

IBM DS8900F storage family delivers additional features and functions

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At a glance

IBM[®] DS8900F models offer additional cyber resilience, ultra-low latency, cloud and object integration functionalities, and features to improve storage efficiency.

Overview

This release provides enhancements to cyber resilience, storage efficiency, ultra-low latency, and cloud and object integration with additional features and functions:

- Dynamic expansion of the safeguarded backup capacity
- Space release support for devices protected by IBM Safeguarded Copy
- 70% more system memory in IBM DS8950F to increase cache hit ratio and improve workload consolidation
- 1.92 TB high-capacity flash drive sets available for DS8950F models
- zHyperLink write support for Global Mirror primary devices
- Compression support for transparent cloud tiering with TS7700 as an object store
- Secure data transfer for transparent cloud tiering to TS7700 as an object store
- DFSMSdss full volume dump support for transparent cloud tiering
- DS8910F Model 993 integration with IBM z15[™] (Model T02) and LinuxONE III (Model LT2)

Key requirements

All announced features and functions that are supported on the IBM DS8000[®] series require DS8000 LMC 8.9.10.xx.xx (bundle version 89.10.xx.xx), or later.

Planned availability date

September 11, 2020

Description

The IBM DS8900F family is designed for data-intensive, mission-critical workloads adding next-level performance, data protection, resiliency, and availability across your hybrid multicloud solutions through ultra-low latency, better than seven

9s availability with HyperSwap^(R), transparent cloud tiering, and advanced data protection against malware and ransomware.

Additional features and functions provide enhancements to the following aspects of the DS8900F family:

Cyber resilience

- Dynamic expansion of safeguarded backup capacity

The amount of safeguarded backup capacity depends on the number copies and retention period of the backups that are maintained by the safeguarded schedule, as well as the write workload on the safeguarded source devices. If the backup policy needs to be changed, it is possible to dynamically increase the backup capacity by providing a new value for the virtual capacity reservation for a volume. Details to determine this value can be found in the [IBM DS8000 Safeguarded Copy Redbook](#).

- Space release support for devices protected by IBM Safeguarded Copy

Storage capacity can be maximized while reducing costs by reclaiming deleted space and make it available for reuse to meet continuous storage needs in environments protected by IBM Safeguarded Copy. Space can be released when no targets need the reclaimed data and the retention period has expired. If unused safeguarded copies already exist, their space will not be released but reused once their retention periods expire.

Storage efficiency

- 70% more system memory in IBM DS8950F to increase cache hit ratio and enable greater workload consolidation

DS8950F Model 996 supports 3.4 TB of cache (feature number 4455), which can help reduce the total cost of ownership and consolidates your mission critical workloads at a rate of 2:1 or more.

- 1.92 TB high-capacity flash drive sets available for DS8950F models

The 1.92 TB flash drive set (feature number 1622) is available for models 996 and E96 to provide additional performance options with flexible capacity to address application and business requirements. This high-capacity flash drive is added to the already supported 400 GB, 800 GB, 1.6 TB, and 3.2 TB high-performance flash drive sets, and 3.84 TB, 7.68 TB, and 15.36 TB high-capacity flash drives. Intermixing of high-performance and high-capacity flash drives in the same enclosure is not supported.

Ultra-low latency

- zHyperLink write support for Global Mirror primary devices

Low latency helps organizations to improve client satisfaction, achieve higher levels of service delivery, and capitalize on new business opportunities. IBM zHyperLink is the result of an IBM research project created to provide ultra-low latency links between the mainframe and the storage. With the extension of zHyperLink writes to Global Mirror, clients can take advantage of the performance benefits provided by zHyperLink while ensuring high availability and disaster recovery.

zHyperLink writes are already supported for Metro Mirror when used with zHyperWrite, and with Global Mirror write support, users can now use zHyperLink writes with HyperSwap and Global Mirror together to provide the best combination of performance, high availability, and disaster recovery in the industry.

