



IBM Systems & Technology Group

# IBM TotalStorage

*The power to break through  
DS8000 and DS6000*

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**ON DEMAND BUSINESS™**

## The power to break through



**Simplify** the underlying IT infrastructure and its management to help lower cost and complexity while increasing your ability to respond to changing demands



Help assure **business continuity**, security and data durability



Efficiently manage information **throughout its lifecycle**, relative to its business value

# IBM TotalStorage



## How do I break through?

What is keeping you from accessing the information you require?  
**It's old technology, old thinking.**

### Past

**Monolithic infrastructure architectures**

**Task-specific view of IT**

**Hard partitioning of resources**

**Midrange vs. enterprise storage**

### Today

**Industry-standard technologies in modular packages**

**Holistic, end-to-end approach**

**A virtualized fabric of resources**

**Enterprise storage continuum**

# The IBM TotalStorage DS Family

The industry's broadest range of disk storage systems



Common management platform  
 Common suite of copy services  
 Virtualization  
 Compelling price points  
 Industry leading service and support

Simplify the underlying IT infrastructure and its management to help lower cost and complexity while increasing your ability to respond to changing demands

Assure business continuity, security and data durability

Efficiently manage information throughout its lifecycle, relative to its business value

## Empowering you to break through

- ▶ **IBM TotalStorage DS6000—exceptional price and performance breakthrough in a modular package that redefines enterprise-class storage**
- ▶ **IBM TotalStorage DS8000—a new standard delivers massive scalability and revolutionary partitioning provided by the IBM POWER5™ processors—helping to lower costs**



Total control over your storage infrastructure  
The scalability. The performance. The value.

# Introducing IBM<sup>®</sup> TotalStorage<sup>®</sup> DS8000

**“Game Changing”  
Capabilities!**



**New opportunities to help  
increase ROI and decrease  
long-term costs**

- **Setting a “New Standard” in Cost Effectiveness**
  - **Balanced Performance** – Up to 6X ESS Model 800
  - **Model to Model upgradeability** – Up to 192TB
    - (designed for > 1PB)
  - **Integrated Solution Capability** – Storage System LPARs
  - **Flexibility** – Dramatic addressing enhancements
  - **Extendability** – Designed to add/adapt new technologies
  - **Storage Management** – All New Management Tools
  - **Availability** – Designed for 24X7 environments
  - **Resiliency** – Industry Leading Copy and Mirroring Capability
  - **Long Term Cost** – Four Year Warranty
  
- **Delivered through**
  - Server/Storage Integration – POWER5™ Technology
  - Exploitation of IBM Virtualization Engine™ Technology
  - Innovation by leveraging IBM technology leadership
  - Extension of a proven microcode base to offer stability but allow exploitation of new technologies
  - Timely integration of new technologies

# DS8000 Hardware Overview

## ■ 2-Way (Model 8100)

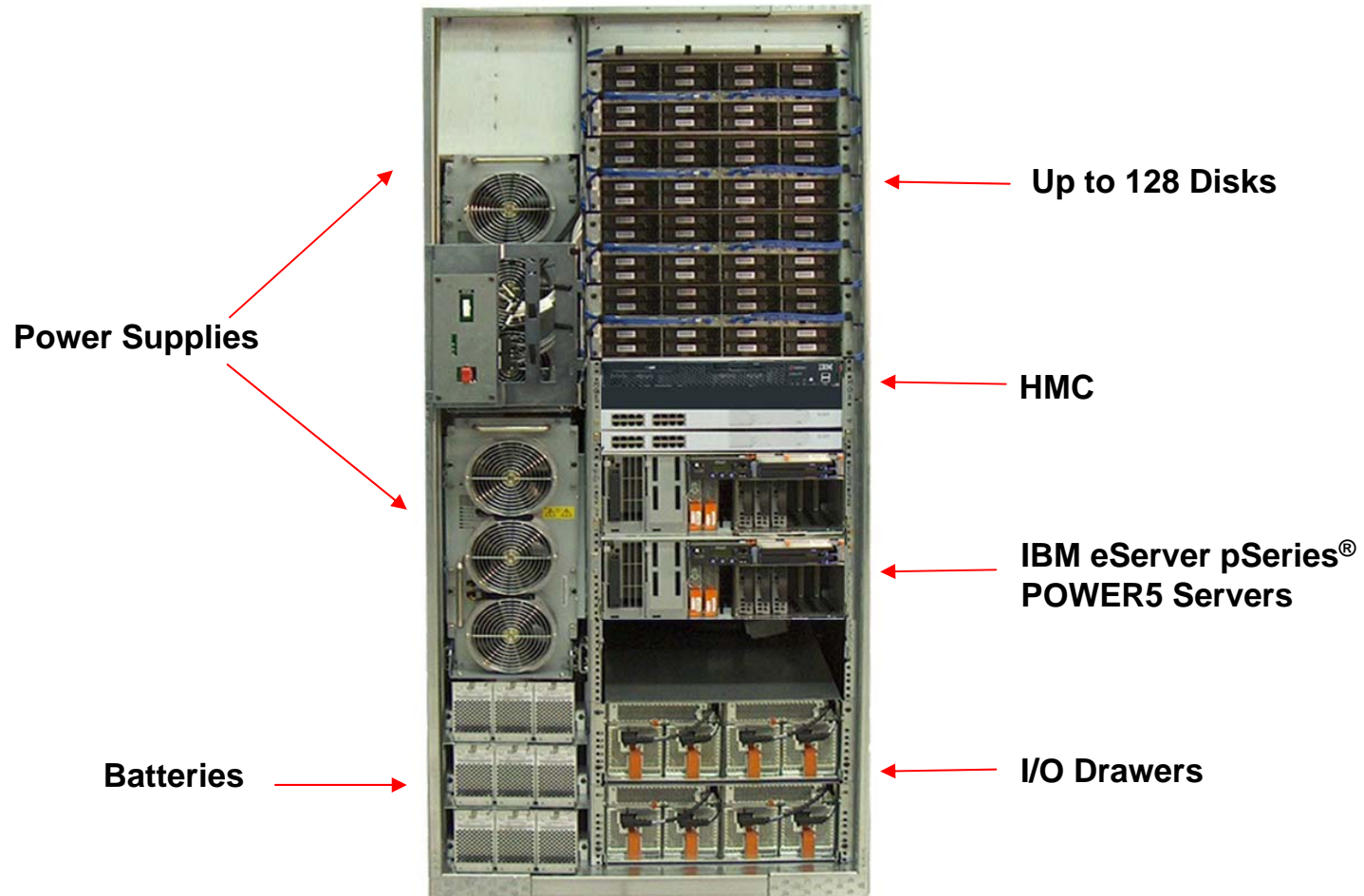
- Two dual processor servers
  - Up to 128GB Cache
- 8 to 64 2Gb FC/FICON – 4 to 32 ESCON Ports
- 16 to 384 HDD
  - Intermixable 73GB 15Krpm, 146/300GB 10Krpm
- Physical capacity from 1.1TB up to 115TB

## ■ 4-Way (Model 8300)

- Two four processor servers
  - Up to 256GB Cache
- 8 to 128 2Gb FC/FICON – 4 to 64 ESCON Ports
- 16 to 640 HDD
  - Intermixable 73GB 15Krpm, 146/300GB 10Krpm
- Physical capacity from 1.1TB up to 192TB

