



IBM DS8880 all-flash family meets the demand for high-speed storage with a one-year warranty

Table of contents

1 Overview	12 Publications
2 Key prerequisites	14 Technical information
2 Planned availability date	19 Terms and conditions
2 Description	22 Prices
3 Statement of general direction	41 Order now
3 Product number	42 Corrections

At a glance

IBM[®] DS8880 all-flash machine types offer increased performance and scalability to address speed demands and data growth. IBM DS8880 offers three all-flash models with the following features:

- Support for up to 48 cores with 2 TB cache (per system)
- 8 Gbps or 16 Gbps Fibre Channel/FICON[®] connectivity options
- Support for up to 384 flash cards per system with the attachment of one expansion frame
- 4U 19-inch, rack-mount enclosure pair that can be installed for up to maximum of 48 flash cards
- Single-phase or three-phase options, depending on the model

Overview

IBM DS8880 all-flash machine types offer the exceptional performance and economic benefits of flash storage while maintaining enterprise-class reliability.

IBM DS8880 offers three different all-flash machine types to support all the advanced functions and security capabilities that are characteristic of IBM enterprise storage:

- Business class
- Enterprise class
- Analytic class

Product Preview

The IBM DS8880 family plans to release additional larger-flash capacity options on all models.

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

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.

Key prerequisites

All released features and functions supported on the IBM DS8000^(R) series require DS8000 LMC 8.8.21.xx.xx (bundle version 88.21.xxx.xx), or later.

Planned availability date

January 20, 2017

Description

The IBM DS8880 family offers three all-flash array models, DS8884F, DS8886F, and DS8888F, to meet the demand for higher speed storage. All-flash arrays deliver higher IOPS and bandwidth with lower power consumption to reduce the total cost of ownership as compared to hybrid or HDD-based solutions.

DS8884F is a single frame, all-flash storage system designed for entry-level customers with small capacity needs looking to boost performance. DS8884F will support the following features:

- Six cores with options of 64 GB, 128 GB, and 256 GB memory combinations
- Support for up to a maximum of 8 four-port or 4 eight-port host adapters
- Support for one high-performance flash enclosure (HPFE) pair with a maximum raw capacity of 153.6 TB
- Up to 48 flash cards with capacity options of 400 GB, 800 GB, 1600 GB, and 3200 GB
- Single-phase power supplies (Model 984/84E)

DS8886F is a one- or two-frame, all-flash storage system designed to help mid-sized organizations overcome their storage challenges with advanced functions and significantly increased performance. DS8886F will support the following features:

- Eight cores with options of 128 GB or 256 GB, sixteen cores with options of 256 GB or 512 GB, and twenty-four cores with options of 1 TB or 2 TB memory combinations
- Support for up to a maximum of 32 four-port or 16 eight-port host adapters
- Support for up to two HPFE pairs with a maximum raw capacity of 307.2 TB on each frame
- Up to 192 flash cards with capacity options of 400 GB, 800 GB, 1600 GB, and 3200 GB
- Single-phase (Model 985/85E) or three-phase (Model 986/86E) power supplies

DS8888F is a one- or two-frame, all-flash storage system designed for businesses that need to accelerate application performance and improve server efficiency. DS8888F will support the following features:

- Options of 24 cores with 1 TB or 48 cores with 2 TB memory combination
- Support for up to maximum of 32 four-port or 16 eight-port host adapters
- Support for up to four HPFE pairs with a maximum raw capacity of 614.4 TB on each frame

- Up to 384 flash cards with capacity options of 400 GB, 800 GB, 1600 GB, and 3200 GB
- Three-phase power supplies (Model 988/88E)

IBM DS8880 all-flash requires a corresponding advanced function license (904x-FF8) for the total physical capacity of the storage system.

For more information on the function authorizations, refer to Hardware Announcement [117-007](#), dated January 10, 2017.

Accessibility by people with disabilities

A US Section 508 Voluntary Product Accessibility Template (VPAT) containing details on accessibility compliance can be found on the [IBM Accessibility](#) website.

Section 508 of the US Rehabilitation Act

IBM DS8880 storage family is capable as of January 20, 2017, when used in accordance with IBM's associated documentation, of satisfying the applicable requirements of Section 508 of the Rehabilitation Act, provided that any assistive technology used with the product properly interoperates with it. A US Section 508 Voluntary Product Accessibility Template (VPAT) can be found on the [IBM Accessibility](#) website.

Statement of general direction

IBM intends to deliver field upgradable support for zHyperLink on existing IBM System Storage[®] DS8880 machines. zHyperLink is a short-distance, mainframe-attach link designed for up to 10x lower latency than High Performance FICON. zHyperLink is intended to speed up DB2[®] for z/OS[®] transaction processing and improve active log throughput.

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 remain at our sole discretion.

Reference information

For more information about available function authorizations, refer to Hardware Announcement [117-007](#), dated January 10, 2017.

Product number

Description	Machine type	Model	Feature number
DS8884	5331	984	
DS8886	5331	985	
DS8886 Expansion Unit	5331	85E	
DS8886	5331	986	
DS8886 Expansion Unit	5331	86E	
DS8888	5331	988	

Description	Machine type	Model	Feature number
DS8888 Expansion Unit	5331	88E	
Model 8xE merge indicators:			
- 8xE factory merge	5331	988, 85E, 86E, 88E	0003
- 8xE field merge	5331	85E, 86E, 88E	0004
- PPA Software Order Indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0017
- DoD indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0020
- JEMT indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0021
Custom features:			
- Top Expansion	5331	988, 88E	0170
- Shipping weight reduction	5331	984, 985, 986, 988, 85E, 86E, 88E	0200
Model 8xE position indicators:			
- 98x - 8xE position 1	5331	988, 85E, 86E, 88E	0241
Encryption not capable	5331	984, 985, 986, 988	0403
Flash card sets custom placement indicator	5331	985, 986, 988, 85E, 86E, 88E	0606
Initial system capacity:			
- Up to 5 TB capacity	5331	984, 985, 986, 988, 85E, 86E, 88E	0795
- 5.1 TB to 10 TB capacity	5331	984, 985, 986, 988, 85E, 86E, 88E	0796
- 10.1 TB to 25 TB capacity	5331	984, 985, 986, 988, 85E, 86E, 88E	0797
- 25.1 TB to 50 TB capacity	5331	984, 985, 986, 988, 85E, 86E, 88E	0798
- 50.1 TB to 75 TB capacity	5331	984, 985, 986, 988, 85E, 86E, 88E	0799
- 75.1 TB to 100 TB capacity	5331	984, 985, 986, 988, 85E, 86E, 88E	0801
- 100.1 TB to 250 TB capacity	5331	984, 985, 986, 988, 85E, 86E, 88E	0803
- 250.1 TB to 500 TB capacity	5331	984, 985, 986, 988, 85E, 86E, 88E	0804
- 500.1 TB to 1250 TB capacity	5331	984, 985, 986, 988, 85E, 86E, 88E	0806
- 1250.1 TB to 3000 TB capacity	5331	984, 985, 986, 988, 85E, 86E, 88E	0807

Description	Machine type	Model	Feature number
- 3000.1 TB to 6000 TB capacity	5331	984, 985, 986, 988, 85E, 86E, 88E	0808
- 6000.1 TB to 10000 TB capacity	5331	984, 985, 986, 988, 85E, 86E, 88E	0809
Attachment indicators:			
-IBM/Openwave Alliance indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0930
-IBM System i ^(R) indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0931
-IBM System p indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0932
-IBM System x indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0933
-IBM System z ^(R) indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0934
-IBM System z B/C indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0935
-IBM System zEnterprise ^(R) Cloud indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0936
-Linux TM indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0940
- Storage Appliance indicator	5331	984, 985, 986, 988	0952
-IBM ProtecTIER ^(R) indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0960
-IBM Storwize ^(R) V7000 indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0961
-IBM N series indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0962
-IBM SAN Volume Controller indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0963
-IBM/EPIC attachment indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0964
- VMware VAAI indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0965
- OpenStack indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0966
- US TAA compliance indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0983
Power:			
- Single phase DC-UPS	5331	984, 985, 85E	1050
- Three phase DC-UPS	5331	986, 988, 86E, 88E	1052