Cloud and object integration

- Compression support for transparent cloud tiering with TS7700 as an object store

Data can be compressed within the DS8900F prior to being transferred over TCPIP to a TS7700 configured as an object store. This enables clients to store more data in the same physical space within the TS7700, reducing cost per GB, improving performance, reducing bandwidth requirements with no impact in IOPS performance, and maximizing system resources by avoiding compression if data is already compressed or encrypted.

- Secure Data Transfer for transparent cloud tiering to TS7700 as an object store

Secure data transfer offers next-level cybersecurity with SP 800-131A-compliant encryption for secure file transfer between DS8900F and TS7700 clusters within a grid. It protects data in-flight over TCPIP through AES 256-bit encryption with no impact in IOPS performance and without the need of an external key manager server and efficient use of resources.

- DFSMSdss full volume dump support for transparent cloud tiering

Full volume copies of data can be backed up to the cloud with DFSMSdss where they can later be used to repair or recover a production environment that has been corrupted by system failures, human error, or compromised by either a cyberattack or internal attack.

DFSMSdss leverages transparent cloud tiering to target either cloud object storage or a TS7700 configured as an object store.

When targeting a TS7700 configured as an object store, these backup copies take advantage of all of the benefits provided by DS8900F transparent cloud tiering:

- No additional server or gateway required
- No impact in IOPS performance
- All logical volume tracks are moved directly between the DS8900F and the TS7700, without having to pass through Z
- In-flight encryption with AES 256-bit
- Data compression occurs within the DS8900F, minimizing both the data sent across the link and the storage required within the TS7700

This is a joint function between DS8900F and IBM Z^(R). You need to verify that both the DS8900F and IBM Z units are capable of supporting this function before using it.

DFSMSdsm also plans to provide full volume dump support using transparent cloud tiering. This capability will include the FRBACKUP and FRRECOV functions, enabling Db2^(R) BACKUP / RESTORE SYSTEM to leverage this capability. For more information, see Software Announcement [220-226](#), dated June 16, 2020.

Statements by IBM regarding its plans, directions, and intent are subject to change or withdrawal without notice at the sole discretion of IBM. Information regarding potential future products is intended to outline general product direction and 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 IBM products remain at the sole discretion of IBM.

DS8910F Model 993 is able to be integrated in a z15TM (Model T02) or LinuxONE III (Model LT2). Integration with a z15 T02 system requires feature number 0611 to be ordered. Integration with a LinuxONE III LT2 system requires feature number 0621

to be ordered. You must verify that the compliance certifications in your geography are complete before ordering and integrating the storage. This can be done by reviewing the [z15 T02 and LinuxONE III LT2 Exception Letter](#) on [Resource Link^{\(R\)}](#). Failure to do so may result in a noncompliant machine configuration.

Section 508 of the US Rehabilitation Act

IBM DS8900F storage family is capable, 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 Accessibility Conformance Statement can be requested on the [Product accessibility information](#) website.

Reference information

For more information about DS8900F family products, see the following Hardware Announcements:

- [119-060](#), dated September 12, 2019
- [119-061](#), dated September 12, 2019
- [119-062](#), dated September 12, 2019
- [119-063](#), dated September 12, 2019

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

Product number

The following are newly announced features of the IBM System StorageTM 5331, 5332, 5333, and 5334 machine types:

Description	Machine type	Model	Feature
z14 (Model ZR1) field integration	5331	993	0610
z15 TM (Model T02) field integration	5331	993	0611
LinuxONE (Model LR1) field integration	5331	993	0620
LinuxONE III (Model LT2) field integration	5331	993	0621
3 phase Delta Power - 200-240V (LL) 60A/63A IEC 60309 (4 pin 3+PE)	5331	993	1045
DS8000 LMC R9.1	5331	993	1891
3 phase Delta Power - 200-240V (LL) 60A/63A IEC 60309 (4 pin 3+PE)	5331	994	1045
DS8000 LMC R9.1	5331	994	1891
1.92 TB 2.5" flash encl ind	5331	996	0264
3 phase Delta Power - 200-240V (LL) 60A/63A IEC 60309 (4 pin 3+PE)	5331	996	1045

