



IBM DS8870 next-generation flash systems deliver high availability and better performance for critical environments

Table of contents

1 Overview	7 Product number
2 Key prerequisites	11 Publications
2 Planned availability date	13 Technical information
3 Description	18 Terms and conditions
6 Statement of general direction	18 Prices

At a glance

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

- Flash optimization II
- Enhanced Easy Tier® capabilities
- 200 GB and 800 GB 2.5-inch FDE SSD drives
- Concurrent code load enhancement
- Warmstart enhancement
- MT-PPRC with limited availability
- OpenStack support

Overview

IBM DS8870 systems (machine types 2421, 2422, 2423, and 2424) are designed to offer better performance with next-generation flash storage and concurrent code load and warmstart enhancements.

Flash optimization II

This high-performance flash enclosure delivers up to 250,000 IOPS and up to 3.4 GB/s bandwidth in just one EIA (1U) of rack space. It will also help to increase IOPS by up to 4 times as compared to SSDs and up to 30 times as compared to spinning drives.

Support has been added for the IBM DS8870 systems, fulfilling the Statement of Direction in Hardware Announcement [112-106](#), dated June 04, 2012.

Enhanced Easy Tier capabilities

There are five types of drives managed in up to three different tiers (flash cards and SSDs as tier 0, SAS 15K and 10K rpm drives as tier 1, and nearline drives as tier 2) by IBM Easy Tier within a managed pool.

Flash cards and SSD drives are treated as the same tier. IBM Easy Tier monitors disk activity in real-time, and migrates data across tiers and within a tier to optimize performance automatically. Flash cards and SSD drives are treated as the same tier and IBM Easy Tier intra-tier auto-rebalance will utilize the higher IOPS capability of flash cards.

In addition, Easy Tier Server will manage the data placement across Flash Adapter 90 within Power® 740+ and DS8870 storage tiers by placing a copy of the hottest data on the IBM Flash Adapter 90. For additional information refer to Hardware Announcement [113-171](#), dated October 07, 2013.

Scalable capacity

DS8870 now offers 200 GB 2.5-inch SSD options for customers who require granularity and improved performance on the storage system and do not need a larger capacity of SSD.

It also now offers up to 800 GB 2.5-inch SSD to provide additional capacity, useful for transaction processing workloads and data warehousing application.

Concurrent code load enhancement

This enhancement will help to improve the average concurrent code load activation time by up to 50%. With this improvement, there will be no need to sacrifice standby manpower for off-hours and weekend shifts to support DS8870 code load strategy.

Warmstart enhancement

This enhancement will help DS8870 reduce the number of warmstarts and eliminate the need to perform a warmstart after certain events to prevent any impact to the attached host.

Multiple Target Peer to Peer Remote Copy (MT-PPRC)

DS8870 now supports MT-PPRC, but only on 7.2.7 microcode. MT-PPRC is supported for the following relationships:

- Two Metro Mirror
- One Metro Mirror and one Global Copy
- Two Global Copy

MT-PPRC can be requested through SCORE.

OpenStack support

DS8870 offers full support for OpenStack releases *Havana* and *Icehouse*. Support is provided through the OpenStack Cinder driver currently available for download.

Key prerequisites

MT-PPRC is supported on the IBM System Storage® DS8000® series and requires DS8000 Licensed Machine Code (LMC) 7.7.27.xx.xx (bundle version 87.27.xxx.xx).

All the remaining announced features and functions are supported on the IBM System Storage DS8000 series and require DS8000 LMC 7.7.30.xx.xx (bundle version 87.20.xxx.xx), or later.

Planned availability date

- June 6, 2014: General availability
- September 5, 2014: Field (MES) availability for 200 GB and 800 GB FDE SSD drives (feature numbers #6058 and #6258) and high-performance flash enclosure placement indicators (feature numbers #0415, #0416, #0417, and #0418)

Refer to the [Description](#) section for further information.

Description

IBM delivers the next generation of flash for the DS8870. This release offers performance improvements of up to four times with flash implementation, more drive options, and enhanced concurrent code load function.

Flash optimization II

SSD or flash technology has improved the storage system performance by providing much higher IOPS compared to spinning disk drives (HDDs) and can help to reduce I/O-bound batch window times and improve interactive or query response times.

The integration of a new high-performance flash enclosure (feature number 1500) provides a new and even higher standard of flash performance with the DS8870. The high-performance flash enclosure is directly attached to the PCIe fabric, enabling increased bandwidth and transaction processing capability. The 1U enclosure contains a pair of powerful redundant RAID controllers and up to 30 SAS flash cards. The RAID controller is specifically designed to help unleash the performance capabilities of flash-based storage. The RAID controller design combines the technical expertise of IBM research and development resources with the common building blocks from the recently acquired leader in flash integration, Texas Memory Systems®. The flash enclosure (feature number 1500) in the DS8870 provides up to four times the performance of current SSDs.