Description	Machine type	Model	Feature number
- Extended PLD	5331	984, 985, 986, 988, 85E, 86E, 88E	1055
Single phase line cords:			
- SPP cord, 200-240V, 60A, 3- pin connector	5331	984, 985, 85E	1062
- SPP cord, 200-240V, 63A, no connector	5331	984, 985, 85E	1063
Three phase line cords:			
- Three phase power cord, 380-415V, 30A, 5 pin connector	5331	986, 988, 86E, 88E	1086
- Three phase power cord, 200-240V, 30A, 4 pin connector	5331	986, 988, 86E, 88E	1087
- Three phase power cord, 380-415V, 40A, no connector	5331	986, 988, 86E, 88E	1088
- Three phase power cord, 200-240V, 60A, 4 pin connector	5331	986, 988, 86E, 88E	1089
Special tool:			
- Overhead ladder - 5ft	5331	984, 985, 986, 988	1101
- Ladder - Top Expansion - 3ft	5331	988	1102
- Kick Step	5331	984, 985, 986, 988	1103
Management Console:			
- Mgmt console - Primary	5331	984, 985, 986, 988	1140
- Mgmt console - Secondary	5331	984, 985, 986, 988	1150
I/O enclosure pair PCIe 3	5331	984, 985, 986, 988, 85E, 86E, 88E	1303
Top exit bracket:			
- Top exit bracket for Fibre cable	5331	984, 985, 986, 988, 85E, 86E, 88E	1400
Fibre Channel/ FICON cables:			
- 50 um Fibre cable (LC)	5331	984, 985, 986, 988, 85E, 86E, 88E	1410
- 50 um Fibre cable (LC/SC)	5331	984, 985, 986, 988, 85E, 86E, 88E	1411
- 50 um Fibre cable (Jumper)	5331	984, 985, 986, 988, 85E, 86E, 88E	1412
- 9 um Fibre cable (LC)	5331	984, 985, 986, 988, 85E, 86E, 88E	1420

Description	Machine type	Model	Feature number
- 9 um Fibre cable (LC/SC)	5331	984, 985, 986, 988, 85E, 86E, 88E	1421
- 9 um Fibre cable (Jumper)	5331	984, 985, 986, 988, 85E, 86E, 88E	1422
High Performance Flash Enclosure Gen2 family:			
- High Performance Flash Enclosure Gen2 pair	5331	984, 985, 986, 988, 85E, 86E, 88E	1600
-400 GB 2.5-inch flash card set	5331	984, 985, 986, 988, 85E, 86E, 88E	1610
- 800 GB 2.5-inch flash card set	5331	984, 985, 986, 988, 85E, 86E, 88E	1611
- 1600 GB 2.5-inch flash card set	5331	984, 985, 986, 988, 85E, 86E, 88E	1612
- 3200 GB 2.5-inch flash card set	5331	984, 985, 986, 988, 85E, 86E, 88E	1613
- Flash enclosure filler set	5331	984, 985, 986, 988, 85E, 86E, 88E	1699
DS8000 Licensed Machine Code:			
-DS8000 LMC R8.2	5331	984, 985, 986, 988	1882
-DS8000 LMC R8.2 indicator	5331	85E, 86E, 88E	1982
Earthquake kit	5331	984, 985, 986, 988, 85E, 86E, 88E	1906
Hardware installation MES	5331	984, 985, 986, 988, 85E, 86E, 88E	1999
Host adapters:			
- 8 Gb 4 port SW FCP/FICON adapter PCIe	5331	984, 985, 986, 988, 85E, 86E, 88E	3153
- 8 Gb 8 port SW FCP/FICON adapter PCIe	5331	984, 985, 986, 988, 85E, 86E, 88E	3157
- 8 Gb 4 port LW FCP/FICON adapter PCIe	5331	984, 985, 986, 988, 85E, 86E, 88E	3253
- 8 Gb 8 port LW FCP/FICON adapter PCIe	5331	984, 985, 986, 988, 85E, 86E, 88E	3257
- 16 Gb 4 port SW FCP/FICON adapter PCIE	5331	984, 985, 986, 988, 85E, 86E, 88E	3353
- 16 Gb 4 port LW FCP/FICON adapter PCIE	5331	984, 985, 986, 988, 85E, 86E, 88E	3453
Processor memory:			
- 64GB PROCESSOR MEMORY 6COR	5331	984	4223

Description	Machine type	Model	Feature number
- 128GB PROCESSOR MEMORY 6CO	5331	984	4224
- 256GB PROCESSOR MEMORY 6CO	5331	984	4225
- 128 GB Processor memory (8-core only)	5331	985, 986	4324
- 256 GB Processor memory (8-core or 16- core)	5331	985, 986	4325
- 512 GB Processor memory (16-core only)	5331	985, 986	4326
- 1 TB Processor memory (24-core only)	5331	985, 986	4327
- 2 TB Processor memory (24-core only)	5331	985, 986	4328
- 1 TB Processor memory (24-core only)	5331	988	4487
- 2 TB Processor memory (48-core only)	5331	988	4488
Processor license indicators:			
- 6-core processor indicator	5331	984	4421
- 8-core processor indicator	5331	985, 986	4422
- 16-core processor indicator	5331	985, 986	4423
- 24-core processor indicator	5331	985, 986	4424
- 24-core processor indicator	5331	988	4868
- 48-core processor indicator	5331	988	4888
Function Authorization indicators			
Base Function (BF):			
- BF - Up to 100 TB capacity	5331	984, 985, 986, 988	8151
- BF - 100.1 TB to 250 TB capacity	5331	984, 985, 986, 988	8152
- BF - 250.1 TB to 500 TB capacity	5331	984, 985, 986, 988	8153
- BF - 500.1 TB to 1250 TB capacity	5331	984, 985, 986, 988	8154
- BF - 1250.1 TB to 3000 TB capacity	5331	984, 985, 986, 988	8155
- BF - 3000.1 TB to 6000 TB capacity	5331	984, 985, 986, 988	8156
- BF - 6000.1 TB to 10000 TB	5331	984, 985, 986, 988	8160

Description	Machine type	Model	Feature number
Copy Services (CS) license:			
- CS - Inactive	5331	984, 985, 986, 988	8250
- CS - Up to 100 TB capacity	5331	984, 985, 986, 988	8251
- CS - 100.1 TB to 250 TB capacity	5331	984, 985, 986, 988	8252
- CS - 250.1 TB to 500 TB capacity	5331	984, 985, 986, 988	8253
- CS - 500.1 TB to 1250 TB capacity	5331	984, 985, 986, 988	8254
- CS - 1250.1 TB to 3000 TB capacity	5331	984, 985, 986, 988	8255
- CS - 3000.1 TB to 6000 TB capacity	5331	984, 985, 986, 988	8256
- CS - 6000.1 TB to 10000 TB	5331	984, 985, 986, 988	8260
z-synergy Services (zsS) license:			
- zsS - Active	5331	984, 985, 986, 988	8300
- zsS - Inactive	5331	984, 985, 986, 988	8350
- zsS - Up to 100 TB capacity	5331	984, 985, 986, 988	8351
- zsS - 100.1 TB to 250 TB capacity	5331	984, 985, 986, 988	8352
- zsS - 250.1 TB to 500 TB capacity	5331	984, 985, 986, 988	8353
- zsS - 500.1 TB to 1250 TB capacity	5331	984, 985, 986, 988	8354
- zsS - 1250.1 TB to 3000 TB capacity	5331	984, 985, 986, 988	8355
- zsS - 3000.1 TB to 6000 TB capacity	5331	984, 985, 986, 988	8356
- zsS - 6000.1 TB to 10000 TB	5331	984, 985, 986, 988	8360
Copy Services Manager (CSM on HMC) license:			
- CSM on HMC - Inactive	5331	984, 985, 986, 988	8450
- CSM on HMC - Up to 100 TB capacity	5331	984, 985, 986, 988	8451
- CSM on HMC - 100.1 TB to 250 TB capacity	5331	984, 985, 986, 988	8452
- CSM on HMC - 250.1 TB to 500 TB capacity	5331	984, 985, 986, 988	8453
- CSM on HMC - 500.1 TB to 1250 TB capacity	5331	984, 985, 986, 988	8454
- CSM on HMC - 1250.1 TB to 3000 TB capacity	5331	984, 985, 986, 988	8455