Description	Machine type	Model	Feature
1.92 TB 2.5-inch highcapacity flash	5331	996	1622
DS8000 LMC R9.1	5331	996	1891
3.4 TB system cache (20 core)	5331	996	4455
1.92 TB 2.5" flash encl ind	5331	E96	0264
3 phase Delta Power - 200-240V (LL) 60A/63A IEC 60309 (4 pin 3+PE)	5331	E96	1045
1.92 TB 2.5-inch highcapacity flash	5331	E96	1622
DS8000 LMC R9.1 indicator	5331	E96	1991
z14 (Model ZR1) field integration	5332	993	0610
z15 (Model T02) field integration	5332	993	0611
LinuxONE (Model LR1) field integration	5332	993	0620
LinuxONE III (Model LT2) field integration	5332	993	0621
3 phase Delta Power - 200-240V (LL) 60A/63A IEC 60309 (4 pin 3+PE)	5332	993	1045
DS8000 LMC R9.1	5332	993	1891
3 phase Delta Power - 200-240V (LL) 60A/63A IEC 60309 (4 pin 3+PE)	5332	994	1045
DS8000 LMC R9.1	5332	994	1891
1.92 TB 2.5" flash encl ind	5332	996	0264
3 phase Delta Power - 200-240V (LL) 60A/63A IEC 60309 (4 pin 3+PE)	5332	996	1045
1.92 TB 2.5-inch highcapacity flash	5333	996	1622
DS8000 LMC R9.1	5332	996	1891
3.4 TB system cache (20 core)	5332	996	4455
1.92 TB 2.5" flash encl ind	5332	E96	0264
3 phase Delta Power - 200-240V (LL) 60A/63A IEC 60309 (4 pin 3+PE)	5332	E96	1045
1.92 TB 2.5-inch highcapacity flash	5332	E96	1622
DS8000 LMC R9.1 indicator	5332	E96	1991
z14 (Model ZR1) field integration	5333	993	0610

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z15 (Model T02) field integration	5333	993	0611
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DS8000 LMC R9.1	5333	996	1891
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DS8000 LMC R9.1	5334	996	1891
3.4 TB system cache (20 core)	5334	996	4455
1.92 TB 2.5" flash encl ind	5334	E96	0264
3 phase Delta Power - 200-240V (LL) 60A/63A IEC 60309 (4 pin 3+PE)	5334	E96	1045
1.92 TB 2.5-inch highcapacity flash	5334	E96	1622
DS8000 LMC R9.1 indicator	5334	E96	1991

Feature conversions

The existing components being replaced during a model or feature conversion become the property of IBM and must be returned.

Feature conversions are always implemented on a "quantity of one for quantity of one" basis. Multiple existing features may not be converted to a single new feature. Single existing features may not be converted to multiple new features.

The following conversions are available to clients:

Feature conversions for 5331-996

From feature:	To feature:	Returned parts*
4452 - 512GB System Cache (10 core)	4454 - 2048GB System Cache (20 core)	No
4452 - 512GB System Cache (10 core)	4455 - 3.4 TB system cache (20 core)	Yes
4453 - 1024GB System Cache (20 core)	4455 - 3.4 TB system cache (20 core)	Yes
4454 - 2048GB System Cache (20 core)	4455 - 3.4 TB system cache (20 core)	Yes

