

IBM DS8880F family supports additional high-density flash enclosures, a new flash drive option to meet flash demand, and other features and functions

Table of contents

1 Overview	5 Product number
1 Key prerequisites	7 Publications
2 Planned availability date	8 Technical information
2 Description	12 Terms and conditions
5 Statement of general direction	13 Prices
	16 Corrections

At a glance

IBM^(R) DS8880F offers three all-flash models with the following features:

- 3.8 TB 2.5-inch high-capacity flash option
- More flash enclosure pairs
- Features and functions that enable lower latency between IBM z14 and DS8886F, transparent cloud tiering (TCT) support and copy services, and GUI improvements
- Cache options are now available with DDR4 technology
- New processor for Model 988

Overview

The IBM DS8880 all-flash family of products offers:

- Increased number of High-Performance Flash Enclosure Gen2 with DS8884F, DS8886F, and DS8888F offerings
- An additional 3.8 TB 2.5-inch high-capacity flash option for DS8884F Model 984, DS8886F models 985/986/85E/86E, and DS8888F models 988/88E
- Processor refresh for DS8888F
- Lower latency with zHyperlink on DS8886 models with 16-core and 128 GB or 256 GB cache attached to mainframe
- Support added to TCT to improve business efficiency and flexibility
- Cascading FlashCopy^(R) support for flash copy back from target to source without having to destroy other target volumes
- GUI that incorporates Easy Tier^(R) reports
- Cache technology refresh

The zHyperlink enhancements in this release partially fulfill the Statements of General Direction found in Hardware Announcement [A17-0030](#), dated January 10, 2017.

Key prerequisites

All released features and functions supported on the IBM DS8000^(R) series require DS8000 LMC 8.8.30.xx.xx (bundle version 88.30.xxx.xx), or later, except zHyperlink read functionality, which requires DS8000 LMC 8.8.31.xx.xx (bundle version 88.31.xxx.xx), or later.

Planned availability date

September 8, 2017: For all features and functions except zHyperlink read functionality

Note: zHyperlink read functionality requires LMC 88.31.xxx or higher, available on December 8, 2017

Description

New high-capacity 3.8 TB flash drive set

IBM DS8880 offers a new flash capacity of 3.8 TB to provide additional performance options with flexible capacity to address application and business requirements.

This high-capacity flash drive is addition to the already supported 400 GB, 800 GB, 1.6 TB, and 3.2 TB high-performance flash drive sets.

Easy Tier has been enhanced to support the use of high-capacity flash drives and will treat them as a separate tier when combined with high-performance flash drives. This enables both types of flash drives to be contained in the same storage pool with Easy Tier promoting the most active data to the high-performance flash drives.

Intermixing of high-performance flash drives in the same enclosure can be requested as a field MES through RPQ.

Intermixing of high-performance and high-capacity flash drives in the same enclosure is not supported.

With this added flash option, the maximum flash storage capacity supported per flash enclosure is 182.4 TB raw.

Additional capacity

The IBM DS8880F family offers more flash enclosure pairs to drive cost effectiveness to meet the demand for flash storage while maintaining performance and availability.

DS8884F now supports up to four high-performance flash enclosure pairs, delivering a maximum raw capacity of 729.6 TB within a single frame.

DS8886F is a one or two frame system with support for up to four high-performance flash enclosure pairs on each frame, delivering a maximum raw capacity of 1.45 PB.

DS8888F is either a one, two, or three frames system, supporting up to four high-performance flash enclosure pairs on the first frame and up to six high performance flash enclosure pairs on the second and third frames, delivering a maximum raw capacity of 2.9 PB.

New processor options for 988

DS8888F offers new processors that when combined with new memory will boost performance when compared to its predecessor.

zHyperlink

The DS8880 family introduces a low latency hardware attachment supporting direct point-to-point connectivity to IBM z14 servers at distances up to 150 meters called zHyperlink. The hardware required to support zHyperlink connectivity is available in this release. The enablement of the zHyperlink connections for use with host IO on the DS8886 models and hardware MES requires R8.3.1 microcode, which is planned to be generally available on December 8, 2017.

The initial release of zHyperLink will only support read IO.

zHyperLink works in conjunction with a FICON[®] point-to-point or SAN infrastructure to provide extremely low latency connectivity to FICON storage systems.