The 400 GB flash cards (feature numbers 1506 and 1508) used in the high-performance flash enclosure are packaged as 1.8-inch SAS encryption capable drives, which can be added to or removed concurrently while the enclosure is in use. The flash card can only be configured for RAID 5 arrays in this release.

Each of the two integrated SAS controllers in the high-performance flash enclosure require a connection to a GX++ PCIe2 x4 adapter located in the DS8870 GX++ slot. The DS8870 uses a dual-port GX++ PCIe2 adapter (feature number 3054), and thus one GX++ PCIe2 adapter can support one high-performance flash enclosure.

Each high-performance flash enclosure supports a pair of RAID controllers in an active/active configuration. The pair of controllers are fully redundant and offer complete, nondisruptive maintenance. The DS8870 offers two types of configurations:

1. A 4U space with up to 48 TB of raw capacity, in addition to the existing standard configuration options
2. An all-flash, single rack system configured with only flash and up to 96 TB of capacity (73.6 TB of usable capacity) in a 8U of space

The all-flash DS8870 system configuration also provides twice as many I/O enclosures and up to twice as many host adapters as the standard DS8870 single frame configuration.

Refer to the following table for more details on supported flash and adapter counts with the available configuration options:

Per frame maximum configuration table:

Model number	Processor	Physical capacity	Flash cards	Processor memory	Host adapters	Flash enclosures
All-flash configuration:						
961	8-core	96 TB	240	256 GB	16	8
961	16-core	96 TB	240	1 TB	16	8
Enterprise/Business class configuration:						
961	2-core	24 TB	60	32 GB	4	2
961	4-core	48 TB	120	64 GB	8	4
961	8-core	48 TB	120	256 GB	16	4
961	16-core	48 TB	120	1 TB	16	4

Enhanced IBM Easy Tier capabilities

This new microcode release includes the sixth generation of IBM Easy Tier, adding IBM Easy Tier support for the new flash cards. All previously released IBM Easy Tier functions apply to the new flash cards, including manual volume migration, automated sub-volume data relocation to help optimize price and performance, automated performance rebalancing within drive tiers (in both single tier and multi-tier drive pools), hotspot management, rank depopulation, and Easy Tier Application interfaces.

Beginning with this release, IBM Easy Tier will copy frequently accessed data from the DS8870 storage tier to an IBM Flash Adapter 90 attached to a POWER® 740+ server, in addition to the EXP24/EXP30 Ultra SSD that DS8870 already supports. This enhancement is provided on the Easy Tier Server.

200 GB and 800 GB 2.5-inch FDE SSD drives

IBM DS8870 now offers 200 GB and 800 GB 2.5-inch SSD disk drive sets which support the sixteen drive install group of SSD disk drive sets. DS8870 200 GB and 800 GB 2.5-inch disk drive sets provide additional price, performance, and capacity flexibility to help address specific application and business requirements. 800 GB 2.5-inch SSD disk drives provide more raw capacity than the previously supported 400 GB 2.5-inch drives, increasing the total capacity of high-performance drives supported in a DS8870 system.

Feature conversions are available for 200 GB and 400 GB 2.5-inch SSD drive sets to exchange existing disk drive sets when purchasing new sets with higher capacity. 200 GB and 800 2.5-inch GB SSD disk drive sets are optional to the DS8870 and are available with feature numbers 6058 and 6258, respectively.

Support for 200 GB and 800 GB 2.5-inch SSD drive is an included feature of DS8870 models 961 and 96E.

Concurrent code load enhancement

Concurrent code load has made significant average time reductions of up to 50%, including the amount of time when the system is in *single cluster mode*, where one processor is taken offline during code update.

In addition to this advantage, the code is able to reduce the risk exposure because of a code update interruption. It is able to automatically recover from these situations and complete the code update without suspending the next level of support.

Warmstart enhancement

Warmstart is a built-in architecture design on the DS8000 storage with the purpose of optimizing data integrity and data protection during hardware or microcode component error recovery. Due to the requirement for faster response time, there are many improvements to help reduce and even help eliminate warmstarts in certain events. The following events are the ones supported in this release:

- **Lightweight on-demand dump (ODD):** The ability to capture data for analysis with no impact to host applications.
- **No warmstart for power events:** Any failure related to batteries, uninterruptible power supplies, and power components will not require warmstart. Data capture for analysis will be using ODD.

OpenStack support

OpenStack is a rapidly growing, open cloud infrastructure platform that allows companies to build massively scale-able clouds either for private, hybrid, and public use or to become Infrastructure as a Service (IaaS) providers.