Feature conversions for 5332-996

From feature:	To feature:	Returned parts*
4452 - 512GB System Cache (10 core)	4454 - 2048GB System Cache (20 core)	No
4452 - 512GB System Cache (10 core)	4455 - 3.4 TB system cache (20 core)	Yes
4453 - 1024GB System Cache (20 core)	4455 - 3.4 TB system cache (20 core)	Yes
4454 - 2048GB System Cache (20 core)	4455 - 3.4 TB system cache (20 core)	Yes

Feature conversions for 5333-996

From feature:	To feature:	Returned parts*
4452 - 512GB System Cache (10 core)	4454 - 2048GB System Cache (20 core)	No
4452 - 512GB System Cache (10 core)	4455 - 3.4 TB system cache (20 core)	Yes

From feature:	To feature:	Returned parts*
4453 - 1024GB System Cache (20 core)	4455 - 3.4 TB system cache (20 core)	Yes
4454 - 2048GB System Cache (20 core)	4455 - 3.4 TB system cache (20 core)	Yes

Feature conversions for 5334-996

From feature:	To feature:	Returned parts*
4452 - 512GB System Cache (10 core)	4454 - 2048GB System Cache (20 core)	No
4452 - 512GB System Cache (10 core)	4455 - 3.4 TB system cache (20 core)	Yes
4453 - 1024GB System Cache (20 core)	4455 - 3.4 TB system cache (20 core)	Yes
4454 - 2048GB System Cache (20 core)	4455 - 3.4 TB system cache (20 core)	Yes

*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^(R) ID and password are required (use IBMid).

[BP Attachment for Announcement Letter 120-040](#)

Publications

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

You can search, view, and collaborate with documentation using [IBM Knowledge Center](#). IBM Knowledge Center is an IBM-wide view of technical information with multiple sources of offerings in a single location.

IBM Knowledge Center provides a centralized and consolidated way to access the information you need to use IBM products and also provides innovative ways to find information and to create your own set of information to cater to your needs. You will be able to personalize views, build customer documents, and interact with other information.

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

The Publications Center is a worldwide central repository for IBM product publications and marketing material with a catalog of 70,000 items. Extensive search facilities are provided. A large number of publications are available online in various file formats, which can currently be downloaded.

Services

IBM Systems Lab Services

IBM Systems Lab Services offers a wide array of services available for your enterprise. It brings expertise on the latest technologies from the IBM development community and can help with your most difficult technical challenges.

IBM Systems Lab Services exists to help you successfully implement emerging technologies so as to accelerate your return on investment and improve your satisfaction with your IBM systems and solutions. Services examples include initial implementation, integration, migration, and skills transfer on IBM systems solution

capabilities and recommended practices. IBM Systems Lab Services is one of the service organizations of IBM's world-renowned IBM Systems Group development labs.

For details on available services, contact your IBM representative or go to the [Lab Services](#) website.

Global Technology Services

IBM services include business consulting, outsourcing, hosting services, applications, and other technology management.

These services help you learn about, plan, install, manage, or optimize your IT infrastructure to be an on-demand business. They can help you integrate your high-speed networks, storage systems, application servers, wireless protocols, and an array of platforms, middleware, and communications software for IBM and many non-IBM offerings. IBM is your one-stop shop for IT support needs.

For details about available services, contact your IBM representative or go to the [IBM Global Technology Services](#) 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 Skills Gateway](#) website.

Technical information

Specified operating environment

Hardware requirements

Licensed Machine Code

All announced features and functions are supported on the IBM System Storage™ DS8000 series and require DS8000 LMC 8.9.10.xx.xx (bundle version 89.10.xx.xx), or later.

Limitations

None.

Planning information

Client responsibilities

Physical configuration planning

Physical configuration planning is a client 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 DS8900F Introduction and Planning Guide* (SC27-9560) for the following models:

- DS8910F flexibility class: Rack-mounted models 993 and 994
- DS8950F agility class: Models 996 and E96

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 DS8900F Introduction and Planning Guide (SC27-9560)* for models 993, 994, 996, and E96.

