
2758	6108	Yes	SAS to SSD drive conversion

Standby CoD disk drive sets:

Feature	Returned		
From	To	Parts *	Description
2209	2208	No	CoD disk drive conversion
2309	2308	No	CoD disk drive conversion

2709	2708	No	CoD disk drive conversion
2759	2758	No	CoD disk drive conversion
2859	2858	No	CoD half drive conversion

Encryption disk drive sets:

Feature	Returned		
From	To	Parts *	Description
5108	5858	Yes	Encryption disk drive set conversion
5308	5858	Yes	Encryption disk drive set conversion
5708	5858	Yes	Encryption disk drive set conversion
5758	5858	Yes	Encryption disk drive set conversion

SSD drive sets:

Feature	Returned		
From	To	Parts *	Description
6106	6108	No	SSD 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 June 4, 2013.

Title	Order number
IBM System Storage DS8870 Introduction and Planning Guide	GC27-4209

The following publications are shipped with the DS8000 series:

Title	Order number
IBM System Storage DS8000 Series Documentation CDROM	98Y5086
IBM System Storage DS8000 Series License Documentation CDROM	98Y5096

The publications CD contains the following documents:

Title	Order number
IBM System Storage DS8870 Introduction and Planning Guide	GC27-4209
IBM System Storage DS8000 Host Systems Attachment Guide	GC27-4210
IBM System Storage DS® Command-Line Interface User's Guide	GC53-4212
IBM System Storage DS Open Application Programming Interface Reference	GC35-0516
IBM System Storage Notice Regarding Storage Encryption	45W6389
READ ME FIRST for IBM System Storage Products	GA32-1061
IBM System Storage Multipath Subsystem Device Driver User's Guide	GC52-1309

The following documents are on the publications CD:

- IBM Warranty Information, GC26-7919
- IBM System Storage DS8000 series Non-IBM Licenses and Notices-Rel 5.x-6.0, 6.1, 6.2, 6.3, 7.0
- IBM System Storage DS8000 Licensed Machine Code Agreement, SC28-6872-02 (P/N 88Y7960)

The license CD contains the following documentation:

- IBM System Storage DS Storage Manager Version 7 Release 0 and IBM CIM Agent for DS Open Application Programming Interface 5.7.0, GC27-3907
- IBM International License Agreement for Non-Warranted Programs (ILAN), P/N 98Y2827
- Global Mirroring Utilities for ICKDSF Users and Open Systems Environments License Information, GC26-7644

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.

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For details on education offerings related to specific products, visit

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

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

Technical information

EMC conformance

- Taiwan BSMI CNS13438 (Taiwan EMC Standard)
- ACA C-Tick (Australia and New Zealand)

Specified operating environment

No

Hardware requirements

Licensed Machine Code

All features and functions in this announcement are supported on the IBM System Storage DS8870 and require DS8000 Licensed Machine Code as follows:

- IBM System Storage DS8870 - level 7.7.10.xx.xx (bundle version 87.10.xxx.xx), or later.

Some DS8000 series features and functions may not be available or supported in all environments. Current information on supported environments, prerequisites, and minimum operating system levels is available at

<http://www-03.ibm.com/systems/support/storage/config/ssic>

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 DS8870 Introduction and Planning Guide* (GC27-4209).

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 DS8870 Introduction and Planning Guide* (GC27-4209).

Logical configuration planning and application

Logical configuration planning is a customer responsibility. Logical configuration refers to the creation of RAID ranks, volumes, and 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 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 website. Not all Licensed Machine Code changes may be available via the support website. 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 DS8870 Introduction and Planning Guide* (GC27-4209) 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 DS8870 Introduction and Planning Guide* (GC27-4209).

DS8870 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 number 1130).
- It is the customer's responsibility to replicate any key labels and their associated key material 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, or later) is recommended to support displaying both key labels in the GUI. Additionally, for customers who intend to replicate keys between separate z Series 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, or later) is required.

Tivoli Key Lifecycle Manager planning

The DS8000 series supports IBM Tivoli Key Lifecycle Manager V2.0 and IBM Security Key Lifecycle Manager V1.1.

Program number	VRM	Program name
5724-T60	2.0.0	IBM Tivoli Key Lifecycle Manager
5608-A99	2.0.0	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 Security Key Lifecycle Manager for z/OS
5698-B42	1.1.0	IBM Security Key Lifecycle Manager for Storage

To support enterprise-wide encryption key management, a new set of pricing metrics is now available. These pricing metrics are simpler and more comprehensive for devices, users, and server capacity.

For self-encrypting disk drives, the metric is per client device with the disk drive feature number.

For more information on the licensing requirements and pricing of the metric, refer to Software Announcement [AP11-0292](#), dated August 30, 2011 .

