IBM DS8880
World-class data systems made for the future of business

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IBM Storage innovation is designed to efficiently manage oceans of data

**Storage Systems**

- **Tier 0 Acceleration**
  - FlashSystem

- **Enterprise Storage Systems**
  - DS8000
  - XIV
  - FlashSystem v9000

- **Midrange & Entry Storage Systems**
  - Storwize V7000
  - Storwize V7000 Unified
  - Storwize V5000

- **Tape and Virtual Tape Systems**
  - Virtualization Engine TS7700
  - ProtecTIER Deduplication
  - Tape Library & Automation
  - Tape drives for Enterprise and LTO6

**Software Defined Storage**

- IBM Spectrum Storage family
  - IBM Spectrum Virtualize
  - IBM Spectrum Protect
  - IBM Spectrum Control
  - IBM Spectrum Accelerate
  - IBM Spectrum Scale
  - IBM Spectrum Archive

**Platform Computing**

- IBM Platform Computing
  - Platform Symphony
  - Platform LSF
  - Platform Application Service Controller
  - Platform Cluster Manager
  - High Performance Cloud Services
  - Platform MPI

**Integrated Infrastructure Solutions**

- VersaStack
- IBM Elastic Storage Server
- IBM Elastic Storage Server
- IBM Elastic Storage Server
- IBM Elastic Storage Server
Solutions Providers Recognize IBM as a Best-in-Class Channel Provider of Enterprise Network Storage

*Source: IDC Tracker 2014, 2015

** In both unit shipment and capacity shipped
Bulletproof Data Systems made for the future

• **Most of the top 20** world banks use DS8000 and z Systems for core banking

• **DS8000 is #1** storage for z Systems

• IBM DS8880 Data Systems are designed to deliver **greater than 6-nines availability**

• **IBM DS8000 was the First** to integrate High Performance Flash into Tier 1 Storage

• **3 sec RPO** RPO; automated site recovery well under 5 minutes
DS8880 advanced copy services for uncompromising availability

FlashCopy
Point in time copy
Within the same Storage System
- Distance: 303 Km; 500Km with RPQ
- Performance improvements
- 50% Less Infrastructure

Metro Mirror
Synchronous mirroring
Primary Site A → Metro distance Site B

Global Mirror
Asynchronous mirroring
Primary Site A → Out of Region Site B

Metro / Global Mirror
Three and four site cascaded and multi-target synchronous and asynchronous mirroring
Primary Site A → Metro Site B → Out of Region Site C

DS8000 Copy Services fully integrated with GDPS and Copy Services Manager to provide simplified CA and DR operations
- Up to 50% bandwidth reduction over competitive arch
- 3 – 5 Sec RPO
- Closest Published RPO >15 Sec (default)
- Superior application failover via GDPS or HACMP
Enhancing client value and confidence with IBM DS8000

For Mission Critical

A bank in Asia increases net profit by 74% and fees revenue by 82% deploying IBM DS8000 to support data management and business intelligence software.

A global bank saves $2.2B per year when real-time fraud detection and credit processing are improved with 10x faster DB scan performance and 7x faster response time.

For Data and Analytics

A retail company was able to accommodate data growth with improved performance on DB2, reducing processing by 85% from 20 days to less than 3 days.

An insurance company in US improves customer service levels significantly by reducing DB runtime by 40% and operation response time by 33%.

For Cloud

A national healthcare institution saves $5.8B in medication spending; 50% reduction in IT management resources and 20% faster insurance system with DB integration and DR implementation.

For Trusted Computing

A global financial client reduces RPO from 60 seconds to less than 4 sec, and migrates 13,000 volumes in just 2 hours.

A travel services company delivers extraordinary guest experiences with their reservation system available 100% of the time, by reducing maintenance windows to less than 3 seconds.

“We can efficiently swap production sites in a full 3-site solution with just 5 clicks”

Storage Engineer, Global Financial Institution
New!