OpenStack Cinder support enables:

- The cloud administrator to add compute and storage resources to the OpenStack infrastructure.
- Creation of a new VM, and determination of appropriate storage capacity and capabilities required for the new VM.
- Tier 1 distributed storage with consistent response time, high performance, reliability, and resiliency for a choice in DS8870 extent pool Tier 1 data placement.
- Automatic provisioning, mapping, and configuration of new storage volumes on the DS8870 that are then attached to the newly created VM.

All new functions in this release require Licensed Machine Code level 7.7.30.xx.xx, or later (feature numbers 1734 and 1834).

- **Plant availability:** June 6, 2014

- Flash optimization II
 - High-performance all-flash single frame indicator (#0169)
 - High-performance flash enclosure placement indicators (#0411-#0418)
 - High-performance flash enclosure (#1500)
 - 400 GB 1.8-inch flash card set A (#1506)
 - 400 GB 1.8-inch flash card set B (#1508)
 - Flash enclosure filler set (#1599)
 - High-performance flash adapter pair (#3054)
- Enhanced IBM Easy Tier capabilities
- 200 GB and 800 GB FDE 2.5-inch SSD drives
 - 200 GB SSD FDE drive set (#6058)
 - 800 GB SSD FDE drive set (#6258)
- Concurrent code load enhancement
- Warmstart enhancement
- OpenStack

- **Field availability:** June 6, 2014

- Flash optimization II
 - High-performance all-flash single frame indicator (#0169)
 - High-performance flash enclosure placement indicators (#0411-#0418)
 - High-performance flash enclosure (#1500)
 - 400 GB 1.8-inch flash card set A (#1506)
 - 400 GB 1.8-inch flash card set B (#1508)
 - Flash enclosure filler set (#1599)
 - High-performance flash adapter pair (#3054)
- Enhanced IBM Easy Tier capabilities
- Concurrent code load enhancement
- Warmstart enhancement
- OpenStack

- **Field availability:** September 5, 2014

- 200 GB and 800 GB FDE 2.5-inch SSD drives
 - 200 GB SSD FDE drive set (#6058)
 - 800 GB SSD FDE drive set (#6258)
- High-performance flash enclosure placement indicators (feature numbers #0415, #0416, #0417, and #0418)
- 400 GB 1.8-inch flash card set B (#1508) if 400 GB 1.8-inch flash card set A (#1506) is selected during initial order or MES upgrade.

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

Section 508 of the US Rehabilitation Act

The IBM DS8870 and IBM DS8870 Expansion Unit are capable, as of October 19, 2012, when used in accordance with associated IBM 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

The current plan and direction of IBM is to release Multiple Target Peer to Peer Remote Copy (MT-PPRC) to support Metro Mirror, Global Mirror, and Global Copy relationships running on IBM DS8870.

IBM intends this release to be available in the fourth quarter of 2014.

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 [112-154](#), 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 [112-173](#), 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 [112-171](#), 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 [112-172](#), 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 [112-156](#), dated October 03, 2012, IBM System Storage DS8000 series high-performance flagship - Function Authorizations for machine type 239x

For the IBM 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	
Custom features:			
- High-performance all-flash single frame indicator			0169
High-performance flash enclosure placement indicators:			
- Enclosure position 1			0411
- Enclosure position 2			0412
- Enclosure position 3			0413
- Enclosure position 4			0414
- Enclosure position 5			0415
- Enclosure position 6			0416
- Enclosure position 7			0417
- Enclosure position 8			0418
- Enclosure position 1 Full			0511
- Enclosure position 2 Full			0512
- Enclosure position 3 Full			0513
- Enclosure position 4 Full			0514
- Enclosure position 5 Full			0515
- Enclosure position 6 Full			0516
- Enclosure position 7 Full			0517
- Enclosure position 8 Full			0518
Disk drive enclosures:			
- HD 200 GB SSD enclosure indicator			1255
- HD 800 GB SSD enclosure indicator			1256
High-performance flash card sets:			
- High-performance flash enclosure			1500
- 400 GB 1.8" flash card set A			1506
- 400 GB 1.8" flash card set B			1508
- Flash enclosure filler set			1599
DS8000 Licensed Machine Code:			
- DS8000 LMC R7.3			1734
Device adapters:			
- High-performance flash adapter pair			3054
Encryption SSD drive sets:			
- 200 GB SSD FDE drive set			6058
- 800 GB SSD FDE drive set			6258

Description	Machine type	Model	Feature
DS8870	2421	96E	
Disk drive enclosures:			
- HD 200 GB SSD enclosure indicator			1255
- HD 800 GB SSD enclosure indicator			1256
DS8000 Licensed Machine Code:			
- DS8000 LMC R7.3 indicator			1834
Encryption SSD drive sets:			
- 200 GB SSD FDE drive set			6058
- 800 GB SSD FDE drive set			6258

