



Highlights

- Improve business efficiency while reducing operating expenses
 - Enable faster decision making with up to 2 times better performance¹
 - Manage business data growth with up to 3.2 times more capacity in the same physical space² for storage consolidation and data-volume demanding workloads
 - Provide excellent business continuity with 24x7 access to data on high-demand transaction processing workloads where data integrity is critical.
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IBM DS8880

Business-critical hybrid-flash data systems, made for the cognitive business in the digital era

Innovative IT leaders are becoming the trusted service providers for their enterprises, moving quickly to deliver value across the ecosystem, enabling new services and business models. Achieving these goals requires a new perspective on the critical capabilities needed to empower business leaders. As organisations start to move at an ever-faster pace, they are required to gain insights faster, protect critical data, eliminate downtime and avoid business risk – all at the same time.

IBM® storage systems have become imperative to helping IT leaders manage the changing conditions in the modern enterprise, including the dynamic demands of cloud, mobile, social, analytics and cognitive strategies.

IBM offers two business-critical hybrid-flash data systems designed to support the most demanding application workloads.



Bulletproof data systems

The IBM DS8880 hybrid-flash solutions are powered by the proven IBM DS8000 enterprise software platform and deliver mission-critical acceleration, uncompromising availability, unparalleled integration with IBM servers and transformational efficiency through leading-edge capabilities. The offerings include:

- **IBM DS8886:** Streamlines operations and improves customer serviceability with a hybrid storage solution, backed by 24x7 availability and extreme functionality for multi-site replication and deep IBM z Systems, IBM Power, or distributed systems integration – all provided in a dense yet expandable package
- **IBM DS8884:** Enables organisations to overcome storage challenges with advanced, easy-to-use functionality for running critical workloads on mainframes, Power servers or distributed systems, either as a dedicated platform for consolidated systems or for multiple platforms – delivered within an affordable, flexible and space-saving package.

To support the most demanding, business-critical applications, the DS8880 data systems combine bulletproof resiliency and intelligent flash performance to deliver consistent microsecond (μ s) application response times.³ The ability to select from hybrid-flash, all-flash or traditional disk configuration options gives the confidence needed to support the dynamic applications that sit at the heart of the business. To that end, DS8880 delivers a range of self-tuning features – such as intelligent caching algorithms, automated quality-of-service (QoS) management and advanced storage tiering that can optimise data placement between itself and the enterprise servers attached to it. DS8880 also boasts high availability (HA) and special integration with z Systems and Power servers that deliver extraordinary value. For organisations seeking an ideal combination of performance, HA, resilience and agility, DS8880 is a logical choice.



Mission-critical acceleration

Designed to provide extraordinary performance for mission-critical applications, DS8880 is based on the same fundamental system architecture as the innovative IBM Watson solution. DS8880 uses this to form the three-tiered architecture that balances system resources for optimal throughput. Intelligent caching algorithms accelerate performance even more and by adding IBM DS8880 High-Performance Flash Enclosure Gen2 to the system, users can feel confident that high-end acceleration will be there when they need it with μ s response time.³

DS8880 delivers exceptional throughput and extremely low application response times. With extraordinary performance and more than six nines availability,⁴ DS8880 can help users make real-time business analytics a reality.

Hybrid-flash data systems

With the addition of High-Performance Flash Enclosure Gen2, DS8880 redefines what true enterprise hybrid data systems should be, with performance worthy of the most critical applications. Hybrid systems that combine flash and traditional spinning drives might be preferred to support a variety of mixed workloads in, say, private or public clouds. Hybrid configurations help enable consolidation of important workloads with the flexibility to deliver flash performance exactly where and when it is needed.

Intelligent IBM Easy Tier technology helps transform IT efficiency by optimising application performance dynamically across any DS8880 hybrid configuration without requiring administrators to manually tune applications. For hybrid configurations, Easy Tier automates data placement across tiers to meet performance objectives at the most reasonable cost by identifying and moving less-frequently accessed data to the most economical drive tier. Similarly, frequently accessed data for busy workloads is automatically migrated to flash storage to ensure the lowest response times for those applications that need it.

Easy Tier rebalances data automatically within each tier to virtually eliminate hotspots or performance skewing across tiers. This capability also helps when users add or remove capacity since all data is automatically distributed to maintain balanced performance. Easy Tier has been strengthened to maintain storage performance after a failover by providing full IBM Geographically Dispersed Parallel Sysplex (GDPS) support for three- and four-site Metro Global Mirror environments with Heat-Map transfer (in addition to Metro Mirror/Global Copy/Global Mirror copy services relationships).