Description	Machine type	Model	Feature number
- CSM on HMC - 3000.1 TB to 6000 TB capacity	5331	984, 985, 986, 988	8456
- CSM on HMC - 6000.1 TB to 100,000 TB	5331	984, 985, 986, 988	8460
IGF transaction:			
- IGF transaction indicator	5331	984, 985, 986, 988	8999
Shipping and Handling NC	5331	984, 985, 986, 988, 85E, 86E, 88E	AG00
Shipping and handling 984	5331	984	AGAA
Shipping and handling 985	5331	985	AGAC
Shipping and handling 85E	5331	85E	AGAD
Shipping and handling 986	5331	986	AGAE
Shipping and handling 86E	5331	86E	AGAF
Shipping and handling 988	5331	988	AGAG
Shipping and handling 88E	5331	88E	AGAH

Description	Machine type	Model	Feature number
Flash card sets custom placement indicator	2831	985, 986, 85E, 86E	0606
Special tool:			
- Kick Step	2831	984, 985, 986	1103

Feature conversions

Machine type 5331 Models 984, 985, 986, and 988

From feature	To feature	Returned parts*	Description
Host adapters:			
3153	3157	Yes	Host adapter conversion
3153	3253	Yes	Host adapter conversion
3153	3257	Yes	Host adapter conversion
3157	3153	Yes	Host adapter conversion
3157	3253	Yes	Host adapter conversion
3157	3257	Yes	Host adapter conversion
3253	3153	Yes	Host adapter conversion
3253	3157	Yes	Host adapter conversion
3253	3257	Yes	Host adapter conversion
3257	3153	Yes	Host adapter conversion
3257	3157	Yes	Host adapter conversion

From feature	To feature	Returned parts*	Description
3257	3253	Yes	Host adapter conversion
3353	3453	Yes	Host adapter conversion
3453	3353	Yes	Host adapter conversion

Machine type 5331 Model 984

From feature	To feature	Returned parts*	Description
Processor memory:			
4223	4224	No	Processor memory conversion
4223	4225	No	Processor memory conversion
4224	4225	No	Processor memory conversion

Machine type 5331 Models 985 and 986

From feature	To feature	Returned parts*	Description
Processor memory:			
4324	4325	No	Processor memory conversion
4324	4326	No	Processor memory conversion
4325	4326	No	Processor memory conversion
4325	4327	No	Processor memory conversion
4326	4327	No	Processor memory conversion
4326	4328	No	Processor memory conversion
4327	4328	Yes	Processor memory conversion
Processor License feature indicators:			
4422	4423	No	Processor License feature conversion
4422	4424	No	Processor License feature conversion
4423	4424	No	Processor License feature conversion

Machine type 5331 Model 988

From feature	To feature	Returned parts*	Description
Processor memory:			
4487	4488	No	Processor memory conversion
Processor License feature indicators:			
4868	4888	No	Processor License feature conversion

Machine type 5331 Model 85E, 86E, and 88E

From feature	To feature	Returned parts*	Description
Host adapters:			
3153	3157	Yes	Host adapter conversion

From feature	To feature	Returned parts*	Description
3153	3253	Yes	Host adapter conversion
3153	3257	Yes	Host adapter conversion
3157	3153	Yes	Host adapter conversion
3157	3253	Yes	Host adapter conversion
3157	3257	Yes	Host adapter conversion
3253	3153	Yes	Host adapter conversion
3253	3157	Yes	Host adapter conversion
3253	3257	Yes	Host adapter conversion
3257	3153	Yes	Host adapter conversion
3257	3157	Yes	Host adapter conversion
3257	3253	Yes	Host adapter conversion
3353	3453	Yes	Host adapter conversion
3453	3353	Yes	Host adapter conversion

Machine types 5331 Models 984, 985, 986, 988, 85E, 86E, and 88E

From feature	To feature	Returned parts*	Description
1610	1611	Yes	Flash cards conversion
1610	1612	Yes	Flash cards conversion
1610	1613	Yes	Flash cards conversion
1611	1612	Yes	Flash cards conversion
1611	1613	Yes	Flash cards conversion
1612	1613	Yes	Flash cards conversion

*Parts removed as a result of a feature conversion become the property of IBM.

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 IBMid).

[BP Attachment for Announcement Letter 117-003](#)

Publications

The following publication has been updated to reflect this announcement and will be available January 10, 2017:

Title	Order number
<i>IBM DS8880 Introduction and Planning Guide</i>	GC27-8525

The following publications are shipped with the DS8000 series:

Title	Order number
<i>IBM DS8000 Customer Series Publications CDROM</i>	01FT024
<i>IBM DS8000 Series License Documentation CDROM</i>	01FT061

The publications CD contains the following documents:

Title	Order number
<i>License Agreement for Machine Code</i>	SC28-6872
<i>IBM DS8880 Introduction and Planning Guide</i>	GC27-8525
<i>IBM DS8000 Host Systems Attachment Guide</i>	SC27-8527
<i>IBM DS Command-Line Interface User's Guide for DS8000 series</i>	SC27-8526
<i>IBM System Storage Multipath Subsystem Device Driver User's Guide</i>	GC52-1309
<i>IBM DS Open Application Programming Interface Installation and Reference</i>	GC27-4211
<i>IBM DS8000 series Non-IBM_Licenses_and_Notices-Rel 5.x-7.x, 8.0, 8.1 , 8.2</i>	GA32-2204
<i>IBM Warranty Information</i>	GC26-7919
<i>READ ME FIRST for IBM Products</i>	GA32-1061
<i>IBM System Storage Notice Regarding Storage Encryption</i>	45W6389

The license CD contains the following documentation:

Title	Order number
<i>IBM System Storage DS[®] Storage Mgr R8.2 & CIM Agent for DS Open Application Programming Interface 5.8.2</i>	GC27-3907
<i>IBM International License Agreement for Non-Warranted Programs (ILAN)</i>	98Y2827
<i>Global Mirroring Utilities for ICKDSF Users and Open Systems Environments License Information</i>	GC26-7644

DS8000 publications are available at the [IBM Publications Center](#).

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Global Technology Services

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For details on available services, contact your IBM representative or go to the [IBM Global Technology Services^{\(R\)}](#) website.

For details on available IBM Business Continuity and Recovery Services, contact your IBM representative or go to the [Resiliency Services](#) website.

Details on education offerings related to specific products can be found on the [IBM authorized training](#) website.

