Almacenamiento inteligente

Adrian Restuccia
High End Storage Sales
Spanish South America & Caribbean

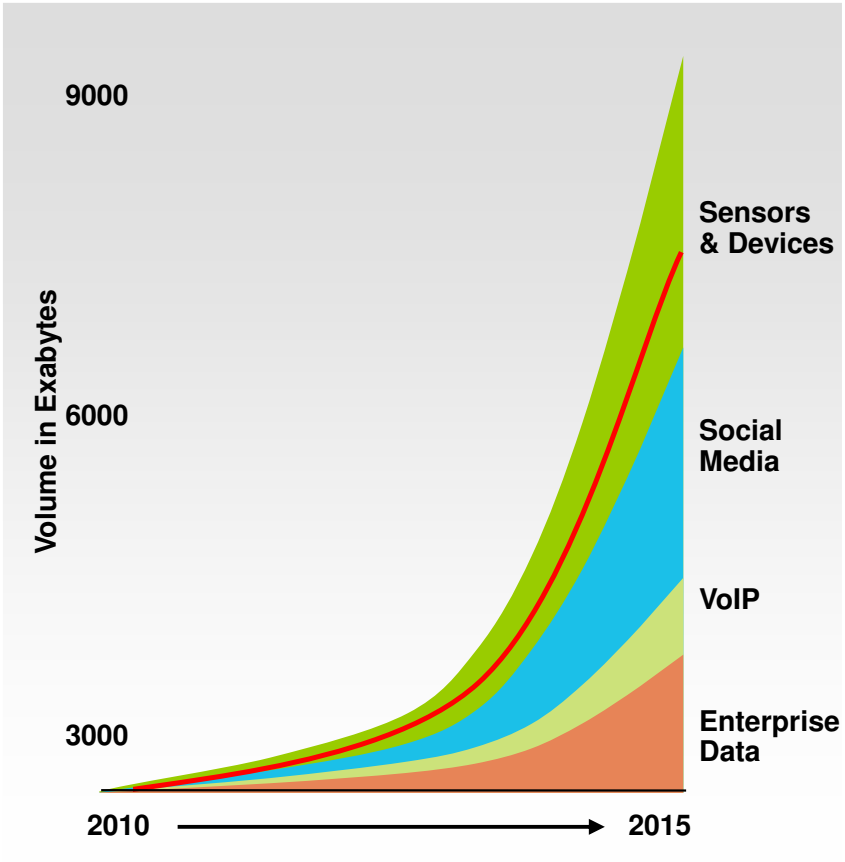
On a Smarter Planet, there are no clear boundaries of IT

"All clients are experiencing the phenomena of what we call '*front office transformation*'
- social media, devices, mobility – all reshaping the way they want to engage their customers, and how they capitalize on Big Data and analytics."