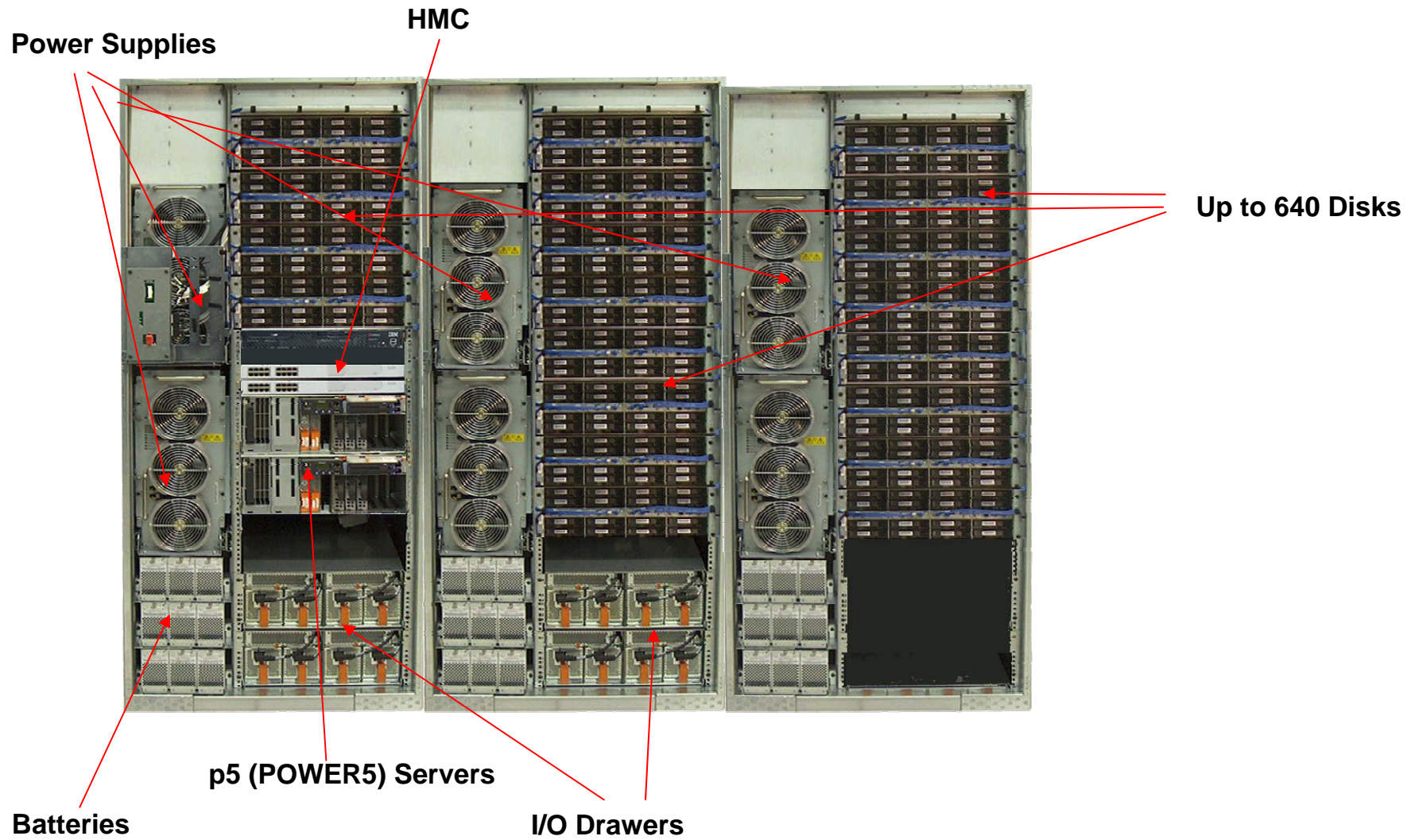


# IBM TotalStorage DS8100 (2-Way)





# DS8300 (4-Way with two expansion frames)



## DS8000 Enhancements Over ESS 750/800 – At a Glance

- **Hardware – new “everything”**
  - Processors, adapters, internal paths, frames...
- **Increased management flexibility via storage system LPARS**
- **Enhanced Performance**
  - Faster or more of almost “everything”
  - New patent pending cache algorithms
- **Extended logical device addressing**
  - Up to 256 logical subsystems (LSS) with virtualized assignment of physical capacity to LSSs
  - Up to 64K logical volumes
- **Extended Connectivity**
  - Up to 128 host ports
  - Up to 510 FCP logins per port and 8,192 per Storage LPAR
  - Up to 512 FICON logical paths per logical control unit image and 128,000 per storage facility image
  - Up to 256 FICON logical path groups per control unit image
  - Up to 2,048 FICON logical paths per port
- **Improved volume management**
  - Nondisruptive volume add *and* delete
  - Up to 64K logical volumes assigned to up to 256 Logical Subsystems (LSSs); an array can contain volumes for multiple LSSs
  - Larger LUNs (over 2 TB)
  - 64,000 cylinder (55.6 GB) zSeries volumes
- **Improved Administration**
  - Online and offline configuration capability using a Web-based graphical user interface (GUI)
  - Ease-of-use improvements (compared to the ESS Specialist)
  - Command line interface (CLI) supports control of copy services without dependencies on GUI-created tasks
- **Even more attractive Total Cost of Ownership**
  - More flexible feature licensing
  - Longer standard warranty period
  - Larger capacity volumes supported
  - Increased opportunities for consolidation

## DS8000 . . . Approaching Infinity

System growth designed for an on demand world

	ESS 800	DS8000	DS8000 with LPAR
Max Logical Subsystems	32	256	512
Max Logical Devices	8K	64K	128K
Max Logical CKD Devices	4K	64K	128K
Max FB Logical Devices	4K	64K	128K
Max N-Port Logins/Port	128	510	510
Max N-Port Logins	512	8K	16K
ITL Nexi	2M	64M	128M
Max Logical Path/FC Port	256	2K	2K
Max Logical Paths/CU Image	256	512K	512K
Max Path Groups/CU Image	128	256K	256K