Easy Tier Application includes an application programming interface (API) that software developers can use to have their applications direct Easy Tier data placement on DS8880. Through this API, applications can provide guidance to Easy Tier, enabling more effective data placement to meet extraordinary performance requirements for mission-critical applications. The Easy Tier Application for z Systems enables applications running on z Systems to direct optimal placement of data by communicating important information about current workload activity and application performance requirements. With Easy Tier, administrators also have the flexibility to assign ('pin') application volumes to a particular tier in a hybrid Easy Tier storage pool, helping to ensure that certain applications remain on a particular tier to meet performance and/or cost requirements.

Easy Tier provides the flexibility to manually move entire volumes across tiers or to other storage pools through the Dynamic Volume Relocation feature. Users can also restripe data non-disruptively to change a volume's Redundant Array of Independent Disks (RAID) type – for example, from RAID 5 to RAID 10. With these advanced features, Easy Tier offers tremendous flexibility for hybrid and single-tier data systems.

IBM DS8000 Storage Tier Advisor Tool helps users easily determine which volumes are likely candidates for Easy Tier optimisation by analysing the performance of the current application workloads. Even without activating Easy Tier, the advisor tool can identify which volumes can benefit from additional flash capacity and provides views and reports that show performance skew and data migration trends for each application volume, which can help ensure the optimal mix of drives for all workloads.

These advanced capabilities help simplify the data architecture and greatly reduce the amount of time administrators spend tuning servers and data systems.

Unparalleled integration

The IBM DS8880 family provides deep integration with z Systems while supporting mainframe, IBM Power Systems and distributed systems under a single management point.

At the heart of today's DS8880 is the advanced microcode that has been developed and enhanced in lockstep with the IBM mainframe input/output (I/O) architecture over the past several decades. This is why DS8880 offers incredible value compared to other storage systems and why it is one of the most trusted storage platforms for mainframe environments.⁵

DS8880 delivers a variety of performance, availability and scalability features that help users maximise the potential of their z Systems environments. Performance examples include advanced integration with IBM High Performance FICON (zHPF) and IBM DB2 for z/OS that delivers extreme performance and helps improve remote data speed for database-intensive applications, such as core banking, enterprise resource planning, healthcare and real-time analytics applications. Special integration between DS8880 I/O Priority Manager and Workload Manager (WLM) for z/OS automates QoS management for applications running on z Systems to help ensure that all critical applications get the performance they need and that network congestion is reduced. Plus the Easy Tier Application for z Systems enables applications running on z Systems to optimise data placement by communicating information about workload activity and performance requirements.

An intelligent and resilient I/O infrastructure strengthens the synergy between DS8880 and z Systems, delivering improved performance and resiliency for mission-critical environments. This infrastructure is composed of 16 gigabit (Gb) FICON host adapters that help reduce latency for workloads such as DB2 for z/OS. With FICON Dynamic Routing and Fabric Priority, organisations can simplify configuration and capacity planning, with persistent, repeatable performance and higher resiliency after hardware failures. DS8880 uses a standards-based approach for enabling Forward Error Correction (FEC) with z Systems, for a complete end-to-end (E2E) data solution.

For uncompromising availability, DS8880 includes advanced integration with IBM HyperSwap and IBM GDPS, as well as sophisticated business-continuity solutions based on IBM z/OS Parallel Sysplex. It also supports IBM zHyperwrite, an innovative technology that combines DS8880 and z/OS enhancements to deliver performance benefits for writing operations to DB2 logs in Metro Mirror environments.

DS8880 support for 1 terabyte (TB) Extended Address Volumes (EAV) on extended count key data (ECKD) devices and up to 16 TB in open environments, as well as z/OS Discovery and Auto Configuration helps administrators simplify management of their mainframe environments. This is more than interoperability – this is truly deep synergy between servers and storage.

DS8880 also delivers excellent integration with Power servers running in IBM AIX and IBM i environments. For performance, DS8880 E2E I/O Priorities enables host adapters on the storage system to give preferential treatment to higher-priority database I/Os with DB2 software. What's more, DS8880 copy services are tightly integrated with IBM PowerHA SystemMirror for AIX and IBM i, which adds another level of assurance for users who need 24x7 business continuity for their critical Power servers. Another example is the integration between DS8880 Metro Mirror and PowerHA HyperSwap – similar to GDPS HyperSwap on the mainframe – where HyperSwap technology enables the server to switch an application's I/O operations to the remote DS8880 system in the event the primary DS8880 system experiences a failure or during planned storage outages. This IBM-only integration is designed to provide the same level of availability that has made the HyperSwap solution the gold standard for enterprise availability.