Isolated key server ordering options:

- **TKLM isolated key server - feature number 1760**

Isolated key servers ordered with feature number 1760 will have a Linux operating system and TKLM software preinstalled.

Customer acquired isolated key server

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 stand-alone server hardware.

Note: The licensing for TKLM includes both an install license for the TKLM management software as well as licensing for the encrypting drives.

Refer to the following publications:

- *IBM Tivoli Key Lifecycle Manager Quick Start Guide (GI11-8738)*
- *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 email to

storsvcs@us.ibm.com

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

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 website 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

No cables required.

Security, auditability, and control

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

Electronic Service Agent™ and the IBM Electronic Support web portal are dedicated to providing fast, exceptional support to IBM Systems customers. The IBM Electronic Service Agent tool is a no-additional-charge tool that proactively monitors and reports hardware events, such as system errors, performance issues, and inventory. The Electronic Service Agent tool can help you stay focused on your company's strategic business initiatives, save time, and spend less effort managing day-to-day IT maintenance issues. Servers enabled with this tool can be monitored remotely around the clock by IBM Support all at no additional cost to you.

Now integrated into the base operating system of AIX 5.3, AIX 6.1, and AIX 7.1, Electronic Service Agent is designed to automatically and electronically report system failures and utilization issues to IBM , which can result in faster problem resolution and increased availability. System configuration and inventory information collected by the Electronic Service Agent tool also can be viewed on the secure Electronic Support web portal, and used to improve problem determination and resolution by you and the IBM support team. To access the tool main menu, simply type "smitty esa_main", and select "Configure Electronic Service Agent ." In addition, ESA now includes a powerful web user interface, giving the administrator easy access to status, tool settings, problem information, and filters. For more information and documentation on how to configure and use Electronic Service Agent , refer to

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

The IBM Electronic Support portal is a single Internet entry point that replaces the multiple entry points traditionally used to access IBM Internet services and support. This portal enables you to gain easier access to IBM resources for assistance in resolving technical problems. The My Systems and Premium Search functions make it even easier for Electronic Service Agent tool-e bled customers to track system inventory and find pertinent fixes.

Benefits

Increased uptime: The Electronic Service Agent tool is designed to enhance the Warranty or Maintenance Agreement by providing faster hardware error reporting and uploading system information to IBM Support. This can translate to less wasted time monitoring the "symptoms," diagnosing the error, and manually calling IBM

Support to open a problem record. Its 24 x 7 monitoring and reporting mean no more dependence on human intervention or off-hours customer personnel when errors are encountered in the middle of the night.

Security: The Electronic Service Agent tool is designed to be secure in monitoring, reporting, and storing the data at IBM. The Electronic Service Agent tool securely transmits either via the Internet (HTTPS or VPN) or modem, and can be configured to communicate securely through gateways to provide customers a single point of exit from their site. Communication is one way. Activating Electronic Service Agent does not enable IBM to call into a customer's system. System inventory information is stored in a secure database, which is protected behind IBM firewalls. It is viewable only by the customer and IBM. The customer's business applications or business data is never transmitted to IBM.

More accurate reporting: Since system information and error logs are automatically uploaded to the IBM Support center in conjunction with the service request, customers are not required to find and send system information, decreasing the risk of misreported or misdiagnosed errors. Once inside IBM, problem error data is run through a data knowledge management system and knowledge articles are appended to the problem record.

Customized support: Using the IBM ID entered during activation, customers can view system and support information in the "My Systems" and "Premium Search" sections of the Electronic Support website at

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

My Systems provides valuable reports of installed hardware and software using information collected from the systems by Electronic Service Agent. Reports are available for any system associated with the customer's IBM ID. Premium Search combines the function of search and the value of Electronic Service Agent information, providing advanced search of the technical support knowledge base. Using Premium Search and the Electronic Service Agent information that has been collected from your system, customers are able to see search results that apply specifically to their systems.

For more information on how to utilize the power of IBM Electronic Services, contact your IBM Systems Services Representative, or visit

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

Terms and conditions

MES Discount Applicable

No

Field Installable Feature

Yes

Warranty period

Machine type 2421: One year

Machine type 2422: Two years

Machine type 2423: Three years

Machine type 2424: Four years

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.

Customer setup

No

Licensed Internal Code

Same license terms and conditions as designated machine.

Prices

For all local charges, contact your IBM representative.

AP distribution

Country/region	Announce
AP IOT	
ASEAN*	Yes
India/South Asia**	Yes
Australia	Yes
People's Republic of China	Yes
Hong Kong S.A.R of the PRC	Yes
Macao S.A.R of the PRC	Yes
Taiwan	Yes
Korea	Yes
New Zealand	Yes
Japan IOT	
Japan	Yes

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Corrections

(Corrected on July 10, 2013)

The Low Cost Entry Class Configuration table in the Description section has been updated.