Logical configuration planning and application

Logical configuration planning is a client responsibility. Logical configuration refers to the creation of RAID arrays, 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 DS8000 Storage Manager (GUI) and DS command-line interface.

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

For capacity calculation guidelines, see the *IBM DS8900F Introduction and Planning Guide (SC27-9560)* for models 993, 994, 996, and E96.

Encryption planning

Encryption planning is a client 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.

- IBM Storage Appliance planning
- IBM Security™ Key Lifecycle Manager (SKLM) planning
- Encryption activation review planning

IBM Storage Appliance planning

IBM Storage Appliance planning is a client responsibility.

According to encryption best practices, DS8900F requires at least two storage appliances and associated software for each site that 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 client'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. This enables 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 clients desiring NIST 800-131a compliance, IBM SKLM, formerly known as IBM Tivoli Key Lifecycle Manager 2.5, or later, is required.

IBM SKLM planning

The DS8000 series now supports SKLM 3.0.

Program number	VRM	Program name
5724-T60	3.0	IBM Security Key Lifecycle Manager (For PPA)
5641-SKL	3.0	IBM Security Key Lifecycle Manager -- 1 year (For AAS)
5641-SKM	3.0	IBM Security Key Lifecycle Manager -- 3 year (For AAS)

To support enterprise-wide encryption-key management, an updated set of pricing metrics is 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, see Software Announcement [213-470](#), dated October 29, 2013.

Isolated key server ordering options

Client-acquired isolated key server: See the [IBM Security Key Lifecycle Manager Knowledge Center](#) for hardware and operating system requirements.

Note: Regardless of the ordering method, clients 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 English publications may be viewed online on the electronic availability date in [IBM Knowledge Center](#).

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

Encryption activation review planning

Encryption activation is a client 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^(R)

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 16 Gbps and 32 Gbps FCP/FICON^(R) host adapter ports to server or fabric ports. Cables can be purchased using the appropriate 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.

These are single 24-fiber cables with MTP connectors. Internally, a single cable houses 12 fibers for transmit and 12 fibers for receive.

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

IBM Systems Lab Services

For details on available services, contact your IBM representative or go to the [Lab Services](#) website.

Terms and conditions

MES discount applicable

No

Field installable feature

Yes

Warranty period

Machine type 5331: One year

Machine type 5332: Two years

Machine type 5333: Three years

Machine type 5334: Four years

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.

Client setup

No

Machine code

Same license terms and conditions as base machine

Prices

The following are newly announced features of the IBM System Storage 5331 machine type:

Description	Model number	Feature numbers	Initial / MES / Both / Support	CSU	RP MES
z14 (Model ZR1) field integration	993	0610	Initial	No	No
z15™ (Model T02) field integration	993	0611	Initial	No	No
LinuxONE (Model LR1) field integration	993	0620	Initial	No	No
LinuxONE III (Model LT2) field integration	993	0621	Initial	No	No
3 phase Delta Power - 200-240V (LL) 60A/63A IEC 60309 (4 pin 3+PE)	993	1045	Both	No	No
DS8000 LMC R9.1	993	1891	Both	No	No

Description	Model number	Feature numbers	Initial / MES / Both / Support	CSU	RP MES
3 phase Delta Power - 200-240V (LL) 60A/63A IEC 60309 (4 pin 3+PE)	994	1045	Both	No	No
DS8000 LMC R9.1	994	1891	Both	No	No
1.92 TB 2.5" flash encl ind	996	0264	Both	No	No
3 phase Delta Power - 200-240V (LL) 60A/63A IEC 60309 (4 pin 3+PE)	996	1045	Both	No	No
1.92 TB 2.5-inch high capacity flash	996	1622	Both	No	No
DS8000 LMC R9.1	996	1891	Both	No	No
3.4 TB system cache (20 core)	996	4455	Both	No	No
1.92 TB 2.5" flash encl ind	E96	0264	Both	No	No
3 phase Delta Power - 200-240V (LL) 60A/63A IEC 60309 (4 pin 3+PE)	E96	1045	Both	No	No
1.92 TB 2.5-inch high capacity flash	E96	1622	Both	No	No
DS8000 LMC R9.1 indicator	E96	1991	Both	No	No