# IBM Virtualization Engine Offerings

## IBM Integrated and Tested

### **IBM Virtualization Engine Suite for Servers**

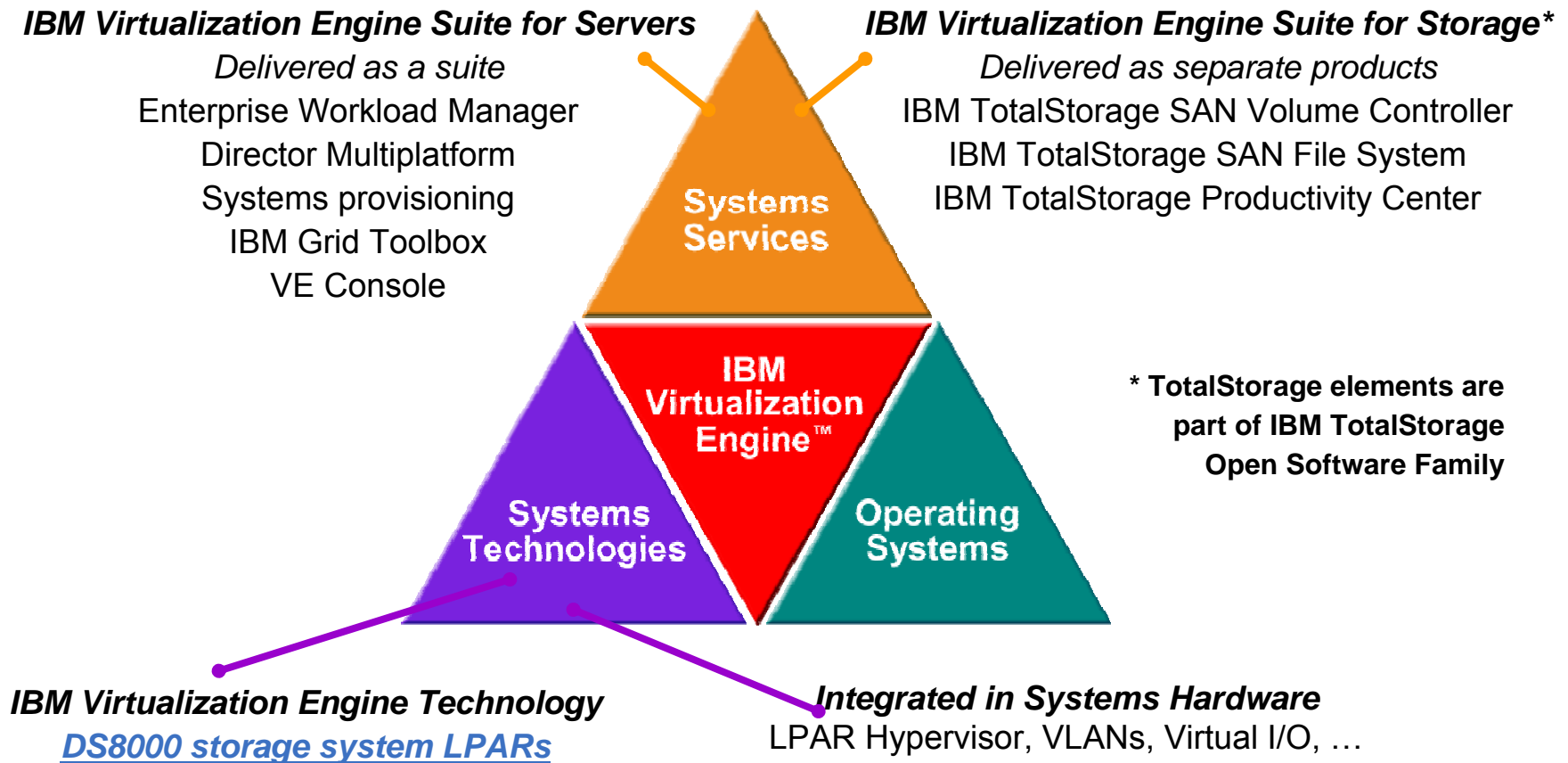
*Delivered as a suite*

- Enterprise Workload Manager
- Director Multiplatform
- Systems provisioning
- IBM Grid Toolbox
- VE Console

### **IBM Virtualization Engine Suite for Storage\***

*Delivered as separate products*

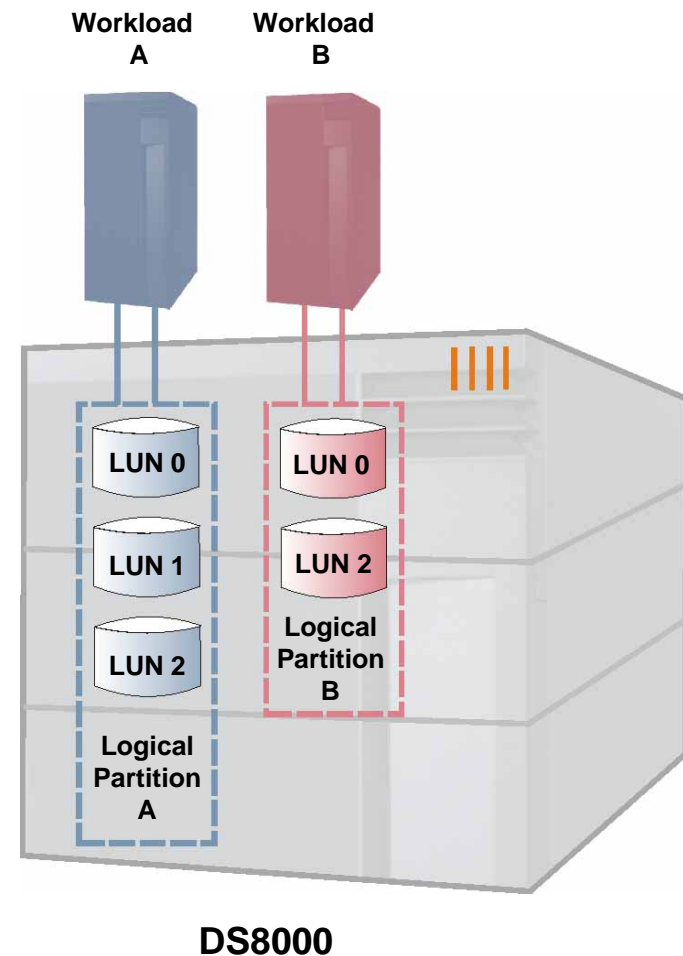
- IBM TotalStorage SAN Volume Controller
- IBM TotalStorage SAN File System
- IBM TotalStorage Productivity Center



\* TotalStorage elements are part of IBM TotalStorage Open Software Family

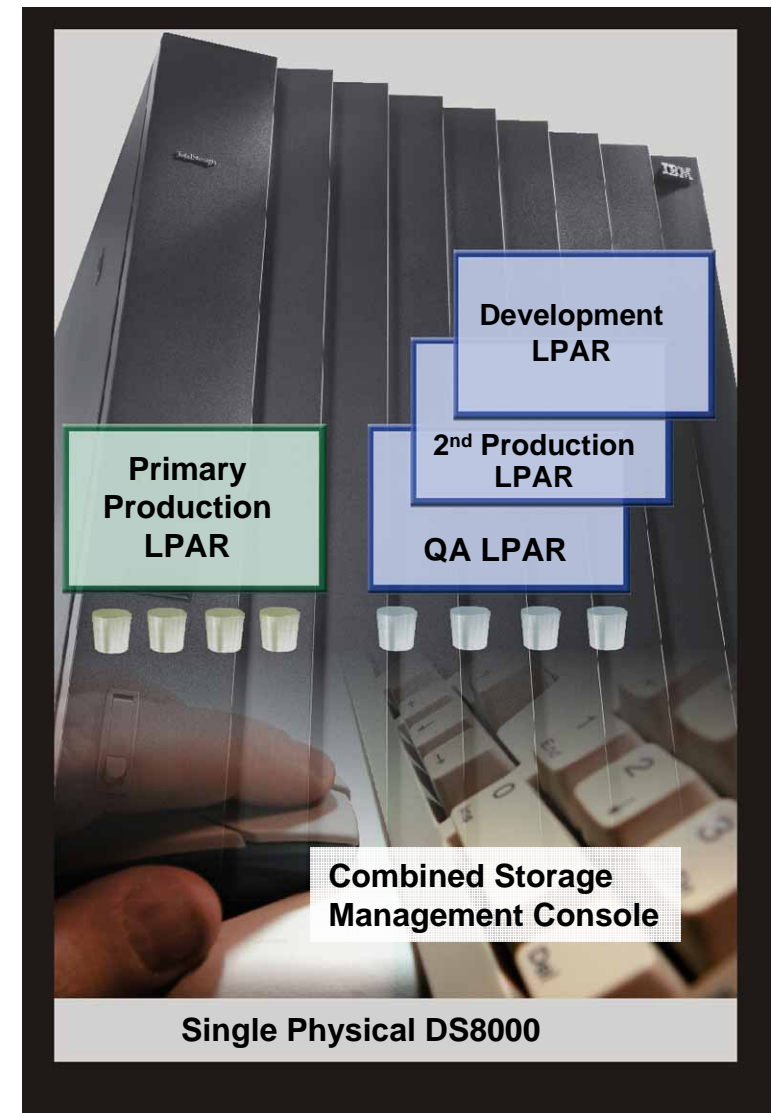
## Benefits of Storage System LPARs

- **Create virtual storage subsystems**
  - Scalability/performance leverage
  - Improved TCO over “singular” sub systems
- **Heterogeneous workload support**
- **System (hardware) based implementation ensures data integrity**
- **Added flexibility/performance optimization**
  - Performance optimization/tailoring
  - Reduced manual tuning