Technical information

Specified operating environment

Physical specifications

- Width: 606 mm (23.86 in)
- Depth:
 - 1,200 mm (47.25 in) without doors
 - 1,380 mm (54.3 in) with doors
- Height: 40U: 1,924 mm (75.75 in)
- Weight: 40U: 975.7 kg (2,151 lb)

Operating environment

- Temperature: 16°C to 32°C (60°F to 90°F)
- Relative humidity: 20% - 80%
- Wet bulb (caloric value):
 - DS8888 Model 988/88E
 - 27715 BTU for A rack
 - 15062 BTU for B rack
 - DS8886 Model 985/85E
 - 16202 BTU for A rack
 - 11129 BTU for B rack
 - DS8886 Model 986/86E
 - 16280 BTU for A rack
 - 10662 BTU for B rack
 - DS8884
 - 7658 BTU for A rack
- Electrical power:
 - DS8888 Model 988/88E
 - 7.9 kW for A rack
 - 4.1 kW for B rack
 - DS8886 Model 985/85E
 - 4.6 kW for A rack
 - 3.0 kW for B rack

- DS8886 Model 986/86E
 - 4.6 kW for A rack
 - 3.0 kW for B rack
- DS8884
 - 2.2 kW for A rack
- Capacity of exhaust:
 - 1300 cubic feet/minute for 988
 - 1500 cubic feet/minute for 88E
 - 1300 cubic feet/minute for 985/986
 - 1500 cubic feet/minute for 85E/86E
 - 1200 cubic meter/minute for 984
- Declared operating A-weighted sound power level: 8.4 bels
- Leakage current: 100 mA

Power consumption

- Model 984 (6-core) with 1 HPFE pair: 2.2 kW
- Model 985 (8, 16, and 24-core) with 2 HPFE pair: 4.6 kW
- Model 85E with 2 HPFE pair: 3.0 kW
- Model 986 (8, 16, and 24-core) with 2 HPFE pair: 4.6 kW
- Model 86E with 2 HPFE pair: 3.0 kW
- Model 988 (24 and 48-core) with 4 HPFE pair: 7.9 kW
- Model 88E with 4 HPFE pair: 4.1 kW

DASD Subsystems

- Product Category (2011 law): N
- Maximum physical storage capacity: 1,228,800 Gigabytes
- Power consumption: 12,000 W
- DASD Energy Consumption Efficiency: 0.0098 W/Gigabytes

Homologation

This product is not certified for connection to interfaces of public telecommunications networks in the following countries:

- Chad
- Eritrea
- Guinea-Bissau
- Haiti
- Macau (China)
- Moldavia
- Sri Lanka

This product is also restricted for use in the embargoed countries:

- Cuba
- Iran, Islamic Republic of
- North Korea
- Sudan
- Syria (Syrian Arab Republic)

Hardware requirements

Licensed Machine Code

All announced features and functions are supported on the IBM System Storage DS8000 series and require DS8000 LMC 8.8.21.xx.xx (bundle version 88.21.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 the [IBM System Storage Interoperation Center](#).

Limitations

None.

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 DS8880 Introduction and Planning Guide* (GC27-8525).

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 DS8880 Introduction and Planning Guide* (GC27-8525).

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, and also the DS8000 GUI.

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 DS8880 Introduction and Planning Guide (GC27-8525)* 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.

- Storage Appliance planning
- Security Key Lifecycle Manager planning
- Encryption activation review planning

Storage Appliance planning

Storage Appliance planning is a customer responsibility. Introductory information, including required and optional features, can be found in the *IBM Storage Appliance Guide (SC27-8520)*.

According to encryption best practices, DS8880 requires at least two storage appliances and associated software for each site which has one or more encryption-enabled DS8000 system. One server must be isolated and the others can be of any supported appliance configuration. Any site that operates independently of other sites must have storage appliances for the encryption-enabled DS8000 systems at that site.

It is the customer's responsibility to replicate any key labels and their associated key material across all storage appliances attached to a given encryption-enabled DS8000 before configuring that key label on the DS8000.

Dual storage appliance server planning

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

For customers desiring NIST 800-131a compliance, IBM Security Key Lifecycle Manager (SKLM), formerly known as IBM Tivoli^(R) Key Lifecycle Manager, V2.5, or later, is required.

IBM SKLM planning

The DS8000 series supports IBM SKLM V2.5, or later.

Program number	VRM	Program name
5724-T60	2.5.0	IBM Security Key Lifecycle Manager for Distributed
5641-KL1/3	2.6.0	IBM Security Key Lifecycle Manager for Distributed
5698-B35	1.1.0	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 about the licensing requirements and pricing of the metric, refer to Software Announcement [213-470](#), dated October 29, 2013.

Isolated key server ordering options

- **Single/dual storage appliance server - Feature numbers 1761 and 1762 are available through Machine type Model 2421-AP1:** New storage appliance server options are available in addition to the existing SKLM isolated key manager (feature number 0204).
- **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 an 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 and a license for the encrypting drives.

IBM Security Key Lifecycle Manager V2.6 English publications may be viewed online, at electronic availability, in [IBM Knowledge Center](#).

To access the IBM Publications Center portal, go to [IBM Publications Center](#) website.

Encryption activation review planning

Encryption activation is a customer responsibility. IBM 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

Go to the [Storage Services](#) website 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

Cables are required to connect DS8000 series 8 Gbps or 16 Gbps FCP/FICON host adapter ports to server or fabric ports. Cables can be purchased using DS8000 series feature numbers. Additional cable options, along with product support services such as installation, are offered by IBM Global Services' Networking Services.

Fibre Channel/FICON (shortwave)

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

Fibre Channel/FICON (longwave)

Longwave Fibre Channel and FICON ports on the DS8000 series require a 9 micron (single mode) fiber optic cable terminated with a LC connector. Fibre Channel cables can be purchased using feature numbers 142x for 9 micron cables.

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 supported products, go to the [Support Line](#) website.

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

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

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

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

To learn how Electronic Services can work for you, go to the [IBM Electronic Support](#) website.

Terms and conditions

Volume orders

Contact your IBM representative.

IBM Global Financing

Yes

Products - terms and conditions

Warranty period

One year.

Customers should consult with their financial personnel on the appropriate financial treatment for this offering.

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

An IBM part or feature installed during the initial installation of an IBM machine is subject to the full warranty period specified by IBM. An IBM part or feature that replaces a previously installed part or feature assumes the remainder of the warranty period for the replaced part or feature. An IBM part or feature added to a machine without replacing a previously installed part or feature is subject to a full warranty. Unless specified otherwise, the warranty period, type of warranty service, and service level of a part or feature are the same as those for the machine in which it is installed.

Premium Support Services

IBM DS8880 models offer enhanced worldwide client care support, including the availability of one year Premium Support Services in a single machine type. Premium Support Services enhance client communications regarding problem status and actions, and will include the following service enhancements:

- Hardware installation and hardware configuration support
- Improved client problem management
- Faster initial response time to prioritize the resolution of high severity problems
- Improved coordination across support teams within IBM
- Technical Advisor support is included during the warranty period

Warranty service

Customer Replaceable Unit (CRU) and On-site, twenty-four hours a day, seven days a week, same day.

Improved worldwide support processes, including additional response to severity 2 calls, twenty-four hours a day, seven days a week.

If required, IBM provides repair or exchange service depending on the types of warranty service specified for the machine. IBM will attempt to resolve your problem over the telephone, or electronically via an IBM website. Certain machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with IBM. You must follow the problem determination and resolution procedures that IBM specifies. Following problem determination, if IBM determines on-site service is required, scheduling of service will depend upon the time of your call, machine technology and redundancy, and availability of parts. If applicable to your product, parts considered CRUs will be provided as part of the machine's standard warranty service.

Service levels are response-time objectives and are not guaranteed. The specified level of warranty service may not be available in all worldwide locations. Additional charges may apply outside IBM's normal service area. Contact your local IBM representative or your reseller for country-specific and location-specific information.

CRU and On-site Service

At IBM's discretion, you will receive specified CRU service, or IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well-lit, and suitable for the purpose.

Service level is:

- 24 hours per day, 7 days a week, same day response.