DS8880 includes interoperability with VMware vStorage APIs for Array Integration, VMware vCentre Site Recovery Manager and a VMware vCentre plug-in that allows users to offload storage management operations in VMware environments to DS8880. This enables virtual servers to focus their resources on computational workloads. DS8880 also supports IBM Storage Management Console for VMware vCentre to help VMware administrators independently monitor and control their storage resources on primarily from the VMware vSphere Client graphical user interface (GUI).

DS8880 enables Transparent Cloud Tiering, allowing organisations to introduce hybrid cloud as a new storage tier for simplified backup and archive operations on z Systems environments. This solution does not require an additional server or gateway, but it is rather a software-defined storage feature that leverages existing DS8880 data systems, avoiding the need for additional hardware infrastructure.

Transparent Cloud Tiering offloads the data movement responsibility for backup and archive operations to DS8880, allowing z Systems to free central processing unit (CPU) resources to be used more efficiently in business-focused applications such as analytics, business intelligence (BI) and cognitive computing.

Transparent Cloud Tiering integrates with IBM Cloud Object Storage and can also provide direct transparent connectivity to IBM Bluemix cloud storage resources.

Uncompromising availability

DS8880 is designed to address the needs of dynamic enterprise environments requiring the highest levels of availability. It is designed to support dynamic system changes such as online system microcode updates and online hardware upgrades and includes redundant, hot-swappable components and sophisticated data integrity features for 24x7 operations.

The system supports RAID-5, RAID-6 and RAID-10 configurations for data protection and monitors internal system functions, so it can 'call home' automatically to alert service personnel if it detects a potential problem. Plus sophisticated light path diagnostics facilitate system maintenance, while secure audit logs can help with root-cause analysis and problem determination.

In addition to its exceptionally resilient architecture, the system offers an array of advanced functions for data backup, remote mirroring and disaster recovery (DR). The IBM FlashCopy feature addresses a key requirement for nonstop data availability by quickly and efficiently creating point-in-time copies without impeding the application server. That is, when a FlashCopy request is made, both the source data and its copy are available for use almost immediately.

DS8880 also supports advanced multi-site business-continuity capabilities to give organisations the peace of mind of knowing that business-critical data will be available during planned and unplanned outages. Metro Mirror is designed to provide a no-data-loss remote mirroring solution for distances up to 300 kilometers (186 miles). Global Mirror can be used to reduce data loss to as low as three seconds or less at virtually any distance. The Metro/Global Mirror option combines these two capabilities to support various multi-site configurations for added protection. Plus with Multiple Target Peer-to-Peer Remote Copy (MT-PPRC), organisations can have two secondary mirror systems with different configuration options for DR and greater than six-nines availability.⁴

With IBM Copy Services Manager, you can simplify copy services management for IBM DS8880 through an extraordinary, easy-to-use interface that helps monitor and control copy-services configurations. Designed to scale for thousands of relationships, Copy Services Manager represents a single point of control to automate and simplify the recovery process in large replication environments, protecting your most valuable data and helping you to keep costs down.

For organisations that require more than six-nines availability, DS8880 is an ideal choice. The aforementioned deep integration between DS8880 DR services and IBM enterprise server clustering provides HA solutions available only from IBM. This integration is what defines extreme HA and is the reason the majority of the world's largest financial institutions rely on z Systems and DS8000 business-continuity solutions for their mission-critical environments.⁶

Increased security, minimised risk

The unrelenting tide of data breaches is driving increased interest in IBM self-encrypting storage, which automatically secures all information on a drive or tape cartridge when physically removed from a storage system. IBM Full Disk Encryption (FDE) also provides a simple, cost-effective way to cleanse sensitive data from systems that are being retired or repurposed through a simple cryptographic erasure. Encryption drives are standard on every DS8880 system and provides support for the Key Management Interoperability Protocol (KMIP). This new standard enables encryption key lifecycle management across encryption-enabled devices and provides a new option to protect sensitive data.

DS8880 has a variety of other security features, such as role-based administration, multi-level authentication, tamper-proof audit logging and support for the Syslog protocol. It also is designed to comply with the US government standards profile for Internet Protocol (IP) version 6 (IPv6) and to support updated guidelines on cryptographic functions defined by the US National Institute of Standards and Technology (NIST). It also supports the T10 standard data integrity field (DIF) for Internet small computer system interface (iSCSI) to enable E2E data protection from the application or host adapter down to the drives. These and other advanced security capabilities make it an ideal choice to help keep sensitive data secure.

Transformational efficiency

DS8880 includes powerful management capabilities that can help IT administrators more effectively control their storage environments as capacity grows. DS8880 Storage Manager was inspired by the acclaimed IBM XIV Storage System GUI and includes intuitive navigation, streamlined configuration processes and helpful links to video tutorials with pages that load in less than a second. In addition, it provides dynamic and customisable views, as well as interactive menus, tabs and charts, enabling administrators to be more productive. Plus the configuration wizard walks IT staff through the setup in just a few steps. DS8880 also supports a command-line interface (CLI) and a Storage Management Initiative Specification-conformant (SMI-S) API.