The following are newly announced features of the IBM System Storage 5332 machine type:

Description	Model number	Feature numbers	Initial / MES / Both / Support	CSU	RP MES
z14 (Model ZR1) field integration	993	0610	Initial	No	No

Description	Model number	Feature numbers	Initial / MES / Both / Support	CSU	RP MES
z15 (Model T02) field integration	993	0611	Initial	No	No
LinuxONE (Model LR1) field integration	993	0620	Initial	No	No
LinuxONE III (Model LT2) field integration	993	0621	Initial	No	No
3 phase Delta Power - 200-240V (LL) 60A/63A IEC 60309 (4 pin 3+PE)	993	1045	Both	No	No
DS8000 LMC R9.1	993	1891	Both	No	No
3 phase Delta Power - 200-240V (LL) 60A/63A IEC 60309 (4 pin 3+PE)	994	1045	Both	No	No
DS8000 LMC R9.1	994	1891	Both	No	No
1.92 TB 2.5" flash encl ind	996	0264	Both	No	No
3 phase Delta Power - 200-240V (LL) 60A/63A IEC 60309 (4 pin 3+PE)	996	1045	Both	No	No
1.92 TB 2.5-inch high capacity flash	996	1622	Both	No	No
DS8000 LMC R9.1	996	1891	Both	No	No
3.4 TB system cache (20 core)	996	4455	Both	No	No
1.92 TB 2.5" flash encl ind	E96	0264	Both	No	No
3 phase Delta Power - 200-240V (LL) 60A/63A	E96	1045	Both	No	No

Description	Model number	Feature numbers	Initial / MES / Both / Support	CSU	RP MES
IEC 60309 (4 pin 3+PE)					
1.92 TB 2.5-inch high capacity flash	E96	1622	Both	No	No
DS8000 LMC R9.1 indicator	E96	1991	Both	No	No

The following are newly announced features of the IBM System Storage 5333 machine type:

Description	Model number	Feature numbers	Initial / MES / Both / Support	CSU	RP MES
z14 (Model ZR1) field integration	993	0610	Initial	No	No
z15 (Model T02) field integration	993	0611	Initial	No	No
LinuxONE (Model LR1) field integration	993	0620	Initial	No	No
LinuxONE III (Model LT2) field integration	993	0621	Initial	No	No
3 phase Delta Power - 200-240V (LL) 60A/63A IEC 60309 (4 pin 3+PE)	993	1045	Both	No	No
DS8000 LMC R9.1	993	1891	Both	No	No
3 phase Delta Power - 200-240V (LL) 60A/63A IEC 60309 (4 pin 3+PE)	994	1045	Both	No	No
DS8000 LMC R9.1	994	1891	Both	No	No
1.92 TB 2.5" flash encl ind	996	0264	Both	No	No
3 phase Delta Power - 200-240V (LL) 60A/63A IEC 60309	996	1045	Both	No	No

Description	Model number	Feature numbers	Initial / MES / Both / Support	CSU	RP MES
(4 pin 3+PE)					
1.92 TB 2.5-inch high capacity flash	996	1622	Both	No	No
DS8000 LMC R9.1	996	1891	Both	No	No
3.4 TB system cache (20 core)	996	4455	Both	No	No
1.92 TB 2.5" flash encl ind	E96	0264	Both	No	No
3 phase Delta Power - 200-240V (LL) 60A/63A IEC 60309 (4 pin 3+PE)	E96	1045	Both	No	No
1.92 TB 2.5-inch high capacity flash	E96	1622	Both	No	No
DS8000 LMC R9.1 indicator	E96	1991	Both	No	No