Usage plan machine

No

IBM hourly service rate classification

Three

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

General terms and conditions

Field-installable features

Yes

Model conversions

No

Machine installation

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

The following activities are a customer responsibility:

- Installation planning
- Retrieval and installation of feature activation codes
- Encryption planning

Refer to the [Customer responsibilities](#) section for more information.

Customer requests for installation of items not covered in the installation guide may be performed at IBM's hourly service rate designated for the machine.

Graduated program license charges apply

No

Licensed Machine Code

IBM Machine Code is licensed for use by a customer on the IBM machine for which it was provided by IBM under the terms and conditions of the IBM License Agreement for Machine Code, to enable the machine to function in accordance with its specifications, and only for the capacity authorized by IBM and acquired by the customer. You can obtain the agreement from the [License Agreement for Machine Code and Licensed Internal Code](#) website.

Access to Machine Code updates is conditioned on entitlement and license validation in accordance with IBM policy and practice. IBM may verify entitlement through customer number, serial number, electronic restrictions, or any other means or methods employed by IBM in its discretion.

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

If the machine does not function as warranted and your problem can be resolved through your application of downloadable Machine Code, you are responsible for downloading and installing these designated Machine Code changes as IBM specifies.

If you would prefer, you may request IBM to install downloadable Machine Code changes; however, you may be charged for that service.

Machine Code License Acceptance Requirement

Acceptance-By-Use Machine: Yes, acceptance of the Machine Code license terms is conveyed through the user's initial use of the Machine.

Educational allowance

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

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

Prices

For additional information and current prices, contact your local IBM representative.

Description	Machine type	Model	Feature number
DS8884	5331	984	
DS8886	5331	985	
DS8886 Expansion Unit	5331	85E	
DS8886	5331	986	
DS8886 Expansion Unit	5331	86E	
DS8888	5331	988	
DS8888 Expansion Unit	5331	88E	
Model 8xE merge indicators:			
- 8xE factory merge	5331	988, 85E, 86E, 88E	0003
- 8xE field merge	5331	85E, 86E, 88E	0004
- PPA Software Order Indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0017
- DoD indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0020
- JEMT indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0021
Custom features:			
- Top Expansion	5331	988, 88E	0170
- Shipping weight reduction	5331	984, 985, 986, 988, 85E, 86E, 88E	0200
Model 8xE position indicators:			
- 98x - 8xE position 1	5331	988, 85E, 86E, 88E	0241
Encryption not capable	5331	984, 985, 986, 988	0403
FLASH CUSTOM PLACEMENT IND	5331	985, 986, 988, 85E, 86E, 88E	0606
Initial system capacity:			
- Up to 5 TB capacity	5331	984, 985, 986, 988, 85E, 86E, 88E	0795

Description	Machine type	Model	Feature number
- 5.1 TB to 10 TB capacity	5331	984, 985, 986, 988, 85E, 86E, 88E	0796
- 10.1 TB to 25 TB capacity	5331	984, 985, 986, 988, 85E, 86E, 88E	0797
- 25.1 TB to 50 TB capacity	5331	984, 985, 986, 988, 85E, 86E, 88E	0798
- 50.1 TB to 75 TB capacity	5331	984, 985, 986, 988, 85E, 86E, 88E	0799
- 75.1 TB to 100 TB capacity	5331	984, 985, 986, 988, 85E, 86E, 88E	0801
- INIT SYS CAPACITY 100.1TB	5331	984, 985, 986, 988, 85E, 86E, 88E	0803
- INIT SYS CAPACITY 250.1TB	5331	984, 985, 986, 988, 85E, 86E, 88E	0804
- INIT SYS CAPACITY 500.1TB	5331	984, 985, 986, 988, 85E, 86E, 88E	0806
- INIT SYS CAPACITY 1250.1TB	5331	984, 985, 986, 988, 85E, 86E, 88E	0807
- INIT SYS CAPACITY 3000.1TB	5331	984, 985, 986, 988, 85E, 86E, 88E	0808
- INIT SYS CAPACITY 6000.1TB	5331	984, 985, 986, 988, 85E, 86E, 88E	0809
Attachment indicators:			
- ATTACHM INDIC OPENWAVE ALL	5331	984, 985, 986, 988, 85E, 86E, 88E	0930
-IBM System i ^(R) indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0931
-IBM System p indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0932
-IBM System x indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0933
-IBM System z ^(R) indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0934
-IBM System z B/C indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0935
- ATTACHM INDIC SYSTEM ZENTE	5331	984, 985, 986, 988, 85E, 86E, 88E	0936
-Linux TM indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0940
- Storage Appliance indicator	5331	984, 985, 986, 988	0952
-IBM ProtecTIER ^(R) indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0960

Description	Machine type	Model	Feature number
- IBM Storwize ^(R) V7000 indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0961
- IBM N series indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0962
- ATTACHM INDIC SAN VOLUME C	5331	984, 985, 986, 988, 85E, 86E, 88E	0963
- EPIC ATTACHMENT INDICATOR	5331	984, 985, 986, 988, 85E, 86E, 88E	0964
- VMware VAAI indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0965
- OpenStack indicator	5331	984, 985, 986, 988, 85E, 86E, 88E	0966
- ATTACHM INDIC US TAA COMPL	5331	984, 985, 986, 988, 85E, 86E, 88E	0983
Power:			
- Single phase DC- UPS	5331	984, 985, 85E	1050
- Three phase DC- UPS	5331	986, 988, 86E, 88E	1052
- Extended PLD	5331	984, 985, 986, 988, 85E, 86E, 88E	1055
Single phase line cords:			
- SNG PHASE LINE CORDS SPP	5331	984, 985, 85E	1062
- SNG PHASE LINE CORDS SPP	5331	984, 985, 85E	1063
Three phase line cords:			
- 3PHS 380-415V 30A 5 PIN	5331	986, 988, 86E, 88E	1086
- 3PHS 200-240V 30A 4 PIN	5331	986, 988, 86E, 88E	1087
- 3PHS 380-415V 40A No CON	5331	986, 988, 86E, 88E	1088
- 3PHS 200-240V 60A 4 PIN	5331	986, 988, 86E, 88E	1089
Special tool:			
- Overhead ladder - 5ft	5331	984, 985, 986, 988	1101
- Ladder - Top Expansion - 3ft	5331	988	1102
- Kick Step	5331	984, 985, 986, 988	1103
Management Console:			
- Mgmt console - Primary	5331	984, 985, 986, 988	1140
- Mgmt console - Secondary	5331	984, 985, 986, 988	1150
I O ENCLOSURE PAIR PCIE 3	5331	984, 985, 986, 988, 85E, 86E, 88E	1303
Top exit bracket:			

Description	Machine type	Model	Feature number
- TOP EXIT BRACKET FOR FIBRE	5331	984, 985, 986, 988, 85E, 86E, 88E	1400
Fibre Channel/ FICON cables:			
- 50 um Fibre cable (LC)	5331	984, 985, 986, 988, 85E, 86E, 88E	1410
- 50 um Fibre cable (LC/SC)	5331	984, 985, 986, 988, 85E, 86E, 88E	1411
- 50 um Fibre cable (Jumper)	5331	984, 985, 986, 988, 85E, 86E, 88E	1412
- 9 um Fibre cable (LC)	5331	984, 985, 986, 988, 85E, 86E, 88E	1420
- 9 um Fibre cable (LC/SC)	5331	984, 985, 986, 988, 85E, 86E, 88E	1421
- 9 um Fibre cable (Jumper)	5331	984, 985, 986, 988, 85E, 86E, 88E	1422
High Performance Flash Enclosure Gen2 family:			
- High Performance Flash Enclosure Gen2 pair	5331	984, 985, 986, 988, 85E, 86E, 88E	1600
-400 GB 2.5-inch flash card set	5331	984, 985, 986, 988, 85E, 86E, 88E	1610
- 800 GB 2.5-inch flash card set	5331	984, 985, 986, 988, 85E, 86E, 88E	1611
- 1600 GB 2.5-inch flash card set	5331	984, 985, 986, 988, 85E, 86E, 88E	1612
- 3200 GB 2.5-inch flash card set	5331	984, 985, 986, 988, 85E, 86E, 88E	1613
- Flash enclosure filler set	5331	984, 985, 986, 988, 85E, 86E, 88E	1699
DS8000 Licensed Machine Code:			
-DS8000 LMC R8.2	5331	984, 985, 986, 988	1882
-DS8000 LMC R8.2 indicator	5331	85E, 86E, 88E	1982
Earthquake kit	5331	984, 985, 986, 988, 85E, 86E, 88E	1906
Hardware installation MES	5331	984, 985, 986, 988, 85E, 86E, 88E	1999
Host adapters:			
- 8GB 4PORT SW FCP FICON ADA	5331	984, 985, 986, 988, 85E, 86E, 88E	3153
- 8GB 8PORT SW FCP FICON ADA	5331	984, 985, 986, 988, 85E, 86E, 88E	3157
- 8GB 4PORT LW FCP FICON ADA	5331	984, 985, 986, 988, 85E, 86E, 88E	3253