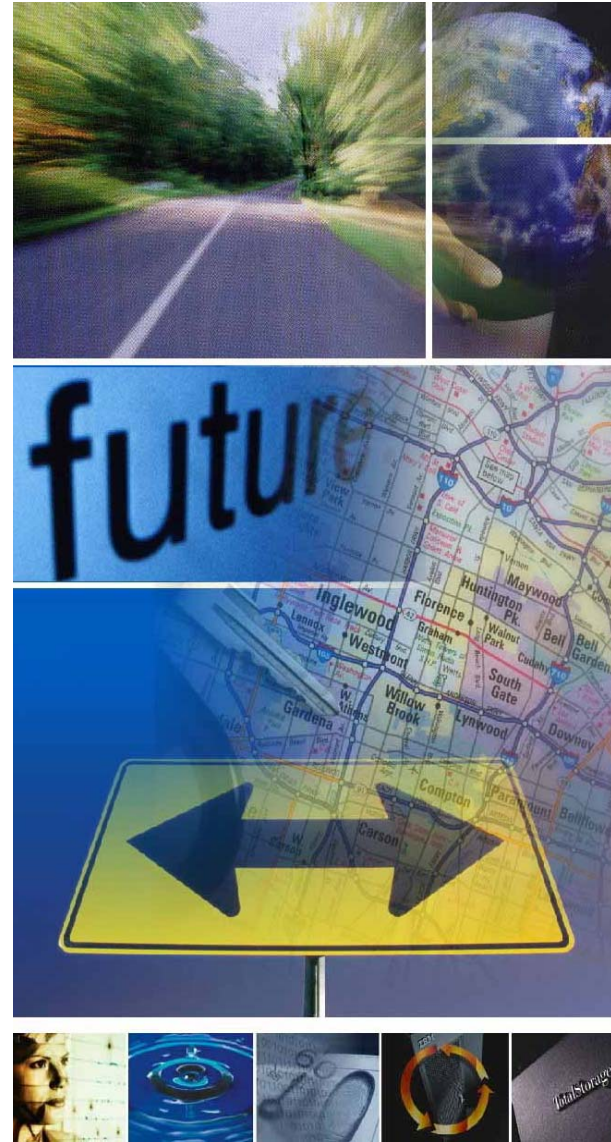
# Dual Partition Customer Exploitation

- **Two production workloads**
  - Production splits by OS, application, organizational boundaries
- **Production and development partitions**
  - Application development
  - Change control, test, education
- **Dedicated partition resources to meet Service Level Agreements**
- **Production and data mining**
- **Business continuance (secondary) within the same physical storage array**
  - Test environment
  - Production for multiple copy scenarios
- **ILM partition with fewer resources, slower drives . . .**
- **Other special purpose**



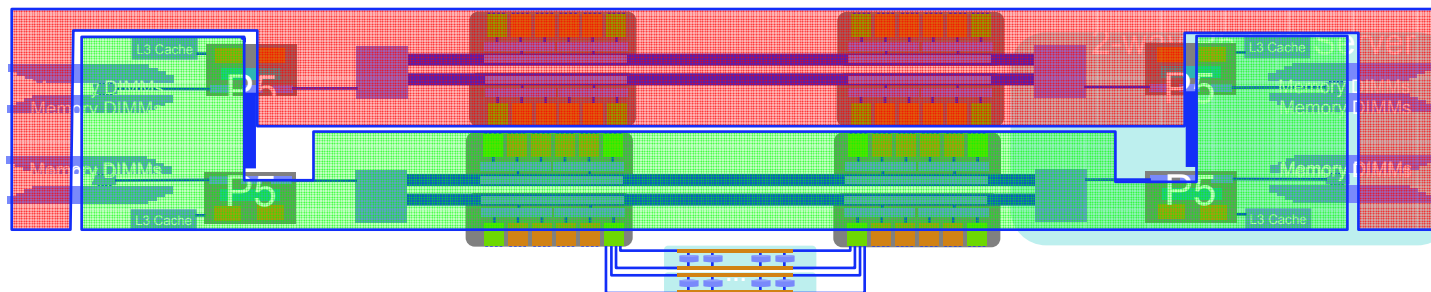
## Future Directions of Storage System LPARs

- More granular I/O allocation
  - Physical array level
- CPU resource allocation between LPARs
  - 50/50 moving to 25/75, 0/100, 10/90, 20/80 etc.
- Dynamic memory movement between LPARs
- Application LPARs
  - Tight integration of storage centric applications
- Virtual I/O between application LPARs and virtual array images
- Virtualized External Application I/O
  - Virtualization of Ethernet and Fiber Channel Ports for application LPARs



# Potential “Applications” in Storage System LPARs

- **Integrated File Systems**
  - SFS
  - NAS
  - Others
- **Additional Storage Protocols / Interfaces**
  - iSCSI gateway
  - Object Server
- **Database Acceleration/Offload**
  - DB2
    - Health check, multi level security, DB reorgs, image copies, HSM
  - Oracle
- **Backup / Recovery**
  - TSM, Legato, Veritas, others
  - Disk to Tape offload
- **Integrated Domain-Specific Apps**
  - Reference Data
  - Medical Imaging
- **Integrated Functions**
  - ESSNet
  - SVC
  - Delayed RPO

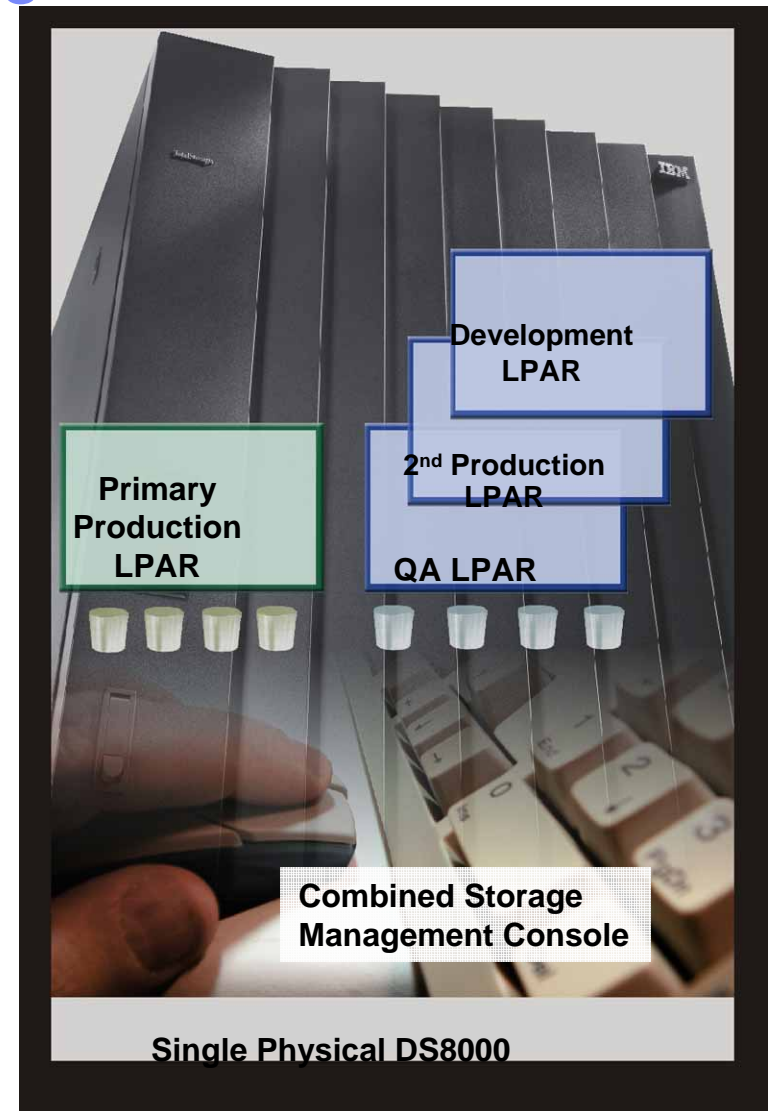




## Storage System LPAR Advantages

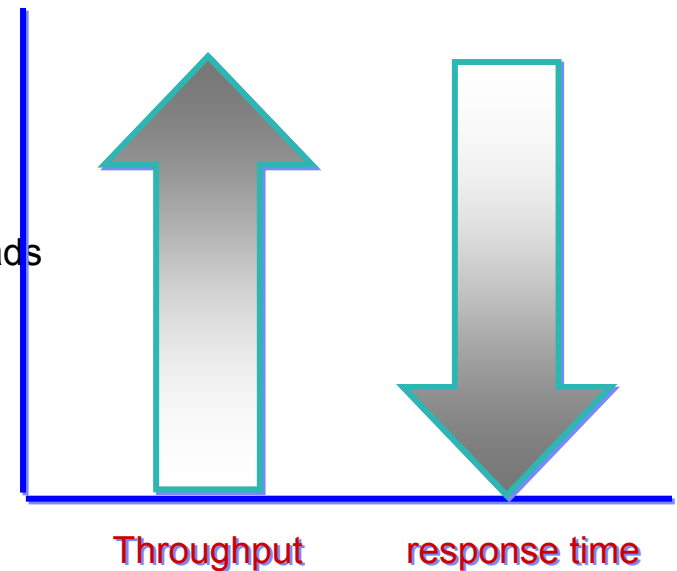
- Improved cost of ownership
- Improved management efficiency
- Reduced “real estate”
- Dynamic allocation of resources
- Efficient workload balancing
- High availability – Storage Image Independence