Easy Tier and other self-tuning features help simplify management further and accommodate real-time workload fluctuations, enabling administrators to manage storage capacity and react to other environmental changes. DS8880 thin provisioning also helps reduce the time administrators spend provisioning new storage while keeping applications online – a key requirement for mission-critical environments.

Innovative DS8880 advanced function license packages help you easily order and install the necessary tools to manage, protect and secure data. This advanced software consolidation can help ensure you have the capabilities needed to get the most out of your hardware in mainframe, Power or distributed environments. IBM Spectrum Protect Snapshot provides advanced management capabilities, such as detailed performance monitoring and reporting, for DS8880 and the extended storage environment by supporting a variety of storage systems and devices from IBM and many other vendors. In addition, it provides a comprehensive view of the storage topology that enables administrators to inspect the real-time health of the environment at an aggregate or in-depth view.

IBM DS8880 at a glance	
DS8880 hybrid-flash models	DS8884 (984, 84E) DS8886 (985, 85E) Single phase DS8886 (986, 86E) Three phase
Shared symmetric multiprocessing (SMP) processor configuration	IBM POWER8 DS8884 – dual 6 core DS8886 – dual 8 core or dual 16 core/24 core
Processor memory for cache and nonvolatile storage (minimum/maximum)	DS8884 – 64 Gigabyte (GB) to 256 GB DS8886 – 128 GB to 2 TB
Host adapters (minimum/maximum)	2/8 host adapter pairs 4- and 8-port 8 gigabits per second (Gbps), or 4-port 16 Gbps Fibre Channel (FC)/IBM FICON
Host ports (minimum/maximum)	8/128
Maximum physical storage capacity*	4,608 TB (hard disk drive (HDD)/solid state drive (SSD)) + 614 TB (flash cards)
RAID levels	5, 6, 10



Take the next step. [Click here.](#)
➔ See the full list of specifications.

Data systems for a greener planet

The new DS8880 design offers a new architecture design that can help lower operating costs with a 30 percent smaller footprint than previously available.⁷

DS8880 includes an energy-efficient power supply designed to reduce energy consumption. Deploying High-Performance Flash Enclosure Gen2 also can have a tremendous impact on reducing energy costs further by replacing power-hungry spinning drives with more energy-efficient flash storage. Plus with Easy Tier, the story gets better, because it helps optimise

the combination of flash and spinning drives for both performance and cost. With this kind of energy efficiency, DS8880 is ready to meet emerging IT energy-efficiency standards as they become available.

DS8880 complies with the Restriction of Hazardous Substances (RoHS) standard, also known as 2002/95/EC – a European Union directive being widely adopted around the world – which aims to restrict specific hazardous materials in the manufacture of various types of electronic and electrical equipment. If green IT is the goal, DS8880 can help organisations get there.

Why IBM?

Whatever the requirements, IBM can help with an E2E infrastructure solution that includes data systems, application servers, software, services, support and equipment financing. The new DS8880 delivers uncompromising availability, mission-critical acceleration, unparalleled synergy with IBM servers and transformational efficiency for critical environments.

For more information

To learn more about IBM DS8880, please contact your IBM representative or IBM Business Partner (BP), or visit: ibm.com/ds8000

For information on specific function availability, please contact your IBM storage specialist.

Additionally, IBM Global Financing provides numerous payment options to help you acquire the technology you need to grow your business. We provide full lifecycle management of IT products and services, from acquisition to disposition. For more information, visit: ibm.com/financing



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*Usable capacity depends on factors such as data format, RAID level and spare disks configured. Maximum capacity values are based on a fully populated DS8886 system.

¹2 times performance per High-Performance Flash Enclosure Gen2 available only for models DS8884 and DS8886.

²3.2 times more capacity with High-Performance Flash Enclosure Gen2 compared with the previous enclosure models.

³Measurements taken from both IBM internal performance benchmark results and customer testimonials using the High-Performance Flash Enclosure.

⁴Six-nines is a term used to denote that a piece of equipment is functioning with 99.9999 percent availability (31.5 seconds of downtime per year), on average.

⁵Data taken from 'Worldwide Quarterly Disk Storage Systems Tracker,' IDC, Q2 2015. https://www.idc.com/tracker/showproductinfo.jsp?prod_id=5

⁶Don't Believe the Myth-Information About the Mainframe; Janet L. Sun, SHARE Inc., July 2013

⁷Based on internal IBM measurements comparing IBM DS8870 to IBM DS8880 footprint and energy usage.