Description	Machine type	Model	Feature number
- 8GB 8PORT LW FCP FICON ADA	5331	984, 985, 986, 988, 85E, 86E, 88E	3257
- 16GB 4PORT SW FCP FICON AD	5331	984, 985, 986, 988, 85E, 86E, 88E	3353
- 16GB 4PORT LW FCP FICON AD	5331	984, 985, 986, 988, 85E, 86E, 88E	3453
Processor memory:			
- 64GB PROCESSOR MEMORY 6COR	5331	984	4223
- 128GB PROCESSOR MEMORY 6CO	5331	984	4224
- 256GB PROCESSOR MEMORY 6CO	5331	984	4225
- 128GB PROCESSOR MEMORY 8CO	5331	985, 986	4324
- 256GB PROCESSOR MEMORY 8CO	5331	985, 986	4325
- 512GB PROCESSOR MEMORY 16C	5331	985, 986	4326
- 1TB PROCESSOR MEMORY 24COR	5331	985, 986	4327
- 2TB PROCESSOR MEMORY 24COR	5331	985, 986	4328
- 1 TB Processor memory (24-core only)	5331	988	4487
- 2 TB Processor memory (48-core only)	5331	988	4488
Processor license indicators:			
- 6-core processor indicator	5331	984	4421
- 8-core processor indicator	5331	985, 986	4422
- 16-core processor indicator	5331	985, 986	4423
- 24-core processor indicator	5331	985, 986	4424
- 24-core processor indicator	5331	988	4868
- 48-core processor indicator	5331	988	4888
Function Authorization indicators			
Base Function (BF):			
- BF - Up to 100 TB capacity	5331	984, 985, 986, 988	8151
- BF 100.1TB TO 250TB CAPACI	5331	984, 985, 986, 988	8152
- BF 250.1TB TO 500TB CAPACI	5331	984, 985, 986, 988	8153
- BF 500.1TB TO 1250TB CAPAC	5331	984, 985, 986, 988	8154

Description	Machine type	Model	Feature number
- BF 1250.1TB TO 3000TB CAPA	5331	984, 985, 986, 988	8155
- BF 3000.1TB TO 6000TB CAPA	5331	984, 985, 986, 988	8156
- BF - 6000.1 TB to 10000 TB	5331	984, 985, 986, 988	8160
Copy Services (CS) license:			
- CS - Inactive	5331	984, 985, 986, 988	8250
- CS - Up to 100 TB capacity	5331	984, 985, 986, 988	8251
- CS 100.1TB TO 250TB CAPACI	5331	984, 985, 986, 988	8252
- CS 250.1TB TO 500TB CAPACI	5331	984, 985, 986, 988	8253
- CS 500.1TB TO 1250TB CAPAC	5331	984, 985, 986, 988	8254
- CS 1250.1TB TO 3000TB CAPA	5331	984, 985, 986, 988	8255
- CS 3000.1TB TO 6000TB CAPA	5331	984, 985, 986, 988	8256
- CS - 6000.1 TB to 10000 TB	5331	984, 985, 986, 988	8260
z-synergy Services (zsS) license:			
- zsS - Active	5331	984, 985, 986, 988	8300
- zsS - Inactive	5331	984, 985, 986, 988	8350
- zsS - Up to 100 TB capacity	5331	984, 985, 986, 988	8351
- ZSS 100.1TB TO 250TB CAPAC	5331	984, 985, 986, 988	8352
- ZSS 250.1TB TO 500TB CAPAC	5331	984, 985, 986, 988	8353
- ZSS 500.1TB TO 1250TB CAPA	5331	984, 985, 986, 988	8354
- ZSS 1250.1TB TO 3000TB CAP	5331	984, 985, 986, 988	8355
- ZSS 3000.1TB TO 6000TB CAP	5331	984, 985, 986, 988	8356
- ZSS 6000.1TB TO 10000TB	5331	984, 985, 986, 988	8360
Copy Services Manager (CSM on HMC) license:			
- CSM on HMC - Inactive	5331	984, 985, 986, 988	8450
- CSM UP TO 100 TB CAP	5331	984, 985, 986, 988	8451
- CSM 100.1 TB TO 250 TB CAP	5331	984, 985, 986, 988	8452
- CSM 250.1 TB TO 500 TB CAP	5331	984, 985, 986, 988	8453
- CSM 500.1 TB TO 1250 TB CA	5331	984, 985, 986, 988	8454
- CSM 1250.1 TB TO 3000 TB C	5331	984, 985, 986, 988	8455
- CSM 3000.1 TB TO 6000 TB C	5331	984, 985, 986, 988	8456
- CSM 6000.1 TB TO 100000 TB	5331	984, 985, 986, 988	8460

Description	Machine type	Model	Feature number
IGF transaction:			
- IGF transaction indicator	5331	984, 985, 986, 988	8999
Shipping and Handling NC	5331	984, 985, 986, 988, 85E, 86E, 88E	AG00
Shipping and handling 984	5331	984	AGAA
Shipping and handling 985	5331	985	AGAC
Shipping and handling 85E	5331	85E	AGAD
Shipping and handling 986	5331	986	AGAE
Shipping and handling 86E	5331	86E	AGAF
Shipping and handling 988	5331	988	AGAG
Shipping and handling 88E	5331	88E	AGAH

Description	Machine type	Model	Feature number
FLASH CUSTOM PLACEMENT IND	2831	985, 986, 85E, 86E	0606
Special tool:			
- Kick Step	2831	984, 985, 986	1103

Description	Feature number	Install type	Feature conversion	Feature exchange	Feature remove	CSU
Model 8xE merge indicators:						
- 8xE factory merge	0003	Plant only	No	No	No	N/A
- 8xE field merge	0004	Plant only	No	No	No	N/A
- PPA Software Order Indicator	0017	Both	No	No	No	N/A
- DoD indicator	0020	Plant only	No	No	No	N/A
- JEMT indicator	0021	Plant only	No	No	No	N/A
Custom features:						
- Top Expansion	0170	Both	No	No	No	No
- Shipping weight reduction	0200	Plant only	No	No	No	N/A
Model 8xE position indicators:						
- 98x - 8xE position 1	0241	Both	No	No	Yes	N/A