As per the Statement of Direction found in Hardware Announcement [A17-0030](#), dated January 10, 2017, IBM intends to provide write support to improve active log throughput in a future release. zHyperLink improves application response time, cutting IO sensitive workload response time by up to 50% without requiring application changes.

Note: This response time estimate is based on IBM internal measurements and projections that assume 75% or more of the workload response time is associated with read DASD I/O and the storage system random read cache hit ratio is above 80%. The actual performance experienced by any user may vary.

zHyperLink connectivity to IBM z14 servers supports distances up to 150 m. For each zHyperLink connection on the DS8000 a CXP transceiver must be ordered (feature #3500) which provides the cable connector. Details of the IBM z14 server requirements can be found in Hardware Announcement [A17-0392](#), dated July 17, 2017.

A 24x MTP-MTP cable is required for each zHyperLink connection which can be ordered with the DS8000 (feature number 1450 for a 40m OM4 cable and feature number 1451 for a 150m OM4 cable) or can be obtained separately. This is a single 24-fibre cable with multi-fibre termination push-on (MTP) connectors.

Two fibre type options are available with specifications supporting different distances for the zHyperLink connection for customer provided cables:

- Up to 150 m: OM4 50/125 micrometer multimode fibre optic cable with a fibre bandwidth at wavelength: 4.7 GHz-km at 850 nm.
- Up to 40 m: OM4 50/125 micrometer multimode fibre optic cable with a fibre bandwidth at wavelength: 2.0 GHz-km at 850 nm.

zHyperlink connectivity requires operating system and middleware changes to exploit and requires z/OS[®] V2.1/V2.2/V2.3 with PTFs and Db2 V12 with PTFs. Software Announcement [A17-0390](#), dated July 17, 2017, provides more detail on the z/OS and Db2 support.

IBM also intends to extend the software support for zHyperLinks to other middleware and has provides statements of direction contained in the Software Announcement above.

Initial zHyperLink connectivity supports two zHyperlink connections on each IO bay, providing up to 16 physical connections in a fully configured system with eight IO bays. At general availability zHyperlink support will be restricted to DS8886 configurations with 16 cores and 256 GB or 512 GB of memory, and only four active zHyperlink connections will be able to be used. These restrictions are intended to be lifted in the first half of 2018, enabling up to twelve zHyperlink connections to be used and providing support for all configurations of DS8886 systems.

IBM also intends to extend zHyperlink support to all DS8880 and DS8880F models in future releases.

Transparent cloud tiering

DS8880 enables TCT enables organizations to introduce hybrid cloud as a new storage tier for simplified archive operations on IBM Z environments. TCT improves

business efficiency and flexibility while reducing capital and operating expenses with direct data transfer from DS8880 to the cloud without any impact on performance. TCT can provide more than 50% savings in CPU utilization when archiving large data sets, as compared to archiving to tape¹. An additional server or gateway is not required, TCT is a software feature that leverages the existing DS8880 infrastructure.

¹ Results are based on internal IBM data measurements on an EC12 (8 CPUs, 32GB Main Memory) when migrating data sets exceeding 5,000 3390 tracks in size. Results will vary by customer based on particular workloads, configurations, software levels and the quantity and size of data sets being migrated.

In addition to connectivity to cloud storage using the OpenStack Swift API, TCT now supports the Amazon S3 API, enabling organizations to send data to IBM Cloud Object Storage, IBM Bluemix^(R), and Amazon S3 object storage systems. This provides additional capability and flexibility, whether public or private cloud infrastructures.

This release also includes the capability for DFSMSshsm to direct the DS8880 to recall data to volumes which participate in a two-site Metro Mirror environment. This integration with Metro Mirror is seamless in that data which is recalled is automatically replicated to the Metro Mirror Secondary allowing for support of high availability (HyperSwap^(R)) and disaster recovery environments.

TCT requires z/OS V2.1, V2.2, or V2.3 operating system changes with PTFs to exploit. Contact your IBM representative for PTF availability.