Lower Long Term Cost –  
Improved ROI



## DS8000 – Key Performance Benefits

- **Improved application responsiveness**
  - Increases employee productivity, user satisfaction
- **Modular design to help address performance requirements**
  - Model to Model Upgradeability
  - Can accommodate future technology improvements
- **Self-tuning capabilities**
  - Two pools of dual-active SMPs help address varying workloads
  - Multiple RAID-5 performance optimizations
  - Virtually 100% cache write hits
  - Efficient cache algorithms
  - Any two host paths can transfer data concurrently
  - FibrePath+ minimizes disk path arbitration delays
  - z/OS: I/O priority queuing and Multiple Allegiance
- **Price/performance options**
  - Model to model scalability
  - Up to 256GB of cache
  - RAID-5 and RAID-10, intermixable
  - Disk capacity/speed intermix
  - z/OS Parallel Access Volumes (PAV) feature
- **Performance attributes increase opportunities for consolidation cost savings**



# “DS8000” – New Storage Consolidation Platform in a Modular Package

## Examples



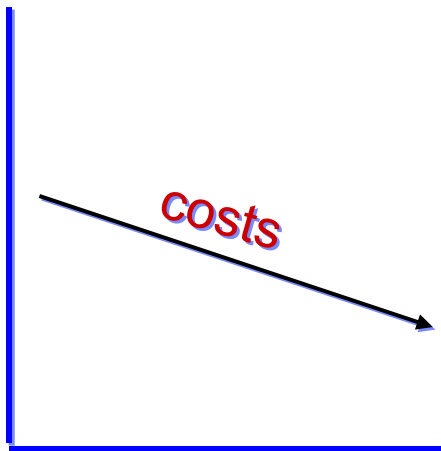
Note: 1. Assuming consolidation from 9TB ESS, 9TB DMX into 4 way, 36TB, “DS8000”

## DS8000 – TCO Benefits

- All disks RAID protected
- Storage systems LPARs
- Configuration management software - standard
- Multipath subsystem device drivers – standard
- 4 year warranty for hardware - standard
- 4 year warranty for priced software – standard
- Installation - standard
- Remote mirror and copy
  - Interoperable with the ESS Models 750 and 800 over Fibre Channel communication links

### Feature License Flexibility

- Sub-capacity licensing option with “license scope management” for:
  - Point-in-time copy (FlashCopy®)
  - Remote mirror and copy (PPRC)
- If the function will be used with only open systems data:
  - A license is required for only total physical capacity configured as Fixed Block (FB)
- If the function will be used with only zSeries data:
  - A license is required for only total physical capacity configured as Count Key Data (CKD)
- License scope is client-managed
  - Can be changed on a given machine as business requirements change



## DS8000 – Designed to Support Continuous Operations

- **No single point of failure**
  - RAID-all” disk drives; spare disks always configured
  - Dual-active server complexes
- **No single point of repair / hot-swappable components**
- **Optional host-based drivers for transparent I/O path failover and failback**
- **Concurrent microcode loads**
- **Online administration control over logical configuration**
- **Proactive and reactive “call home”**
- **Extension of extremely stable/proven operating environment**
- **Storage LPARs can run different copies and even different versions of microcode**



## DS8000 Future Directions

- Planned Hardware Enhancements
  - Additional multi-processor models (with upgrade ability)
  - Higher performance multi-processors
  - 4Gb Fibre Channel/FICON Host Adapters
  - Higher capacity/speed disk drives
- Functional Enhancements
  - Integration of storage system LPAR applications
  - Additional RAID data protection options
  - On demand enhancements
  - Logical volume over provisioning
  - Larger zSeries Volumes



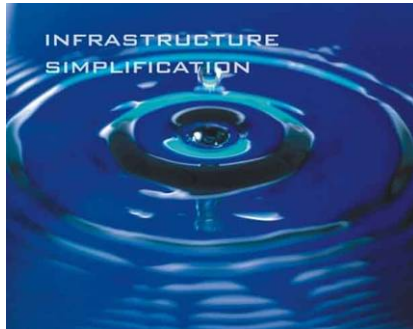
## DS8000 -- Value that Makes a Difference

- Breakthrough Performance
- Useable Capacity
  - Linear Scalability
- Storage System LPARs
  - Improved scalability/resiliency
- TCO
  - Four Year Warranty
  - Model to Model Upgradeability
  - Management Efficiency
  - Storage System LPARs
- Business Continuity
  - Portfolio of functions to meet varied business needs
  - Outstanding asynchronous remote mirroring offering (Global Mirror)



Long term value  
Leadership

## DS8000 – The Power to Break Through



**Exceptional price/performance and scale through POWER5 technology**

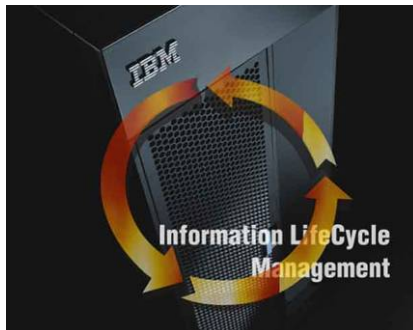
**New levels of simplification made possible by storage system LPARs**

**Vertical and Horizontal scalability for flexible growth**



**Availability, Performance, and Capacity needed to support mission critical, on demand workloads**

**Integrated, automated comprehensive set of solutions designed to address customer's business continuity needs**



**Ideal first choice of storage in the tiered storage hierarchy**

**Investment protection through model to model upgrades**

**Foundation for future integrated solutions**



## DS6000: Enterprise Class Function in a Modular Platform

- **Truly modular disk storage platform that supports open systems and mainframe**
- **Part of a broad continuum of enterprise storage products with the same software and compatible copy services**
- **50% better projected performance (read cache IO/sec) than CX700, even better when compared to DMX800, based on our estimates of DMX800 performance**
- **Almost twice the scalability of a DMX800 taking up 4% of the space at 5TB and 50% of the space fully configured**
- **Approximately 1/4 the power consumption of the DMX800 at 5TB**
- **Resiliency features not generally found in modular storage products**

## DS6000 Highlights

***ESS reliability and host attachment features now available in an incredibly small, modular, affordable package***

- **DS6000**
  - 3U package for controllers and disk expansion units
  - Open systems and mainframe support
  - Advanced functions interoperate with DS8000, ESS
  - High storage density footprint
    - 16 drives per 3U package, including controller
  - Up to 13 expansion units
    - Scalable to 224 Disk Drives; 67.2TB
  
- **Differentiators**
  - zSeries and iSeries native attachment
    - Including Parallel Access Volumes support
  - Same advanced software features as DS8000, ESS 800, ESS 750
  - High availability features not generally found in midrange storage products

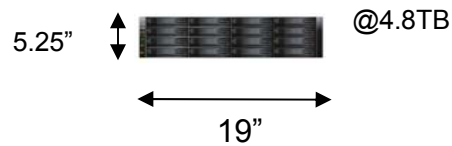


# Enterprise Class Storage Solutions

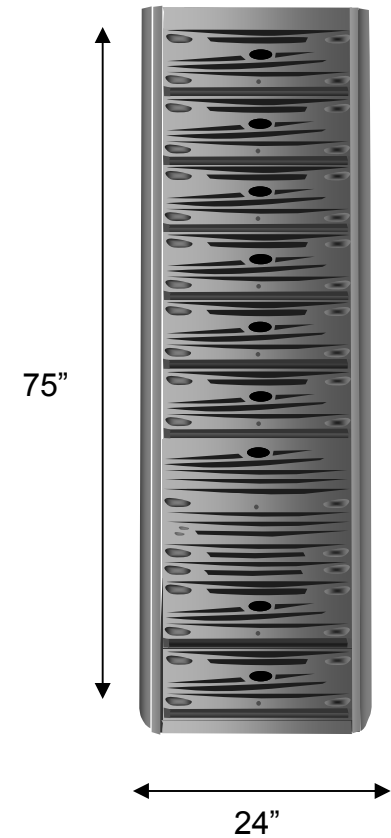
ESS 750



DS6000



DMX800



**Maximum Configuration** Up to 32 HDDs, 5TB  
**5 TB Configured Weight** 2,322 lbs  
**Maximum Power Consumption** 4.83 kVA