Description	Machine type	Model	Feature
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Custom features:
 - High-performance all-flash single frame indicator 0169

High-performance flash enclosure placement indicators:
 - Enclosure position 1 0411
 - Enclosure position 2 0412
 - Enclosure position 3 0413
 - Enclosure position 4 0414
 - Enclosure position 5 0415
 - Enclosure position 6 0416
 - Enclosure position 7 0417
 - Enclosure position 8 0418
 - Enclosure position 1 Full 0511
 - Enclosure position 2 Full 0512
 - Enclosure position 3 Full 0513
 - Enclosure position 4 Full 0514
 - Enclosure position 5 Full 0515
 - Enclosure position 6 Full 0516
 - Enclosure position 7 Full 0517
 - Enclosure position 8 Full 0518

Disk drive enclosures:
 - HD 200 GB SSD enclosure indicator 1255
 - HD 800 GB SSD enclosure indicator 1256

High-performance flash card sets:
 - High-performance flash enclosure 1500
 - 400 GB 1.8" flash card set A 1506
 - 400 GB 1.8" flash card set B 1508
 - Flash enclosure filler set 1599

DS8000 Licensed Machine Code:
 - DS8000 LMC R7.3 1734

Device adapters:
 - High-performance flash adapter pair 3054

Encryption SSD drive sets:
 - 200 GB SSD FDE drive set 6058
 - 800 GB SSD FDE drive set 6258

Description	Machine type	Model	Feature
DS8870	2422	96E	

Disk drive enclosures:
 - HD 200 GB SSD enclosure indicator 1255
 - HD 800 GB SSD enclosure indicator 1256

DS8000 Licensed Machine Code:
 - DS8000 LMC R7.3 indicator 1834

Encryption SSD drive sets:
 - 200 GB SSD FDE drive set 6058
 - 800 GB SSD FDE drive set 6258

Description	Machine type	Model	Feature
DS8870	2423	961	

Custom features:
 - High-performance all-flash single frame indicator 0169

High-performance flash enclosure placement indicators:

- Enclosure position 1	0411
- Enclosure position 2	0412
- Enclosure position 3	0413
- Enclosure position 4	0414
- Enclosure position 5	0415
- Enclosure position 6	0416
- Enclosure position 7	0417
- Enclosure position 8	0418
- Enclosure position 1 Full	0511
- Enclosure position 2 Full	0512
- Enclosure position 3 Full	0513
- Enclosure position 4 Full	0514
- Enclosure position 5 Full	0515
- Enclosure position 6 Full	0516
- Enclosure position 7 Full	0517
- Enclosure position 8 Full	0518

Disk drive enclosures:

- HD 200 GB SSD enclosure indicator	1255
- HD 800 GB SSD enclosure indicator	1256

High-performance flash card sets:

- High-performance flash enclosure	1500
- 400 GB 1.8" flash card set A	1506
- 400 GB 1.8" flash card set B	1508
- Flash enclosure filler set	1599

DS8000 Licensed Machine Code:

- DS8000 LMC R7.3	1734
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Device adapters:

- High-performance flash adapter pair	3054
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Encryption SSD drive sets:

- 200 GB SSD FDE drive set	6058
- 800 GB SSD FDE drive set	6258

Description	Machine type	Model	Feature
DS8870	2423	96E	

Disk drive enclosures:

- HD 200 GB SSD enclosure indicator	1255
- HD 800 GB SSD enclosure indicator	1256

DS8000 Licensed Machine Code:

- DS8000 LMC R7.3 indicator	1834
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Encryption SSD drive sets:

- 200 GB SSD FDE drive set	6058
- 800 GB SSD FDE drive set	6258

Description	Machine type	Model	Feature
DS8870	2424	961	

Custom features:

- High-performance all-flash single frame indicator	0169
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High-performance flash enclosure placement indicators:

- Enclosure position 1	0411
- Enclosure position 2	0412
- Enclosure position 3	0413
- Enclosure position 4	0414
- Enclosure position 5	0415
- Enclosure position 6	0416
- Enclosure position 7	0417
- Enclosure position 8	0418

- Enclosure position 1 Full	0511
- Enclosure position 2 Full	0512
- Enclosure position 3 Full	0513
- Enclosure position 4 Full	0514
- Enclosure position 5 Full	0515
- Enclosure position 6 Full	0516
- Enclosure position 7 Full	0517
- Enclosure position 8 Full	0518

Disk drive enclosures:

- HD 200 GB SSD enclosure indicator	1255
- HD 800 GB SSD enclosure indicator	1256

High-performance flash card sets:

- High-performance flash enclosure	1500
- 400 GB 1.8" flash card set A	1506
- 400 GB 1.8" flash card set B	1508
- Flash enclosure filler set	1599

DS8000 Licensed Machine Code:

- DS8000 LMC R7.3	1734
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Device adapters:

- High-performance flash adapter pair	3054
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Encryption SSD drive sets:

- 200 GB SSD FDE drive set	6058
- 800 GB SSD FDE drive set	6258

Description	Machine type	Model	Feature
DS8870	2424	96E	

Disk drive enclosures:

- HD 200 GB SSD enclosure indicator	1255
- HD 800 GB SSD enclosure indicator	1256

DS8000 Licensed Machine Code:

- DS8000 LMC R7.3 indicator	1834
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Encryption SSD drive sets:

- 200 GB SSD FDE drive set	6058
- 800 GB SSD FDE drive set	6258

Feature conversions

Feature conversions (machine types 2421, 2422, 2423, and 2424 for Model 961 and 96E):

Disk enclosures:

Feature From	Feature To	Returned Parts *	Description
1255	1245	No	HD 200 GB SSD enclosure indicator to 400 GB SSD enclosure indicator
1255	1256	No	HD 200 GB SSD enclosure indicator to 800 GB SSD enclosure indicator
1245	1256	No	HD 400 GB SSD enclosure indicator to 800 GB SSD enclosure indicator

Encryption SSD drive sets:

Feature From	Feature To	Returned Parts *	Description
6058	6158	Yes	Encryption SSD drive conversion
6058	6258	Yes	Encryption SSD drive conversion

6156 6258 Yes Encryption SSD drive conversion

6158 6258 Yes Encryption SSD drive conversion

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

Business Partner information

If you are a Direct Reseller - System Reseller acquiring products from IBM, you may link directly to Business Partner information for this announcement. A PartnerWorld® ID and password are required (use IBM ID).

<https://www.ibm.com/partnerworld/mem/sla.jsp?num=114-074>

Publications

The following publication has been updated to reflect this announcement and will be available by May 13, 2014.

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

The following publications are shipped with the DS8000 series:

Title	Order number
IBM DS8000 Series Publications CDROM	98Y6559
IBM DS8000 Series License Documentation CDROM	98Y6557

The publications CD contains the following documents:

Title	Order number
License Agreement for Machine Code	SC28-6872
IBM DS8870 Introduction and Planning Guide	GC27-4209
IBM DS8000 Host Systems Attachment Guide	GC27-4210
IBM DS Command-Line Interface User's for DS8000 series	GC53-4212
IBM System Storage Multipath Subsystem Device Driver User's Guide	GC52-1309
IBM DS Open Application Programming Interface Installation and Reference	GC27-4211
IBM DS8000 series Non-IBM_Licenses_and_Notices-Rel 5.x-6.0, 6.1, 6.2, 6.3, 7.0, 7.1, 7.2, 7.3	GA32-2204
IBM Warranty Information	GC26-7919
READ ME FIRST for IBM Products	GA32-1061
IBM System Storage Notice Regarding Storage Encryption	45W6389

The license CD contains the following documentation:

Title	Order number
IBM System Storage DS® Storage Mgr R7.3 & CIM Agent for DS Open Application Programming Interface 5.7.3	GC27-3907
IBM International License Agreement for Non-warranted Programs (ILAN)	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/>

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For details on available services, contact your IBM representative or visit

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

For details on available IBM Business Continuity and Recovery Services, contact your IBM representative or visit

<http://www.ibm.com/services/continuity>

For details on education offerings related to specific products, visit

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

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

Technical information

Specified operating environment

Homologation

This product is certified for connection to interfaces of public telecommunications networks in all countries **except** in the following:

- Haiti
- Honduras
- Moldavia
- Mozambique
- Oman

And the embargoed countries:

- Iraq
- Sudan
- North Korea
- Syria

Hardware requirements

Licensed Machine Code

MT-PPRC is supported on the IBM System Storage DS8000 series and requires DS8000 Licensed Machine Code (LMC) 7.7.27.xx.xx (bundle version 87.27.xxx.xx).

All features and functions in this announcement are supported on the IBM DS8870 and require DS8000 Licensed Machine Code - level 7.7.30.xx.xx (bundle version 87.30.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 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 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 will also apply or modify the logical configuration (fee-based service).

Licensed Machine Code planning and application

IBM may release changes to the DS8000 series Licensed Machine Code. IBM plans to make the most current 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 through 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 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
- Security Key Lifecycle Manager planning
- FDE 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 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 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 desiring NIST 800-131a compliance, IBM Security Key Lifecycle Manager (formerly named IBM Tivoli® Key Lifecycle Manager (TKLM)) V2.5, or higher is required.

For customers needing dual platform key server support on the DS8000 system, 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.