Cascading FlashCopy

This release includes Cascading FlashCopy support to enable a FlashCopy source device to become a FlashCopy target, or a FlashCopy target device to become a FlashCopy source. This provides improvements to a range of scenarios including the following use cases:

- Reverse one of several FlashCopy relationships from a source device to restore this copy without first removing the other relationships
- Recover a Global Mirror environment without needing to withdraw an existing FlashCopy used for Disaster Recovery testing
- Use dataset FlashCopy between devices that are both also the sources of full volume FlashCopy relationships, including in Remote Pair FlashCopy environments
- Perform an object-level restore using FlashCopy from a Db2 System Backup which still has an active FlashCopy relationship
- Increase the flexibility of dataset FlashCopy where an existing source track can become a target of a new FlashCopy and an existing target track can become a source of a new FlashCopy

GUI improvements

With an increase in GUI logins from around 6,000 per month at the start of 2016 and over 16,000 per month at the start of 2017, the utilization of the DS8000 management GUI has exploded due to its fast response time, ease of use, and intuitive design. As of this release, many enhancements continue to be added to greatly improve the productivity of storage administrators.

The management GUI delivers the following enhancements:

- Fully integrated Easy Tier reporting
- Full reporting and monitoring support for FlashCopy, Mirroring, and Mirroring Paths
- Advanced provisioning support for IBM Z and IBM i volume configurations
- Integrated functionality from the DS8000 Service Management Console

New DDR4 technology

The DS8880 family is refreshing the current cache options by introducing processor memories with DDR4 technology. DDR4 memories require license machine code release 8.3, or higher, and replace the current DDR3 cache options for initial orders. New orders no longer support DDR3 cache options. Cache upgrades in the field are available if they match the same DDR technology.

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.

Statement of general direction

With the release of the 3.8 TB flash drives, IBM is introducing a new family of high-capacity flash drive sets for IBM System Storage[®] DS8880 and DS8880F models. IBM intends to increase the number of high-capacity flash options by delivering 7.6 TB and 15.3 TB flash drives once they complete the qualification and certification processes. These drives should enable customers to manage their business data growth requirements while helping improve the overall total cost of ownership by increasing the flash capacity in the same physical rack space.

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 [A17-0035](#), dated January 10, 2017.

Product number

Description	Machine type	Models	Feature number
98x - 8xE position 2	5331, 5332, 5333, 5334	988, 88E	0242
400 GB 2.5" flash encl ind	5331, 5332, 5333, 5334	984, 985, 986, 85E, 86E	0260
800 GB 2.5" flash encl ind	5331, 5332, 5333, 5334	984, 985, 986, 85E, 86E	0261
1.6 TB 2.5" flash encl ind	5331, 5332, 5333, 5334	984, 985, 986, 85E, 86E	0262
3.2 TB 2.5" flash encl ind	5331, 5332, 5333, 5334	984, 985, 986, 85E, 86E	0263
3.8 TB 2.5" flash encl ind	5331, 5332, 5333, 5334	984, 985, 986, 988, 85E, 86E, 88E	0265
Flash card sets custom placement indicator	5331, 5332, 5333, 5334	984	0606
Flash enclosure pair indicators	5331, 5332, 5333, 5334	984, 985, 986, 85E, 86E	0607

Description	Machine type	Models	Feature number
40m zHyperlink cable	5331, 5332, 5333, 5334	985, 986, 85E, 86E	1450
150m zHyperlink cable	5331, 5332, 5333, 5334	985, 986, 85E, 86E	1451
High Performance Flash Enclosure Gen2 pair (Dynamic)	5331, 5332, 5333, 5334	88E	1602
HPFE Gen 2 adapter pair	5331, 5332, 5333, 5334	988, 88E	1604
3.8 TB 2.5-inch high capacity flash	5331, 5332, 5333, 5334	984, 985, 986, 988, 85E, 86E, 88E	1623
DS8000 LMC R8.3	5331, 5332, 5333, 5334	984, 985, 986, 988	1883
DS8000 LMC R8.3 indicator	5331, 5332, 5333, 5334	85E, 86E, 88E	1983
zHyperlink adapter	5331, 5332, 5333, 5334	985, 986, 85E, 86E	3500
64 GB processor memory	5331, 5332, 5333, 5334	984	4233
128 GB processor memory	5331, 5332, 5333, 5334	984	4234
256 GB processor memory	5331, 5332, 5333, 5334	984	4235
128 GB processor memory (8-core only)	5331, 5332, 5333, 5334	985, 986	4334
256 GB processor memory (8-core only or 16-core)	5331, 5332, 5333, 5334	985, 986	4335
512 GB processor memory (16-core only)	5331, 5332, 5333, 5334	985, 986	4336
1,024 GB Processor memory (24-core only)	5331, 5332, 5333, 5334	985, 986	4337
2,048 GB Processor memory (24-core only)	5331, 5332, 5333, 5334	985, 986	4338
1,024 GB Processor memory (24-core only)	5331, 5332, 5333, 5334	988	4497
2,048 GB Processor memory (48-core only)	5331, 5332, 5333, 5334	988	4498
24-core processor II license indicator	5331, 5332, 5333, 5334	988	4878
48-core processor II license indicator	5331, 5332, 5333, 5334	988	4898