Up to 224 HDDs, 67TB  
 125 lbs  
 0.69 kVA controller  
 0.48 kVA expansion unit

Up to 120 HDDs, 35TB  
 1,596 lbs (full config)  
 4.64kVA

# Enterprise Continuum of Storage Products

- **97% shared operational code**
- **Compatible copy services**
  - With each other and ESS 750 and ESS 800
- **Common CLI**
- **User written 'scripts' run identically on both machines**
- **Common management interfaces**



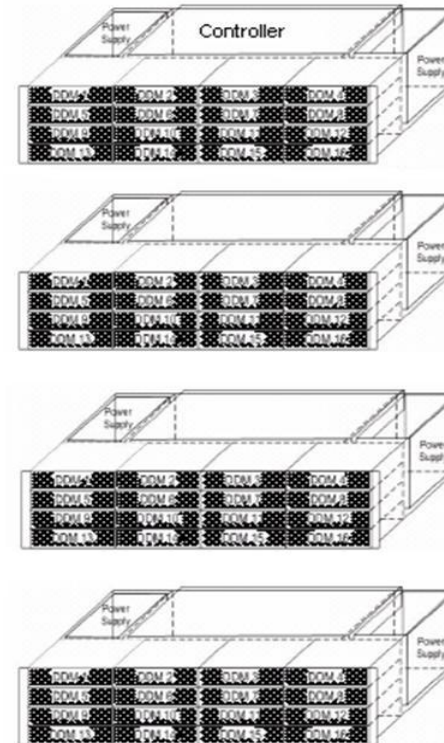
DS6000 series



DS8000 series

## Modular Scalability Potential Benefits

- **Lower acquisition costs**
  - Avoid having to buy for the future
  - Add capacity and function as needed
- **“Pay as you grow” design**
  - Grow capacity with storage needs
- **Flexible storage capacity**
  - Add capacity without disrupting data availability
  - Optimize storage to information needs by using appropriate drive sizes and speeds



## High Availability/Resiliency Features

- **Redundant and hot-swappable components**
- **Designed to reduce/avoid single points of failure**
- **Non-disruptive upgrades and configuration changes**
- **Switch fabric in disk expansion units**
- **4 data paths to each drive**
- **Preferred path I/O**
- **End to end data checking**
- **Predictive failure analysis for HDDs**

## Installability and Serviceability

- **Installability**

- Designed for customer install
- Simplified GUI
- Remote configuration
- Easy installation wizards

- **Serviceability**

- Intuitive status indicators on front and rear panels
- Light Path Diagnostics
- Call home
- Remote management
- Customer replaceable components
- Open standards S-MIS interface
- Manage multiple IBM TotalStorage products through IBM TotalStorage Productivity Center (TPC)

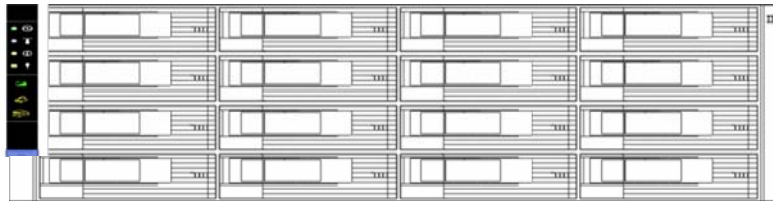
## New 4 Year Warranty

- **4 year warranty for hardware and operational code**
  - 9x5 NBD
  - Limited on-site repair
  - Most parts are customer replaceable units
  - Service upgrades are available
  - Business partners can provide additional services



# Front Panel Indicator

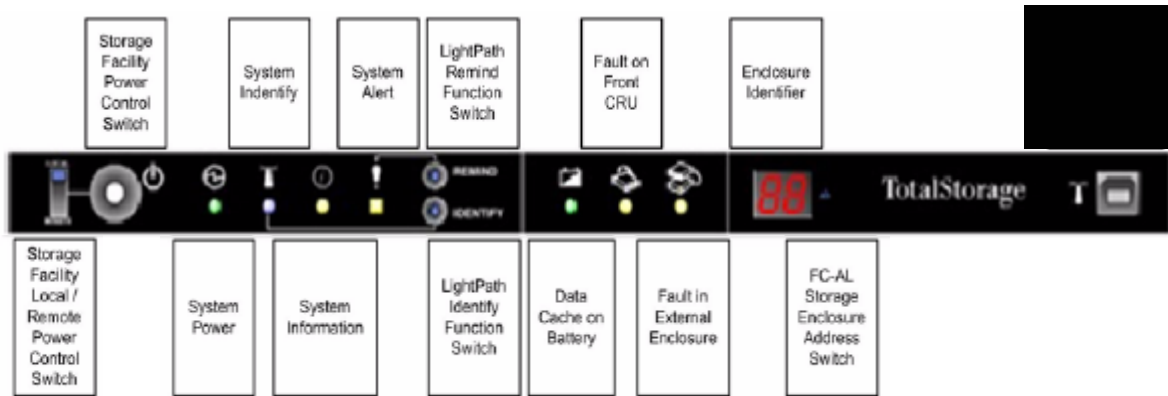
Server / Storage Enclosure – Front



	System Power
	System Identify
	System Information
	System Alert
	Data Cache On Battery
	CRU Fault on Rear
	Fault in External Enclosure

# Rear Panel Indicators

- Enclosure panel



Server Enclosure – Rear



## Rear Panel Indicators

- Enclosure panel
- Controller card



Server Enclosure – Rear

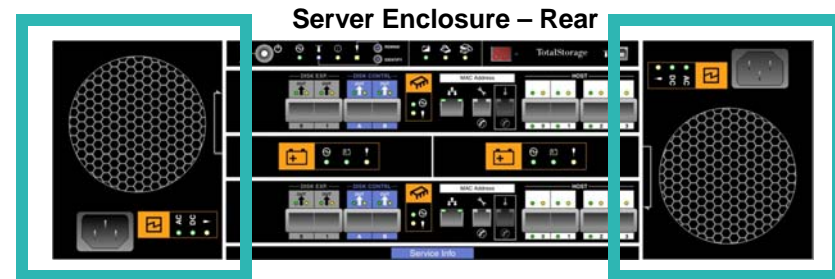


## Rear Panel Indicators

- Enclosure panel
- Controller card
- Power supply/Fan

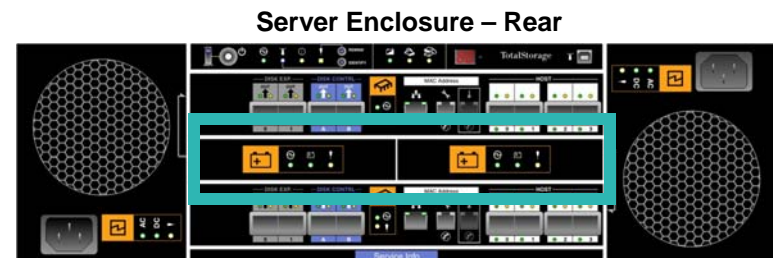
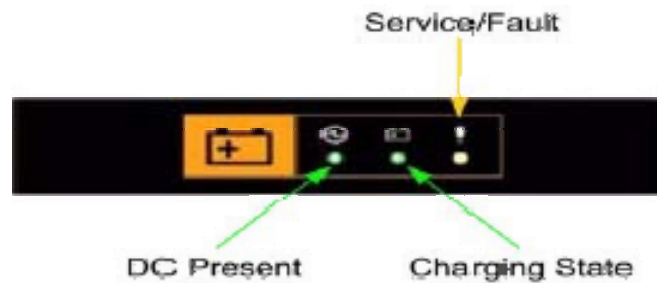