Description	Feature number	Install type	Feature conversion	Feature exchange	Feature remove	CSU
Encryption not capable	0403	Plant only	No	No	No	N/A
FLASH CUSTOM PLACEMENT IND	0606	Both	No	No	No	N/A
Initial system capacity:						
- Up to 5 TB capacity	0795	Both	No	No	Yes	N/A
- 5.1 TB to 10 TB capacity	0796	Both	No	No	Yes	N/A
- 10.1 TB to 25 TB capacity	0797	Both	No	No	Yes	N/A
- 25.1 TB to 50 TB capacity	0798	Both	No	No	Yes	N/A
- 50.1 TB to 75 TB capacity	0799	Both	No	No	Yes	N/A
- 75.1 TB TO 100.0 TB CAPACI	0801	Both	No	No	Yes	N/A
- INIT SYS CAPACITY 100.1TB	0803	Both	No	No	Yes	N/A
- INIT SYS CAPACITY 250.1TB	0804	Both	No	No	Yes	N/A
- INIT SYS CAPACITY 500.1TB	0806	Both	No	No	Yes	N/A
- INIT SYS CAPACITY 1250.1TB	0807	Both	No	No	Yes	N/A
- INIT SYS CAPACITY 3000.1TB	0808	Both	No	No	Yes	N/A
- INIT SYS CAPACITY 6000.1TB	0809	Both	No	No	Yes	N/A
Attachment indicators:						
- ATTACHM INDIC OPENWAVE ALL	0930	Both	No	No	No	N/A

Description	Feature number	Install type	Feature conversion	Feature exchange	Feature remove	CSU
-IBM System i indicator	0931	Both	No	No	No	N/A
-IBM System p indicator	0932	Both	No	No	No	N/A
-IBM System x indicator	0933	Both	No	No	No	N/A
-IBM System z indicator	0934	Both	No	No	No	N/A
-IBM System z B/C indicator	0935	Both	No	No	No	N/A
- ATTACHM INDIC SYSTEM ZENTE	0936	Both	No	No	No	N/A
-Linux indicator	0940	Both	No	No	No	N/A
- Storage Appliance indicator	0952	Both	No	No	No	N/A
-IBM ProtecTIER indicator	0960	Both	No	No	No	N/A
-IBM Storwize V7000 indicator	0961	Both	No	No	No	N/A
-IBM N series indicator	0962	Both	No	No	No	N/A
- ATTACHM INDIC SAN VOLUME C	0963	Both	No	No	No	N/A
- EPIC ATTACHMENT INDICATOR	0964	Both	No	No	No	N/A
- VMware VAAI indicator	0965	Both	No	No	No	N/A
- OpenStack indicator	0966	Both	No	No	No	N/A
- ATTACHM INDIC US TAA COMPL	0983	Plant only	No	No	No	N/A
Power:						
- Single phase DC-UPS	1050	Plant only	No	No	No	No

Description	Feature number	Install type	Feature conversion	Feature exchange	Feature remove	CSU
- Three phase DC-UPS	1052	Plant only	No	No	No	No
- Extended PLD	1055	Both	No	No	No	No
Single phase line cords:						
- SNG PHASE LINE CORDS SPP	1062	Both	No	No	No	No
- SNG PHASE LINE CORDS SPP	1063	Both	No	No	No	No
Three phase line cords:						
- 3PHS 380-415V 30A 5 PIN	1086	Both	No	No	No	No
- 3PHS 200-240V 30A 4 PIN	1087	Both	No	No	No	No
- 3PHS 380-415V 40A No CON	1088	Both	No	No	No	No
- 3PHS 200-240V 60A 4 PIN	1089	Both	No	No	No	No
Special tool:						
- Overhead ladder - 5ft	1101	Both	No	No	No	No
- Ladder - Top Expansion - 3ft	1102	Both	No	No	No	No
- Kick Step	1103	Both	No	No	No	No
Management Console:						
- Mgmt console - Primary	1140	Plant only	No	No	No	No
- Mgmt console - Secondary	1150	Both	No	No	No	No
I O ENCLOSURE PAIR PCIE 3	1303	Both	No	No	No	No

Description	Feature number	Install type	Feature conversion	Feature exchange	Feature remove	CSU
Top exit bracket:						
- TOP EXIT BRACKET FOR FIBRE	1400	Both	No	No	No	No
Fibre Channel/ FICON cables:						
- 50 um Fibre cable (LC)	1410	Both	No	No	No	No
- 50 um Fibre cable (LC/SC)	1411	Both	No	No	No	No
- 50 um Fibre cable (Jumper)	1412	Both	No	No	No	No
- 9 um Fibre cable (LC)	1420	Both	No	No	No	No
- 9 um Fibre cable (LC/SC)	1421	Both	No	No	No	No
- 9 um Fibre cable (Jumper)	1422	Both	No	No	No	No
High Performance Flash Enclosure Gen2 family:						
- High Performance Flash Enclosure Gen2 pair	1600	Both	No	No	No	No
-400 GB 2.5-inch flash card set	1610	Both	No	No	No	No
- 800 GB 2.5-inch flash card set	1611	Both	No	No	No	No
- 1600 GB 2.5-inch flash card set	1612	Both	No	No	No	No
- 3200 GB 2.5-inch flash card set	1613	Both	No	No	No	No
- Flash enclosure filler set	1699	Both	No	No	No	No

Description	Feature number	Install type	Feature conversion	Feature exchange	Feature remove	CSU
DS8000 Licensed Machine Code:						
-DS8000 LMC R8.2	1882	Both	No	No	Yes	No
-DS8000 LMC R8.2 indicator	1982	Both	No	No	Yes	N/A
Earthquake kit	1906	Both	No	No	Yes	No
Hardware installation MES	1999	Field only	No	No	No	No
Host adapters:						
- 8GB 4PORT SW FCP FICON ADA	3153	Both	Yes	No	No	No
- 8GB 8PORT SW FCP FICON ADA	3157	Both	Yes	No	No	No
- 8GB 4PORT LW FCP FICON ADA	3253	Both	Yes	No	No	No
- 8GB 8PORT LW FCP FICON ADA	3257	Both	Yes	No	No	No
- 16GB 4PORT SW FCP FICON AD	3353	Both	Yes	No	Yes	No
- 16GB 4PORT LW FCP FICON AD	3453	Both	Yes	No	Yes	No
Processor memory:						
- 64GB PROCESSOR MEMORY 6COR	4223	Both	Yes	No	No	No
- 128GB PROCESSOR MEMORY 6CO	4224	Both	Yes	No	No	No
- 256GB PROCESSOR MEMORY 6CO	4225	Both	Yes	No	No	No
- 128GB PROCESSOR MEMORY 8CO	4324	Both	Yes	No	No	No

Description	Feature number	Install type	Feature conversion	Feature exchange	Feature remove	CSU
- 256GB PROCESSOR MEMORY 8CO	4325	Both	Yes	No	No	No
- 512GB PROCESSOR MEMORY 16C	4326	Both	Yes	No	No	No
- 1TB PROCESSOR MEMORY 24COR	4327	Both	Yes	No	No	No
- 2TB PROCESSOR MEMORY 24COR	4328	Both	Yes	No	No	No
- 1TB PROCESSOR MEMORY 24COR	4487	Both	Yes	No	No	No
- 2TB PROCESSOR MEMORY 24COR	4488	Both	Yes	No	No	No
Processor license indicators:						
- 6-core processor indicator	4421	Both	No	No	No	No
- 8-core processor indicator	4422	Both	No	No	Yes	No
- 16-core processor indicator	4423	Both	No	No	Yes	No
- 24-core processor indicator	4424	Both	No	No	Yes	No
- 24-core processor indicator	4868	Both	No	No	Yes	No
- 48-core processor indicator	4888	Both	No	No	Yes	No
Function Authorization indicators						
Base Function (BF):						
- BF - Up to 100 TB capacity	8151	Both	No	No	Yes	N/A
- BF 100.1TB TO 250TB CAPACI	8152	Both	No	No	Yes	N/A
- BF 250.1TB	8153	Both	No	No	Yes	N/A