The following are newly announced features of the IBM System Storage 5334 machine type:

Description	Model number	Feature numbers	Initial / MES / Both / Support	CSU	RP MES
z14 (Model ZR1) field integration	993	0610	Initial	No	No
z15 (Model T02) field integration	993	0611	Initial	No	No
LinuxONE (Model LR1) field integration	993	0620	Initial	No	No
LinuxONE III (Model LT2) field integration	993	0621	Initial	No	No
3 phase Delta Power - 200-240V (LL) 60A/63A IEC 60309 (4 pin 3+PE)	993	1045	Both	No	No

Description	Model number	Feature numbers	Initial / MES / Both / Support	CSU	RP MES
DS8000 LMC R9.1	993	1891	Both	No	No
3 phase Delta Power - 200-240V (LL) 60A/63A IEC 60309 (4 pin 3+PE)	994	1045	Both	No	No
DS8000 LMC R9.1	994	1891	Both	No	No
1.92 TB 2.5" flash encl ind	996	0264	Both	No	No
3 phase Delta Power - 200-240V (LL) 60A/63A IEC 60309 (4 pin 3+PE)	996	1045	Both	No	No
1.92 TB 2.5-inch high capacity flash	996	1622	Both	No	No
DS8000 LMC R9.1	996	1891	Both	No	No
3.4 TB system cache (20 core)	996	4455	Both	No	No
1.92 TB 2.5" flash encl ind	E96	0264	Both	No	No
3 phase Delta Power - 200-240V (LL) 60A/63A IEC 60309 (4 pin 3+PE)	E96	1045	Both	No	No
1.92 TB 2.5-inch high capacity flash	E96	1622	Both	No	No
DS8000 LMC R9.1 indicator	E96	1991	Both	No	No

CSU = Customre setup

RP MES = Returnable parts MES

Feature conversion purchase price

Feature conversions for 5331-996

From feature:	To feature:	Returned parts*
4452 - 512GB System Cache (10 core)	4454 - 2048GB System Cache (20 core)	No
4452 - 512GB System Cache (10 core)	4455 - 3.4 TB system cache (20 core)	Yes
4453 - 1024GB System Cache (20 core)	4455 - 3.4 TB system cache (20 core)	Yes
4454 - 2048GB System Cache (20 core)	4455 - 3.4 TB system cache (20 core)	Yes

Feature conversions for 5332-996

From feature:	To feature:	Returned parts*
4452 - 512GB System Cache (10 core)	4454 - 2048GB System Cache (20 core)	No
4452 - 512GB System Cache (10 core)	4455 - 3.4 TB system cache (20 core)	Yes
4453 - 1024GB System Cache (20 core)	4455 - 3.4 TB system cache (20 core)	Yes
4454 - 2048GB System Cache (20 core)	4455 - 3.4 TB system cache (20 core)	Yes

Feature conversions for 5333-996

From feature:	To feature:	Returned parts*
4452 - 512GB System Cache (10 core)	4454 - 2048GB System Cache (20 core)	No
4452 - 512GB System Cache (10 core)	4455 - 3.4 TB system cache (20 core)	Yes
4453 - 1024GB System Cache (20 core)	4455 - 3.4 TB system cache (20 core)	Yes
4454 - 2048GB System Cache (20 core)	4455 - 3.4 TB system cache (20 core)	Yes

Feature conversions for 5334-996

From feature:	To feature:	Returned parts*
4452 - 512GB System Cache (10 core)	4454 - 2048GB System Cache (20 core)	No
4452 - 512GB System Cache (10 core)	4455 - 3.4 TB system cache (20 core)	Yes
4453 - 1024GB System Cache (20 core)	4455 - 3.4 TB system cache (20 core)	Yes
4454 - 2048GB System Cache (20 core)	4455 - 3.4 TB system cache (20 core)	Yes

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

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