Security Key Lifecycle Manager planning

The DS8000 series supports IBM Security Key Lifecycle Manager V2.5 and IBM Security Key Lifecycle Manager V1.1.

Program number	VRM	Program name
5724-T60	2.5.0	IBM Security Key Lifecycle Manager
5608-A99	2.5.0	IBM Security Key Lifecycle Manager

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 [211-305](#), dated August 30, 2011,

Isolated key server ordering options:

- **SKLM isolated key server - feature number 1760:** Isolated key servers ordered with feature number 1760 will have a Linux™ operating system and SKLM software preinstalled.
- **Customer acquired isolated key server:** Refer to the *IBM Security Key Lifecycle Manager Installation and Configuration Guide (SC27-5335)* for hardware and operating system requirements.

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

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

Refer to the following publications:

- *IBM Security Key Lifecycle Manager Quick Start Guide (GI13-2316)*
- *IBM Security Key Lifecycle Manager Installation and Configuration Guide (SC27-5335)*

FDE activation review planning

FDE activation is a customer responsibility. IBM FDE 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.

http://www-03.ibm.com/systems/services/labservices/platforms/labservices_storage.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 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.

Direct customer support

Direct customer support for the DS8000 series is provided by IBM Operational Support Services - Support Line. This fee service can enhance your productivity by providing voice and electronic access into the IBM support organization. IBM Operational Support Services - Support Line will help answer questions pertaining to product and feature usage (how to), configuration, and product compatibility for eligible products. For a list of the products supported via Support Line, visit

<http://www.ibm.com/services/sl/products/>

For more information on services, call 800-IBM-4YOU (426-4968).

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-enabled 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 Web site 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

Terms and conditions

Terms and conditions features section

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

Description	Machine type	Model	Feature number
DS8870	2421	961	
Custom features:			
- High-performance all-flash single frame indicator			0169
High-performance flash enclosure placement indicators:			
- Enclosure position 1			0411
- Enclosure position 2			0412
- Enclosure position 3			0413
- Enclosure position 4			0414
- Enclosure position 5			0415
- Enclosure position 6			0416
- Enclosure position 7			0417
- Enclosure position 8			0418
- Enclosure position 1 Full			0511
- Enclosure position 2 Full			0512
- Enclosure position 3 Full			0513
- Enclosure position 4 Full			0514
- Enclosure position 5 Full			0515
- Enclosure position 6 Full			0516
- Enclosure position 7 Full			0517
- Enclosure position 8 Full			0518

Disk drive enclosures:

- HD 200 GB SSD enclosure indicator 1255
- HD 800 GB SSD enclosure indicator 1256

High-performance flash card sets:

- High-performance flash enclosure 1500
- 400 GB 1.8" flash card set A 1506
- 400 GB 1.8" flash card set B 1508
- Flash enclosure filler set 1599

DS8000 Licensed Machine Code:

- DS8000 LMC R7.3 1734

Device adapters:

- High-performance flash adapter pair 3054

Encryption SSD drive sets:

- 200 GB SSD FDE drive set 6058
- 800 GB SSD FDE drive set 6258

Description	Machine type	Model	Feature number
DS8870	2421	96E	

Disk drive enclosures:

- HD 200 GB SSD enclosure indicator 1255
- HD 800 GB SSD enclosure indicator 1256

DS8000 Licensed Machine Code:

- DS8000 LMC R7.3 indicator 1834

Encryption SSD drive sets:

- 200 GB SSD FDE drive set 6058
- 800 GB SSD FDE drive set 6258

Description	Machine type	Model	Feature number
DS8870	2422	961	

Custom features:

- High-performance all-flash single frame indicator 0169

High-performance flash enclosure placement indicators:

- Enclosure position 1 0411
- Enclosure position 2 0412
- Enclosure position 3 0413
- Enclosure position 4 0414
- Enclosure position 5 0415
- Enclosure position 6 0416
- Enclosure position 7 0417
- Enclosure position 8 0418
- Enclosure position 1 Full 0511
- Enclosure position 2 Full 0512
- Enclosure position 3 Full 0513
- Enclosure position 4 Full 0514
- Enclosure position 5 Full 0515
- Enclosure position 6 Full 0516
- Enclosure position 7 Full 0517
- Enclosure position 8 Full 0518

Disk drive enclosures:

- HD 200 GB SSD enclosure indicator 1255
- HD 800 GB SSD enclosure indicator 1256

High-performance flash card sets:

- High-performance flash enclosure 1500
- 400 GB 1.8" flash card set A 1506

- 400 GB 1.8" flash card set B 1508
 - Flash enclosure filler set 1599
- DS8000 Licensed Machine Code:
- DS8000 LMC R7.3 1734
- Device adapters:
- High-performance flash adapter pair 3054
- Encryption SSD drive sets:
- 200 GB SSD FDE drive set 6058
 - 800 GB SSD FDE drive set 6258