Description	Feature number	Install type	Feature conversion	Feature exchange	Feature remove	CSU
TO 500TB CAPACI						
- BF 500.1TB TO 1250TB CAPAC	8154	Both	No	No	Yes	N/A
- BF 1250.1TB TO 3000TB CAPA	8155	Both	No	No	Yes	N/A
- BF 3000.1TB TO 6000TB CAPA	8156	Both	No	No	Yes	N/A
- BF - 6000.1 TB to 10000 TB	8160	Both	No	No	Yes	N/A
Copy Services (CS) license:						
- CS - Inactive	8250	Both	No	No	Yes	N/A
- CS - Up to 100 TB capacity	8251	Both	No	No	Yes	N/A
- CS 100.1TB TO 250TB CAPACI	8252	Both	No	No	Yes	N/A
- CS 250.1TB TO 500TB CAPACI	8253	Both	No	No	Yes	N/A
- CS 500.1TB TO 1250TB CAPAC	8254	Both	No	No	Yes	N/A
- CS 1250.1TB TO 3000TB CAPA	8255	Both	No	No	Yes	N/A
- CS 3000.1TB TO 6000TB CAPA	8256	Both	No	No	Yes	N/A
- CS - 6000.1 TB to 10000 TB	8260	Both	No	No	Yes	N/A
z- synergy Services						

Description	Feature number	Install type	Feature conversion	Feature exchange	Feature remove	CSU
(zsS) license:						
- zsS - Active	8300	Both	No	No	Yes	N/A
- zsS - Inactive	8350	Both	No	No	Yes	N/A
- zsS - Up to 100 TB capacity	8351	Both	No	No	Yes	N/A
- ZSS 100.1TB TO 250TB CAPAC	8352	Both	No	No	Yes	N/A
- ZSS 250.1TB TO 500TB CAPAC	8353	Both	No	No	Yes	N/A
- ZSS 500.1TB TO 1250TB CAPA	8354	Both	No	No	Yes	N/A
- ZSS 1250.1TB TO 3000TB CAP	8355	Both	No	No	Yes	N/A
- ZSS 3000.1TB TO 6000TB CAP	8356	Both	No	No	Yes	N/A
- ZSS 6000.1TB TO 10000TB	8360	Both	No	No	Yes	N/A
Copy Services Manager (CSM on HMC) license:						
- CSM on HMC - Inactive	8450	Both	No	No	Yes	N/A
- CSM UP TO 100 TB CAP	8451	Both	No	No	Yes	N/A
- CSM 100.1 TB TO 250 TB CAP	8452	Both	No	No	Yes	N/A
- CSM 250.1 TB TO 500 TB CAP	8453	Both	No	No	Yes	N/A
- CSM 500.1 TB TO 1250 TB CA	8454	Both	No	No	Yes	N/A

Description	Feature number	Install type	Feature conversion	Feature exchange	Feature remove	CSU
- CSM 1250.1 TB TO 3000 TB C	8455	Both	No	No	Yes	N/A
- CSM 3000.1 TB TO 6000 TB C	8456	Both	No	No	Yes	N/A
- CSM 6000.1 TB TO 100000 TB	8460	Both	No	No	Yes	N/A
IGF transaction:						
- IGF transaction indicator	8999	Field only	No	No	Yes	N/A
Shipping and Handling NC	AG00	Plant only	No	No	No	N/A
Shipping and handling 984	AGAA	Plant only	No	No	No	N/A
Shipping and handling 985	AGAC	Plant only	No	No	No	N/A
Shipping and handling 85E	AGAD	Plant only	No	No	No	N/A
Shipping and handling 986	AGAE	Plant only	No	No	No	N/A
Shipping and handling 86E	AGAF	Plant only	No	No	No	N/A
Shipping and handling 988	AGAG	Plant only	No	No	No	N/A
Shipping and handling 88E	AGAH	Plant only	No	No	No	N/A
Description						
FLASH CUSTOM PLACEMENT IND	0606	Both	No	No	No	N/A
Special tool:						
- Kick Step	1103	Both	No	No	No	No

CSU = Customer setup

N/A = Not applicable

* 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.

ServiceElect (ESA) charges

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

Feature conversion purchase price

Machine type 5331 Models 984, 985, 986, and 988

From feature	To feature	Returned parts*	Description	Continuous maintenance
Host adapters:				
3153	3157	Yes	Host adapter conversion	Yes
3153	3253	Yes	Host adapter conversion	Yes
3153	3257	Yes	Host adapter conversion	Yes
3157	3153	Yes	Host adapter conversion	Yes
3157	3253	Yes	Host adapter conversion	Yes
3157	3257	Yes	Host adapter conversion	Yes
3253	3153	Yes	Host adapter conversion	Yes
3253	3157	Yes	Host adapter conversion	Yes
3253	3257	Yes	Host adapter conversion	Yes
3257	3153	Yes	Host adapter conversion	Yes
3257	3157	Yes	Host adapter conversion	Yes
3257	3253	Yes	Host adapter conversion	Yes
3353	3453	Yes	Host adapter conversion	Yes
3453	3353	Yes	Host adapter conversion	Yes

Machine type 5331 Model 984

From feature	To feature	Returned parts*	Description	Continuous maintenance
4223	4224	No	Processor memory conversion	Yes
4223	4225	No	Processor memory conversion	Yes

From feature	To feature	Returned parts*	Description	Continuous maintenance
4224	4225	No	Processor memory conversion	Yes

Machine type 5331 Models 985 and 986

From feature	To feature	Returned parts*	Description	Continuous maintenance
Processor memory:				
4324	4325	No	Processor memory conversion	Yes
4324	4326	No	Processor memory conversion	Yes
4325	4326	No	Processor memory conversion	Yes
4325	4327	No	Processor memory conversion	Yes
4326	4327	No	Processor memory conversion	Yes
4326	4328	No	Processor memory conversion	Yes
4327	4328	No	Processor memory conversion	Yes
Processor License feature indicators:				
4422	4423	No	Processor License feature conversion	Yes
4422	4424	No	Processor License feature conversion	Yes
4423	4424	No	Processor License feature conversion	Yes

Machine type 5331 Model 988

From feature	To feature	Returned parts*	Description	Continuous maintenance
Processor memory:				
4487	4488	No	Processor memory conversion	Yes
Processor License feature indicators:				
4868	4888	No	Processor License feature conversion	Yes

Machine type 5331 Model 85E, 86E, and 88E

From feature	To feature	Returned parts*	Description	Continuous maintenance
Host adapters:				

From feature	To feature	Returned parts*	Description	Continuous maintenance
3153	3157	Yes	Host adapter conversion	Yes
3153	3253	Yes	Host adapter conversion	Yes
3153	3257	Yes	Host adapter conversion	Yes
3157	3153	Yes	Host adapter conversion	Yes
3157	3253	Yes	Host adapter conversion	Yes
3157	3257	Yes	Host adapter conversion	Yes
3253	3153	Yes	Host adapter conversion	Yes
3253	3157	Yes	Host adapter conversion	Yes
3253	3257	Yes	Host adapter conversion	Yes
3257	3153	Yes	Host adapter conversion	Yes
3257	3157	Yes	Host adapter conversion	Yes
3257	3253	Yes	Host adapter conversion	Yes
3353	3453	Yes	Host adapter conversion	Yes
3453	3353	Yes	Host adapter conversion	Yes

Machine type 5331 Models 984, 985, 986, 988, 85E, 86E, and 88E

From feature	To feature	Returned parts*	Description	Continuous maintenance
1610	1611	Flash cards conversion	Yes	Yes
1610	1612	Flash cards conversion	Yes	Yes
1610	1613	Flash cards conversion	Yes	Yes
1611	1612	Flash cards conversion	Yes	Yes
1611	1613	Flash cards conversion	Yes	Yes
1612	1613	Flash cards conversion	Yes	Yes

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

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Corrections

(Corrected on January 28, 2017)

The CRU and On-site Service section in the Terms and conditions has been updated.