Feature conversions

Machine type 533x Model 984

From feature	To feature	Returned parts*	Description
Processor memory:			
4233	4234	No	Processor memory conversion
4233	4235	No	Processor memory conversion
4234	4235	No	Processor memory conversion

Machine type 533x models 985 and 986

From feature	To feature	Returned parts*	Description
Processor memory:			
4334	4335	No	Processor memory conversion
4334	4336	No	Processor memory conversion
4335	4336	No	Processor memory conversion
4335	4337	No	Processor memory conversion
4336	4337	No	Processor memory conversion
4336	4338	No	Processor memory conversion
4337	4338	Yes	Processor memory conversion

Machine type 533x Model 988

From feature	To feature	Returned parts*	Description
Processor memory:			
4497	4498	No	Processor memory conversion
Processor License feature indicators:			
4878	4898	No	Processor License feature conversion

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

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 catalogue of 70,000 items. Extensive search facilities are provided. A large number of publications are available on-line in various file formats, which can currently be downloaded.

National language support

None

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 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

Hardware requirements

Licensed Machine Code

All announced features and functions are supported on the IBM System Storage DS8000 series and require DS8000 LMC 8.8.30.xx.xx (bundle version 88.30.xxx.xx), or later, except zHyperlink read functionality, which requires DS8000 LMC 8.8.31.xx.xx (bundle version 88.31.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
- IBM Security Key Lifecycle Manager planning (SKLM)
- 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 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 ^(R)
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 [A13-0913](#), 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^(R) 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) fibre 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 (singlemode) fibre optic cable terminated with a LC connector. Fibre Channel cables can be purchased using feature numbers 142x for 9 micron cables.

Cables are required to connect a zHyperlink adapter port from a DS8880 to a server or port of the zHyperLink Express^(R) feature in a IBM z14.

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

Two fibre distances are available as DS8880 feature codes for the zHyperLink Express:

- Feature #1450 - 150 m zHyperlink cable: OM4 50/125 micrometer multimode fibre optic cable with a fibre bandwidth at wavelength: 4.7 GHz-km at 850 nm
- Feature #1451 - 40 m zHyperlink cable: OM4 50/125 micrometer multimode fibre optic cable with a fibre bandwidth at wavelength: 2.0 GHz-km at 850 nm

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 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.

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

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.

Customer setup

No

Machine code

Same license terms and conditions as base machine

Prices

Description	Machine type	Models	Feature number
98x - 8xE position 2	5331, 5332, 5333, 5334	988, 88E	0242
400 GB 2.5" flash encl ind	5331, 5332, 5333, 5334	984, 985, 986, 85E, 86E	0260
800 GB 2.5" flash encl ind	5331, 5332, 5333, 5334	984, 985, 986, 85E, 86E	0261
1.6 TB 2.5" flash encl ind	5331, 5332, 5333, 5334	984, 985, 986, 85E, 86E	0262
3.2 TB 2.5" flash encl ind	5331, 5332, 5333, 5334	984, 985, 986, 85E, 86E	0263
3.8 TB 2.5" flash encl ind	5331, 5332, 5333, 5334	984, 985, 986, 988, 85E, 86E, 88E	0265
FL CARD SETS CUST PL IN	5331, 5332, 5333, 5334	984	0606
FLASH ENCLOSURE PAIR IND	5331, 5332, 5333, 5334	984, 985, 986, 85E, 86E	0607
40m zHyperlink cable	5331, 5332, 5333, 5334	985, 986, 85E, 86E	1450
150m zHyperlink cable	5331, 5332, 5333, 5334	985, 986, 85E, 86E	1451
HPFE Gen2 pair (Dynamic)	5331, 5332, 5333, 5334	88E	1602
HPFE Gen 2 adapter pair	5331, 5332, 5333, 5334	988, 88E	1604
3.8 TB High cap flash	5331, 5332, 5333, 5334	984, 985, 986, 988, 85E, 86E, 88E	1623
DS8000 LMC R8.3	5331, 5332, 5333, 5334	984, 985, 986, 988	1883
DS8000 LMC R8.3 indicator	5331, 5332, 5333, 5334	85E, 86E, 88E	1983