Description	Machine type	Model	Feature number
DS8870	2422	96E	

- Disk drive enclosures:
- HD 200 GB SSD enclosure indicator 1255
 - HD 800 GB SSD enclosure indicator 1256

- DS8000 Licensed Machine Code:
- DS8000 LMC R7.3 indicator 1834

- Encryption SSD drive sets:
- 200 GB SSD FDE drive set 6058
 - 800 GB SSD FDE drive set 6258

Description	Machine type	Model	Feature number
DS8870	2423	961	

- Custom features:
- High-performance all-flash single frame indicator 0169

High-performance flash enclosure placement indicators:

- Enclosure position 1 0411
- Enclosure position 2 0412
- Enclosure position 3 0413
- Enclosure position 4 0414
- Enclosure position 5 0415
- Enclosure position 6 0416
- Enclosure position 7 0417
- Enclosure position 8 0418
- Enclosure position 1 Full 0511
- Enclosure position 2 Full 0512
- Enclosure position 3 Full 0513
- Enclosure position 4 Full 0514
- Enclosure position 5 Full 0515
- Enclosure position 6 Full 0516
- Enclosure position 7 Full 0517
- Enclosure position 8 Full 0518

- Disk drive enclosures:
- HD 200 GB SSD enclosure indicator 1255
 - HD 800 GB SSD enclosure indicator 1256

- High-performance flash card sets:
- High-performance flash enclosure 1500
 - 400 GB 1.8" flash card set A 1506
 - 400 GB 1.8" flash card set B 1508
 - Flash enclosure filler set 1599

- DS8000 Licensed Machine Code:
- DS8000 LMC R7.3 1734

- Device adapters:
- High-performance flash adapter pair 3054

Encryption SSD drive sets:
 - 200 GB SSD FDE drive set 6058
 - 800 GB SSD FDE drive set 6258

Description	Machine type	Model	Feature number
DS8870	2423	96E	

Disk drive enclosures:
 - HD 200 GB SSD enclosure indicator 1255
 - HD 800 GB SSD enclosure indicator 1256

DS8000 Licensed Machine Code:
 - DS8000 LMC R7.3 indicator 1834

Encryption SSD drive sets:
 - 200 GB SSD FDE drive set 6058
 - 800 GB SSD FDE drive set 6258

Description	Machine type	Model	Feature number
DS8870	2424	961	

Custom features:
 - High-performance all-flash single frame indicator 0169

High-performance flash enclosure placement indicators:

- Enclosure position 1 0411
- Enclosure position 2 0412
- Enclosure position 3 0413
- Enclosure position 4 0414
- Enclosure position 5 0415
- Enclosure position 6 0416
- Enclosure position 7 0417
- Enclosure position 8 0418
- Enclosure position 1 Full 0511
- Enclosure position 2 Full 0512
- Enclosure position 3 Full 0513
- Enclosure position 4 Full 0514
- Enclosure position 5 Full 0515
- Enclosure position 6 Full 0516
- Enclosure position 7 Full 0517
- Enclosure position 8 Full 0518

Disk drive enclosures:
 - HD 200 GB SSD enclosure indicator 1255
 - HD 800 GB SSD enclosure indicator 1256

High-performance flash card sets:
 - High-performance flash enclosure 1500
 - 400 GB 1.8" flash card set A 1506
 - 400 GB 1.8" flash card set B 1508
 - Flash enclosure filler set 1599

DS8000 Licensed Machine Code:
 - DS8000 LMC R7.3 1734

Device adapters:
 - High-performance flash adapter pair 3054

Encryption SSD drive sets:
 - 200 GB SSD FDE drive set 6058
 - 800 GB SSD FDE drive set 6258

Description	Machine type	Model	Feature number
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DS8870 2424 96E

Disk drive enclosures:
 - HD 200 GB SSD enclosure indicator 1255
 - HD 800 GB SSD enclosure indicator 1256

DS8000 Licensed Machine Code:
 - DS8000 LMC R7.3 indicator 1834

Encryption SSD drive sets:
 - 200 GB SSD FDE drive set 6058
 - 800 GB SSD FDE drive set 6258