IBM DS8880 family

World-class data systems made for the future of business
Seven generations of evolution with DS8000

2004 - POWER5
2006 - POWER5+
2009 - POWER6
2010 - POWER6+
2012 - POWER7
2013 - POWER7+
2015 - POWER8

DS8100
DS8300 Turbo
DS8700
DS8800
DS8870
DS8870
DS8880

2014 Flash optimized

Replication and Microcode Compatibility
The story of an architecture evolution

<table>
<thead>
<tr>
<th></th>
<th>DS8300</th>
<th>DS8700</th>
<th>DS8800</th>
<th>DS8870</th>
<th>DS8880</th>
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<tbody>
<tr>
<td>Disk</td>
<td>FC</td>
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<td>SAS</td>
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<td>Power</td>
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<td>p6</td>
<td>p6</td>
<td>p7/p7+</td>
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<td>PCIe-1</td>
<td>PCIe-1</td>
<td>PCIe-2</td>
<td>PCIe-3</td>
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<td>Adapters</td>
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<td>8Gb/8Gb</td>
<td>16Gb/8Gb</td>
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<tr>
<td>Rack</td>
<td>33”</td>
<td>33”</td>
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33” rack 40U
19” rack 40 to 46U
IBM DS8000 8.0 Announcement

- Announced Oct 20, 2015; General Availability Dec 04, 2015

- IBM POWER8 based processors
  - DS8884 Data System
  - DS8886 Data System
  - Preview of DS8880 All Flash Data System

- Scalable system memory and scalable process cores

- Standard 19" rack

- Improved I/O bay interconnect with PCIe Gen3

- Integrated Hardware management Console (HMC)

- Power VC integration with DS8880 (Open Stack Liberty based)

- IBM Cloud Manager support of zKVM

- Simplified licensing structure

*Business Critical Storage for the World’s Most Demanding Clients*
IBM DS8000 Three Layer Architecture

- Intelligent SAN/Host Adapters
- Enterprise Controller Hardware
- Intelligent RAID Adapters
- Enterprise Class Drives

PCIe Fabric

- Host Adapters
- Cache Memory
- Persistent Memory
- Flash RAID Adapters
- FC RAID Adapters

High Bandwidth Fault Tolerant Interconnect
Switched Backend Fabric
Introducing the new DS8880 family of data systems

IBM is introducing a family of business-critical hybrid data systems that span a wide range of price points. The family is powered by the next generation of IBM’s proven DS8000 platform and delivers critical application acceleration, uncompromising availability and industry-leading capabilities.
DS8880: Mission critical architecture

SSD/DDM Media Enclosure

High Performance Flash Enclosure

I/O Bay Enclosure

P8 Servers

DC-UPS

Single or Dual HMC

Base Rack

Expansion Rack

SSD/DDM Media Enclosure

High Performance Flash Enclosure

I/O Bay Enclosure

DC-UPS
IBM DS8884

Mission critical enterprise system in a space savings, affordable package

For clients running critical workloads on mainframe, power or distributed in single or mixed modes needing the same functionality on a lower cost, flexible and space savings solution.

- Up to 12 cores
- 256GB Total system memory
- 64 16Gb FCP/FICON ports
- 768 HDD/SSD drives + 120 Flash Cards
- 19”, 40U rack
IBM DS8886

Scalability and accelerated performance with world class storage services

Up to 2X better performance, highly scalable, with unmatched capability for multisite replication in a dense yet expandable package.

- Up to 48 cores
- 2TB Total system memory
- 128 16Gb FCP/FICON ports
- 1536 HDD/SSD drives + 240 Flash Cards
- 19”, 46U rack
IBM DS8888 all-flash

Extreme performance for applications where time equals money

When performance is as critical as the data it serves: for applications and workloads where time equals money and you want more of each.

- Alpine 850 Power 8 Processor
- Up to 96 cores
- 2TB Total system memory
- 128 16Gb FCP/FICON ports
- 480 Flash Cards
- 19”, 40U rack

Statements on IBM’s future plans and directions are for informational purposes during Customer Briefings under NDA only. Future plans and directions are subject to change without notice. This information is considered IBM Confidential.
IBM DS8880: mission critical acceleration with 2x better response time

<table>
<thead>
<tr>
<th>Units</th>
<th>DS8800 P6 4 Core</th>
<th>DS8870 P7+ 16 Core</th>
<th>DS8884 P8 6 Core</th>
<th>DS8886 P8 24 Core</th>
<th>DS8888 P8 48 Core Targets</th>
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<tr>
<td>Rd Seq GB/s</td>
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<td>22</td>
<td>22</td>
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<td>DB open K IO/s</td>
<td>198K</td>
<td>1096K</td>
<td>574K</td>
<td>1760K</td>
<td>~2500K</td>
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</table>
IBM DS8880 Performance: 2x bandwidth