Description	Machine type	Models	Feature number
zHyperlink adapter	5331, 5332, 5333, 5334	985, 986, 85E, 86E	3500
64 GB processor memory	5331, 5332, 5333, 5334	984	4233
128 GB processor memory	5331, 5332, 5333, 5334	984	4234
256 GB processor memory	5331, 5332, 5333, 5334	984	4235
128GB PROCESSOR MEMORY 8CO	5331, 5332, 5333, 5334	985, 986	4334
256GB PROCESSOR MEMORY 8CO	5331, 5332, 5333, 5334	985, 986	4335
512GB PROCESSOR MEMORY 16C	5331, 5332, 5333, 5334	985, 986	4336
1TB PROCESSOR MEMORY 24COR	5331, 5332, 5333, 5334	985, 986	4337
2TB PROCESSOR MEMORY 24COR	5331, 5332, 5333, 5334	985, 986	4338
1TB PROCESSOR MEMORY 24COR	5331, 5332, 5333, 5334	988	4497
2TB PROCESSOR MEMORY 24COR	5331, 5332, 5333, 5334	988	4498
24 CORE PROCESSOR II IND	5331, 5332, 5333, 5334	988	4878
48 CORE PROCESSOR II IND	5331, 5332, 5333, 5334	988	4898

Description	Feature number	Install type	Feature conversion	Feature exchange	Feature remove	CSU
98x - 8xE position 2	0242	Both	No	No	Yes	N/A
400 GB 2.5" flash encl ind	0260	Both	No	No	No	N/A
800 GB 2.5" flash encl ind	0261	Both	No	No	No	N/A
1.6 TB 2.5" flash encl ind	0262	Both	No	No	No	N/A
3.2 TB 2.5" flash encl ind	0263	Both	No	No	No	N/A
3.8 TB 2.5" flash encl ind	0265	Both	No	No	No	N/A
FL CARD SETS CUST PL IN	0606	Both	No	No	No	N/A
FLASH ENCLOSURE PAIR IND	0607	Field only	No	No	No	N/A

Description	Feature number	Install type	Feature conversion	Feature exchange	Feature remove	CSU
40m zHyperlink cable	1450	Both	No	No	No	No
150m zHyperlink cable	1451	Both	No	No	No	No
HPFE Gen2 pair (Dynamic)	1602	Both	No	No	No	No
HPFE Gen 2 adapter pair	1604	Both	No	No	No	No
3.8 TB High cap flash	1623	Both	No	No	Yes	No
DS8000 LMC R8.3	1883	Both	No	No	Yes	No
DS8000 LMC R8.3 indicator	1983	Both	No	No	Yes	N/A
zHyperlink adapter	3500	Both	No	No	No	No
64 GB processor memory	4233	Both	Yes	No	No	No
128 GB processor memory	4234	Both	Yes	No	No	No
256 GB processor memory	4235	Both	Yes	No	No	No
128GB PROCESSOR MEMORY 8CO	4334	Both	Yes	No	No	No
256GB PROCESSOR MEMORY 8CO	4335	Both	Yes	No	No	No
512GB PROCESSOR MEMORY 16C	4336	Both	Yes	No	No	No
1TB PROCESSOR MEMORY 24COR	4337	Both	Yes	No	No	No
2TB PROCESSOR MEMORY 24COR	4338	Both	Yes	No	No	No
1TB PROCESSOR MEMORY 24COR	4497	Both	Yes	No	No	No
2TB PROCESSOR MEMORY 24COR	4498	Both	Yes	No	No	No

Description	Feature number	Install type	Feature conversion	Feature exchange	Feature remove	CSU
24 CORE PROCESSOR II IND	4878	Both	Yes	No	No	No
48 CORE PROCESSOR II IND	4898	Both	Yes	No	No	No

CSU = Customer setup

N/A = Not applicable

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Corrections

(Corrected on September 23, 2017)

The first sentence under Cascading FlashCopy in the Description section has been updated.