Power supply  
FAN  
Service Indicator



## Rear Panel Indicators

- Enclosure panel
- Controller card
- Power supply
- **Battery Backup (for cache)**



## DS6000 Consolidation Example from ESS F20



ESS F20

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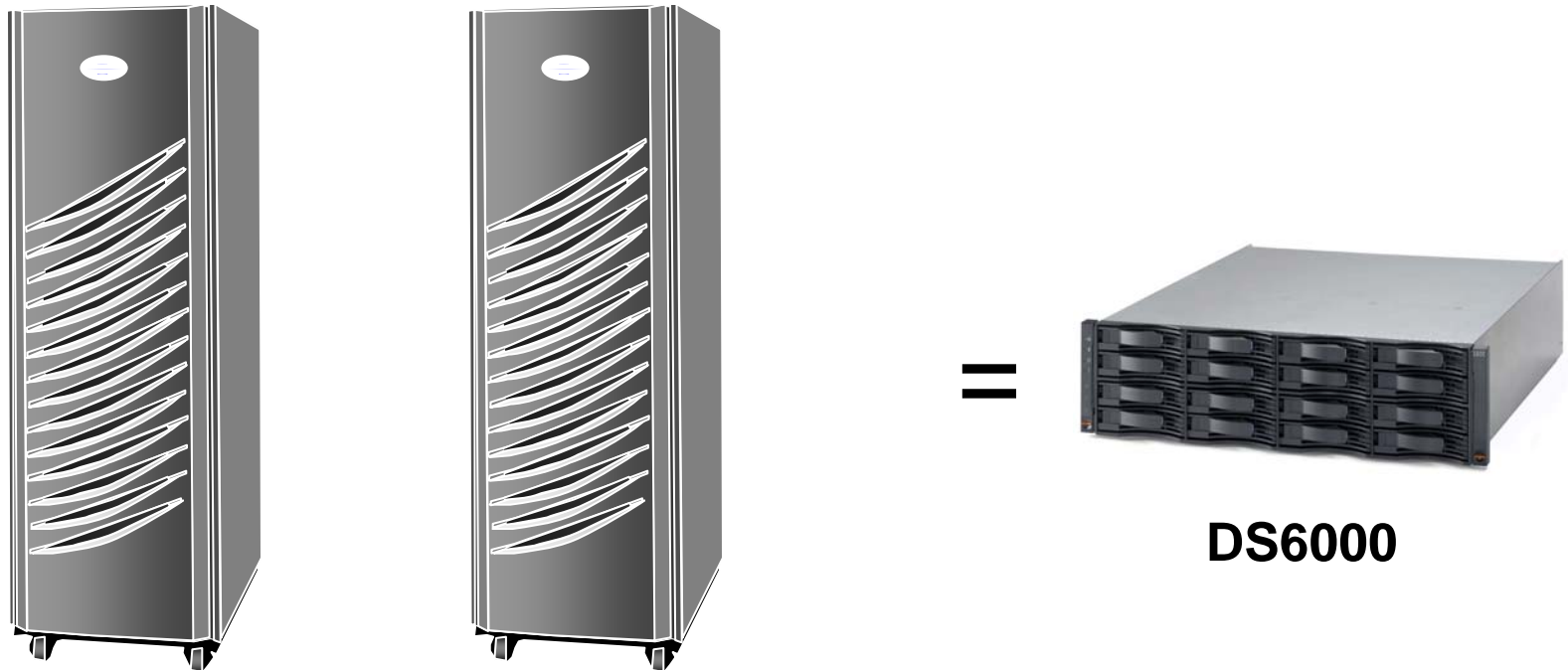
ESS F20

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**DS6000**

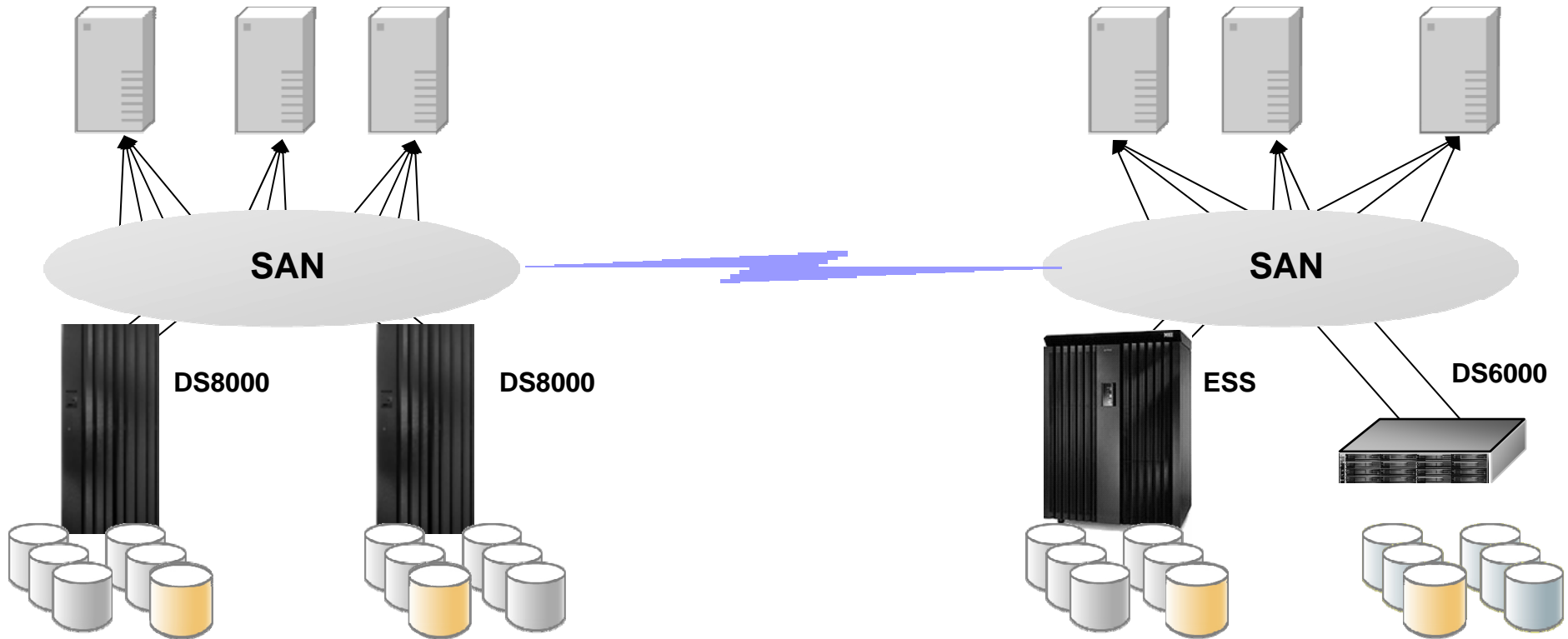
## DS6000 Consolidation: Older EMC Boxes



Ask how much the annual maintenance charges are.

The DS6000 may cost less.