- 2x bandwidth for sequential write workloads
- 1.9x bandwidth for sequential read workloads
- PCIe Gen 3 I/O fabric increases bandwidth
IBM DS8880 Performance: 1.6x faster with sub-millisecond response time

- 1.6x faster: 1.8M IOPs with sub-millisecond response time on Open OLTP
- Multi-thread optimization helps to scale with more cores/threads
IBM DS8880 Performance: 1.5x faster for z Systems environments

- 1.5x faster on z/OS: 1.6M IOPS with sub-millisecond response time
New rack design for 30% reduction in floor space

Keyboard / display slide out from side of rack

1 or 2 HMC under DC-UPS

New Mini HMC allows for 2 HMC’s to be integrated into base Rack.
DS8880 Extendable top rack for 30% reduction in floor space

Adjustable top from 40U to 46U on DS8886

Base 40U rack

Remove bolts to release top. Extend top up, one end at a time from 1U to 8U.

Add side panel/EIA rails and secure with bolts. Release extension corner posts and lock down.

Final asm with top extended. 41U to 46U
### Simplified license structure with new Advanced License packages

<table>
<thead>
<tr>
<th>Base Function License</th>
<th>z Synergy Service Function</th>
<th>Copy Services Function</th>
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<tr>
<td>Logical Configuration support for FB</td>
<td>FICON attachment</td>
<td>FlashCopy</td>
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<td>Original Equipment License (OEL)</td>
<td>zPAV</td>
<td>Metro Mirror, Global Mirror</td>
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<tr>
<td>IBM Database Protection</td>
<td>Hyper-PAV</td>
<td>Metro/Global Mirror</td>
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<td>Thin Provisioning</td>
<td>zHyperWrite</td>
<td>z/Global Mirror &amp; z/Global Mirror Resync</td>
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<td>Encryption Authorization</td>
<td>High Performance FICON (zHPF), zHPF Extended Distance II</td>
<td>Multi-Target PPRC</td>
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<td>Easy Tier</td>
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<td>I/O Priority Manager</td>
<td>zDDB</td>
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<tr>
<td></td>
<td>IBM Sterling MFT Acceleration with zDDB</td>
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DS8880 enhanced user interface for streamlined operations

- Next generation user interface providing unified interface and workflow for IBM storage products

- Enhanced functionality:
  - System health status reporting
  - Monitoring and alerting
  - Logical configuration
  - Performance monitoring and export ability
  - Streamlined enabling of encryption through the GUI

Goal is to have a DS8880 fully configured in under an hour
Unparalleled integration with z Systems and POWER

Beyond connectivity…

Joint IBM Storage and Server effort
Design, Development, Test, Support
Only IBM storage is positioned for earliest support of new IBM servers/Oss
Function located where it makes the most sense

GDPS
DB2, IMS, CICS
DFSMSHsm, DFSMSdss
DFSMSdfp: Device Services, Media Manager, SDM
z/OS (IOS, etc.), z/VM, Linux for z Systems
z Systems Hardware

PowerHA
DB2
AIX / IBM i
Multi pathing / Easy Tier
POWER Hardware

Unparalleled integration with z Systems and POWER
z Systems and DS8880 synergy leadership

- **Accelerate transactions** with DS8880 zHyperWrite by reducing DB2 commit times by 66% while improving scale and reducing costs.

- **Enhanced resilience** with Forward Error Correction (FEC) codes for 300x reduction in link errors.

- **Improved application and middleware I/O performance** for up to 32% reduction in batch elapsed times.

- **Self Healing, self tuning FICON channels** with 58% improvement in reliability, deeper integration with WLM, up to 62.5% better throughput and 2x I/O rates.
Uncompromising availability with GDPS and Power HA

- 90% of GDPS installations are using IBM subsystems
- Complete solution for high availability and disaster recovery in mainframe environments
- Replication management, system management, automated workflows and deep integration with z/OS and parallel sysplex

- Hardware level resiliency and replication
- Does not rely on software ‘application transaction replay’ techniques; eliminates the causes of out-of-sync situations
- Scalable, robust and automated solution
- Always ready to switch
Model Conversion from DS8870 to DS8886

Model conversion is a disruptive activity. See IBM System Storage DS8880 Introduction and Planning Guide, GC27-8525
IBM DS8880 Family: Bulletproof Data Systems made for the future

- **Mission critical acceleration** with 2x accelerated response time with next-generation design and enterprise-class flash

- **Uncompromising availability** with greater than 6-9’s availability for 24x7 access to data and applications with bulletproof data systems and industry-leading capabilities