Feature Change Options

Description	Feature number	Install* type	Feature conversion	Feature exchange	Feature remove
Custom features:					
- High-performance all-flash single frame indicator	0169	Plant	No	No	No
High-performance flash enclosure placement indicators:					
- Enclosure position 1	0411	Both	No	No	Yes
- Enclosure position 2	0412	Both	No	No	Yes
- Enclosure position 3	0413	Both	No	No	Yes
- Enclosure position 4	0414	Both	No	No	Yes
- Enclosure position 5	0415	Both	No	No	Yes
- Enclosure position 6	0416	Both	No	No	Yes
- Enclosure position 7	0417	Both	No	No	Yes
- Enclosure position 8	0418	Both	No	No	Yes
- Enclosure position 1 Full	0511	Both	No	No	Yes
- Enclosure position 2 Full	0512	Both	No	No	Yes
- Enclosure position 3 Full	0513	Both	No	No	Yes
- Enclosure position 4 Full	0514	Both	No	No	Yes
- Enclosure position 5 Full	0515	Both	No	No	Yes
- Enclosure position 6 Full	0516	Both	No	No	Yes
- Enclosure position 7 Full	0517	Both	No	No	Yes
- Enclosure position 8 Full	0518	Both	No	No	Yes
Disk drive enclosures:					
- HD 200 GB SSD enclosure indicator	1255	Both	Yes	No	Yes
- HD 800 GB SSD enclosure indicator	1256	Both	Yes	No	Yes
High-performance flash card sets:					
- High-performance flash enclosure	1500	Both	No	No	No
- 400 GB 1.8" flash card set A	1506	Both	No	No	Yes
- 400 GB 1.8" flash card set B	1508	Both	No	No	Yes
- Flash enclosure filler set	1599	Both	No	No	Yes
DS8000 Licensed Machine Code:					
- DS8000 LMC R7.3	1734	Both	No	No	Yes
- DS8000 LMC R7.3 indicator	1834	Both	No	No	Yes
Device adapters:					
- High-performance flash adapter pair	3054	Both	No	No	No
Encryption SSD drive sets:					
- 200 GB SSD FDE drive set	6058	Both	Yes	No	Yes
- 800 GB SSD FDE drive set	6258	Both	Yes	No	Yes

Description	Feature number	CSU
Custom features:		
- High-performance all-flash single frame indicator	0169	N/A
High-performance flash enclosure placement indicators:		
- Enclosure position 1	0411	N/A
- Enclosure position 2	0412	N/A
- Enclosure position 3	0413	N/A
- Enclosure position 4	0414	N/A
- Enclosure position 5	0415	N/A
- Enclosure position 6	0416	N/A
- Enclosure position 7	0417	N/A
- Enclosure position 8	0418	N/A
- Enclosure position 1 Full	0511	N/A
- Enclosure position 2 Full	0512	N/A
- Enclosure position 3 Full	0513	N/A
- Enclosure position 4 Full	0514	N/A
- Enclosure position 5 Full	0515	N/A
- Enclosure position 6 Full	0516	N/A
- Enclosure position 7 Full	0517	N/A
- Enclosure position 8 Full	0518	N/A
Disk drive enclosures:		
- HD 200 GB SSD enclosure indicator	1255	N/A
- HD 800 GB SSD enclosure indicator	1256	N/A
High-performance flash card sets:		
- High-performance flash enclosure	1500	No
- 400 GB 1.8" flash card set A	1506	No
- 400 GB 1.8" flash card set B	1508	No
- Flash enclosure filler set	1599	No
DS8000 Licensed Machine Code:		
- DS8000 LMC R7.3	1734	No
- DS8000 LMC R7.3 indicator	1834	N/A
Device adapters:		
- High-performance flash adapter pair	3054	No
Encryption SSD drive sets:		
- 200 GB SSD FDE drive set	6058	No
- 800 GB SSD FDE drive set	6258	No

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

- Feature Conversion: 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.

Feature conversion purchase price

Feature conversions (machine types 2421, 2422, 2423, and 2424 for Model 961 and 96E):

Disk enclosures:

Feature From	To	Returned Parts *	Description	Continuous maintenance
1255	1245	No	HD 200 GB SSD enclosure indicator to 400 GB SSD enclosure indicator	NA
1255	1256	No	HD 200 GB SSD enclosure indicator to 800 GB SSD enclosure indicator	NA
1245	1256	No	HD 400 GB SSD enclosure indicator to 800 GB SSD enclosure indicator	NA

Encryption SSD drive sets:

Feature From	To	Returned Parts *	Description	Continuous maintenance
6058	6158	Yes	Encryption SSD drive conversion	Yes
6058	6258	Yes	Encryption SSD drive conversion	Yes
6156	6258	Yes	Encryption SSD drive conversion	Yes
6158	6258	Yes	Encryption SSD drive conversion	Yes

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

Pricing terms

Prices in the following PDF prices link are suggested list prices on day of announcement for the U.S. only. They are provided for your information only. Dealer prices may vary, and prices may also vary by country. IBM list price does not include tax or shipping and is subject to change without notice.

[ENUS-114-074-LIST_PRICES_2014_05_13.PDF](#)

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