# Business Continuity/Flexibility, Lower Costs



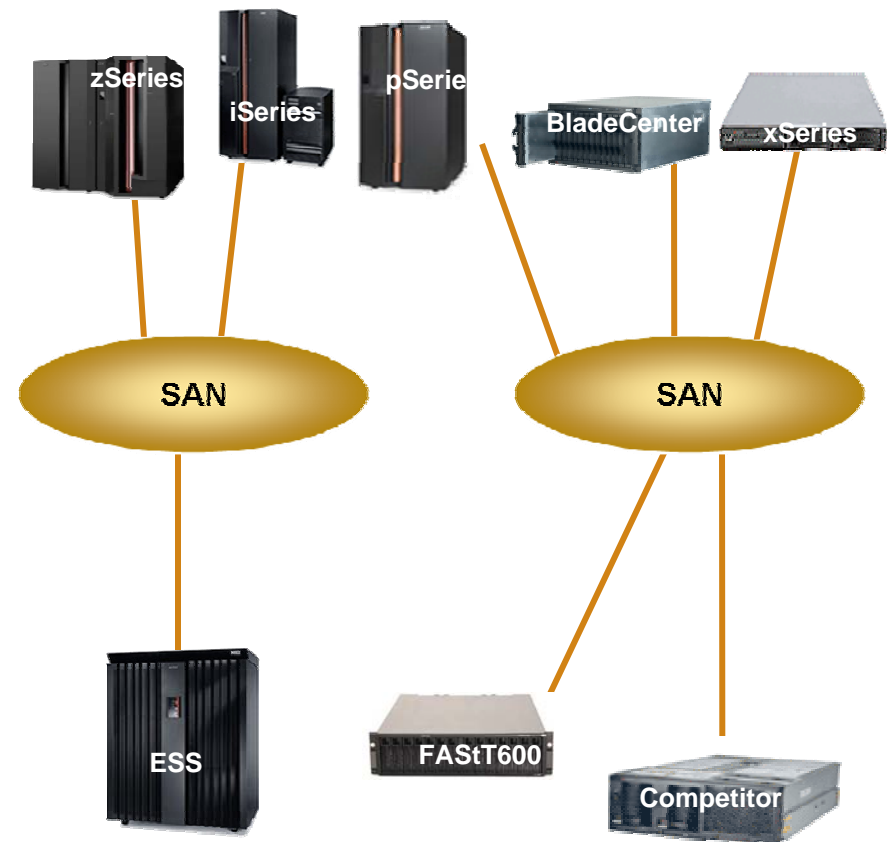
**Global Mirror (PPRC)  
across DS6000,  
DS8000, ESS**

Business Continuity, Investment protection  
Flexible, resilient, robust business solutions  
Lower Costs



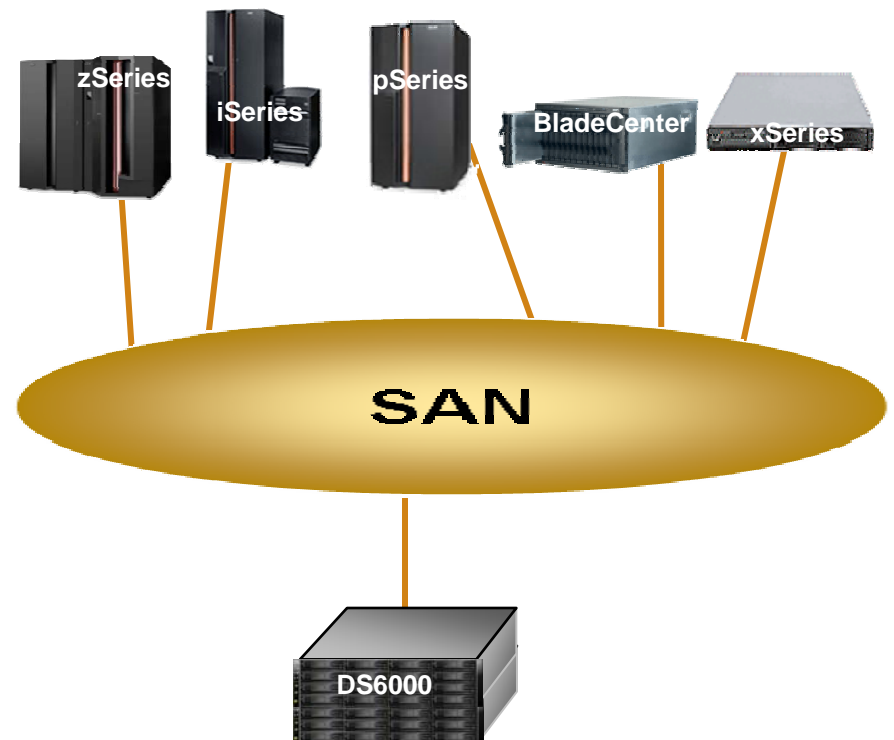
## Mainframe and Open Systems Consolidation

- Customer has two storage implementations
  - Mainframe storage
  - Open systems storage
  
- Challenges
  - IT staff productivity
    - Managed separately
  - Data availability differences
  - Non-interoperable copy services
  - Inconsistent Storage growth costs
  - Varied power requirements
  - Varied space requirements for initial and expansion needs



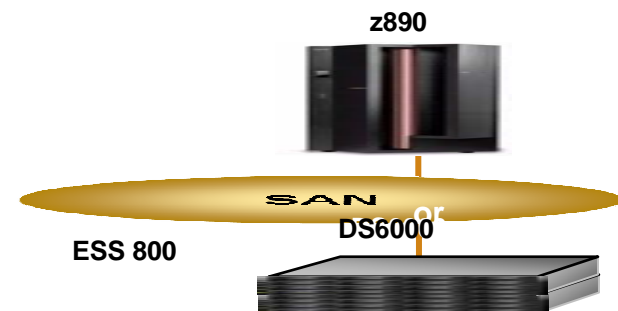
# Mainframe and Open Systems Consolidation

- Change the Game
  - One storage implementation for both mainframe and opens system environments
- Alleviate the customer challenges
  - IT staff productivity
    - Single point of management
    - Consistent IT skills used across entire enterprise
    - Enterprise class availability and architecture
  - Copy services
    - Interoperable between all locations
    - Offers the same industry leading capabilities to even the smallest implementations
  - Modular system hardware – “pay as you grow”
  - Single phase power
  - Rack-mountable in 19” rack

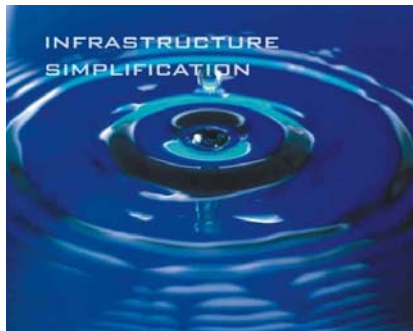


## zSeries Solution: DS6000 – Affordable Disk Storage

- IBM eServer zSeries 890 and 800 customers
  - Need a low-cost storage solution
    - Smaller capacity needs
    - Less I/O intensive transaction processing
    - Suitable as legacy internal/external disk storage replacement
- Customers call for ***“More affordable entry point of disk”***
- DS6000 answers the customer’s call
  - Low-cost z-Series disk storage
  - Modular system price structure
  - Flexible tiered pricing based on capacity used
  - Mission critical requirements in departmental workloads
- TotalStorage DS6000 can provide an on Demand disk infrastructure for zSeries Global Fabric:
  - Disk infrastructure designed to be optimized for customer environment and price point
  - Features mainframe-inspired resiliency
  - Has enterprise-class advanced functions including Metro Mirror, Global Mirror and PAV and Will work with GDPS
  - Has consistent management interface with DS8000



## DS6000 – “The Power to Break Through”



- **Compatible software with DS8000 to allow customers to leverage existing skills**

- **Low cost product supports all types of servers, not just open or mainframe**



- **Enterprise class resiliency and autonomic features**

- **Industry leading advanced functions supporting resiliency, continuous operations, data availability, and recoverability**

- **DS6000 can be used to mirror DS8000 based data**



- **Availability, Performance, and Capacity needed to support mission critical, on demand workloads**

- **Cost effective solution for mission critical and reference data applications**

## Early Returns

- **Commerzbank** is consolidating and simplifying its existing storage infrastructure by replacing more than 100 EMC and HP storage devices with **13 IBM TotalStorage DS8000 systems**.
- At **SIAM City Bank**, the IBM Total Storage Solution implemented includes **IBM DS8100**, SAN Director as well as Peer-to-Peer Remote Copy and Flash Copy functions. The intent is to back-up data between the main computer center and the DRC to minimize data damage or loss.
- Vereniging van Kamers van Koophandel or the **Society of Chambers of Commerce (VVK)** chose IBM's **TotalStorage DS8000 system** as the heart of a new technology infrastructure consolidation project, to support the legal, and import and export mission critical applications of its business. The new systems **will support 21 Dutch Chambers from one location** using IBM's virtualization technologies that allow one physical machine to behave like multiple machines.
- **Van Meter Industrial** has deployed an information on demand solution anchored by the IBM **TotalStorage® DS6000** integrated with Intuit Eclipse software, enabling Van Meter Industrial to tie together its existing infrastructure and **gain fast access to its mission critical information**.

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