- **Unparalleled integration with z Systems to enable** your systems for insight and cloud environments with unparalleled integration with IBM® z Systems™ and Power® servers

- **Transformational efficiency** with streamlined operations and 30% reduction in floor space with next-generation data systems in a wide range of configurations
Act on real-time insights to transform your business!
Get started now and pay in 2016 with IBM Global Financing

Start your DS8880 project today and postpone your first payment until 2016

- Turn the up-front costs of your big data and analytics solutions into affordable monthly payments to help align project cost outlays with anticipated benefits
- Select a customized financing solution for hardware, software and services from IBM and non-IBM IT suppliers

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**Act on real-time insights to transform your business.**
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Do you need more information?
Thank You!

www.ibm.com/DS8000
IBM DS8884 and DS8886 Platforms

**DS8884**
- Model 980
  - Expansion racks are 98B
  - Maximum of 3 racks (base + 2 expansion)
- 19” 40U rack
- Based on Power 8
  - 6 core processors at 3.891 Ghz
  - Up to 64 host adapter ports
  - Up to 256 GB processor memory
- Up to 768 drives
- Up to 4 Flash enclosures – 120 Flash drives
  - 2 Flash enclosures in base rack with 2 additional in first expansion rack
- Option for 1 or 2 HMCs installed in base frame
- Single phase power

**DS8886**
- Model 981
  - Expansion racks are 98E
  - Maximum of 5 racks (base + 4 expansion)
- 19” 46U rack
  - 40U with a 6U top hat that is installed as part of the install when required
- Based on Power 8
  - Options for 8 / 16 / 24 core processors at 3.525 or 3.891 Ghz
  - Up to 128 host adapter ports
  - Up to 2 TB processor memory
- Up to 1536 drives
- Up to 8 Flash enclosures – 240 Flash drives
  - 4 Flash enclosures in base rack with 4 additional in first expansion rack
- Option for 1 or 2 HMCs installed in base frame
- Single phase power
The P8 DS8886 will be the following

- All Racks will 19" 46U - 40U with 6U top Hat
- 2x P8 4U CEC’s dual processor socket
- 4x IO Bay Pairs
  - 2x IO Bay Pair in A Rack
  - 2x IO Bay Pair in B Rack
- Max of 128 Ports
  - 4 port 16Gbps FCP / FICON
  - 4 port and 8 port 8Gbps FCP / FICON adapters
  - max 16 ports per I/O Bay
- Max 8 DA Pairs
- Max of 1536 DDMs/64 Gigapack drawers
- Max of 8 High Performance Flash Enclosures - 240 flash drives
  - 4 HPFE Drawers in A Rack
  - 4 HPFE Drawers in B Rack
- 2x 8U DC-UPS
- Single Phase
- 1 or 2 HMC option
- Max of 5 Racks

New Model Number of 981
The DS8884 will be the following:

- 19" 40U rack
- 2x P8 2U CEC's single processor socket
- 2x IO Bay Pairs
  - 1x IO Bay Pair in A Rack
  - 1x IO Bay Pair in B Rack (B Rack can be ordered with out IO bay Pair)
- Max of Host 64 Ports
  - 4 port 16Gbps FCP / FICON
  - 4 port and 8 port 8GbpsFCP / FICON adapters
  - max 16 ports per I/O Bay
- Max 4 DA Pairs
- Max of 768 DDMs/32 Gigapack drawers
- Max of 4 High Performance Flash Enclosures -120 flash drives
  - 2 HPFE Drawers in A Rack
  - 2 HPFE Drawers in B Rack
- 2x 8U DC-UPS 60A Single Phase
- 1 or 2 HMC option
- Max of 3 Racks

New Model Number of 981
DS8880 Drive Technology

- **Flash – 1.8” in High Performance Flash Enclosure**
  - 400 GB drive

- **SSD – 2.5” Small Form Factor**
  - Latest generation with higher sequential bandwidth
  - 200/400/800/1600GB SSD

- **2.5” Enterprise Class 15K RPM**
  - Drive selection traditionally used for OLTP
  - 300/600GB drives

- **2.5” Enterprise Class 10K RPM**
  - Large capacity, much faster than Nearline
  - 600GB and 1.2TB drives

- **3.5” Nearline – 7200RPM Native SAS**
  - Extremely high density, direct SAS interface
  - 4TB drives
Customers love IBM DS8000 Data Systems