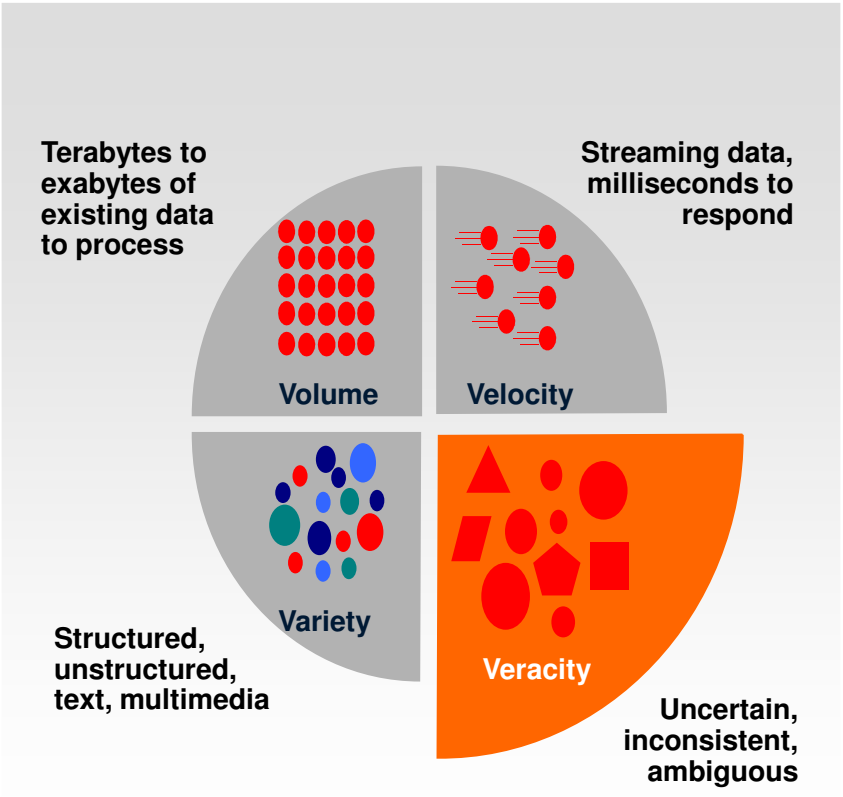
Ginni Rometty, President and CEO
IBM

The “information explosion” is at the center of this new era for IT

Data is growing at an astounding pace…

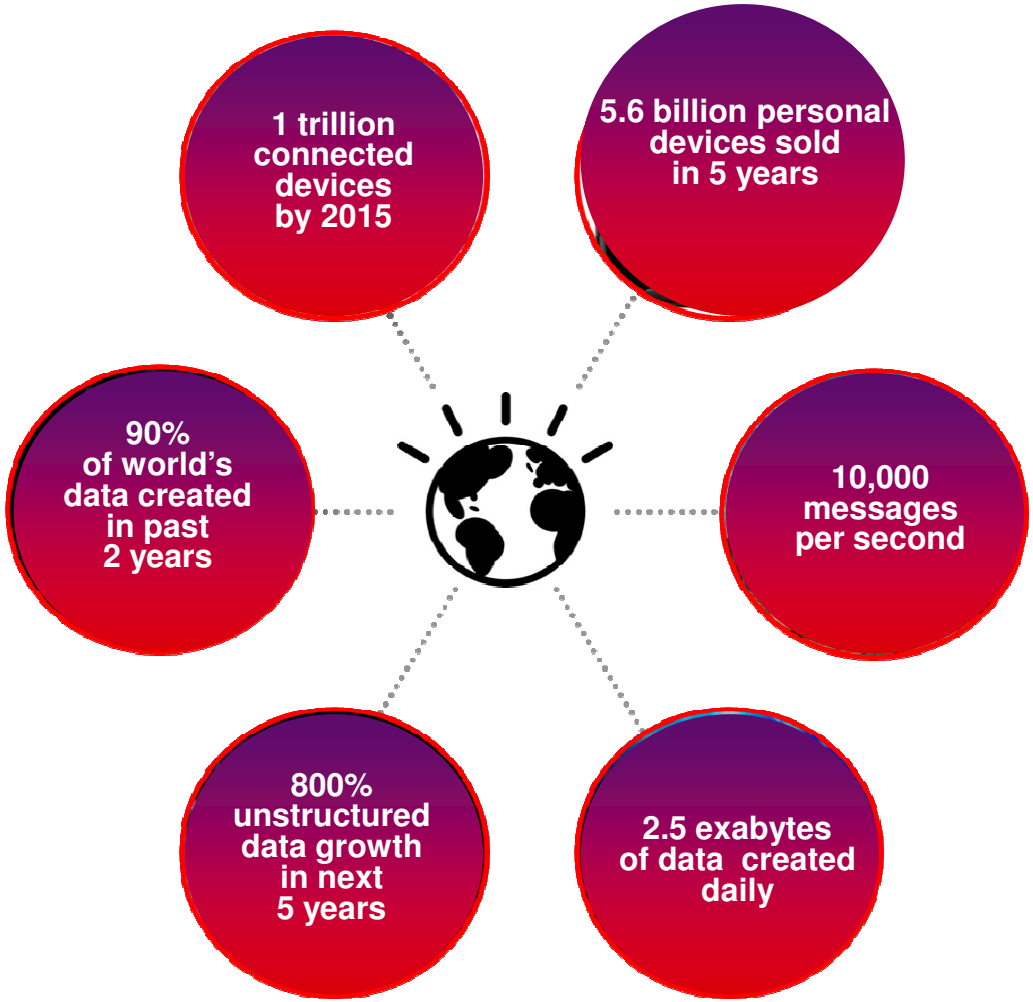


…data is not just about volume



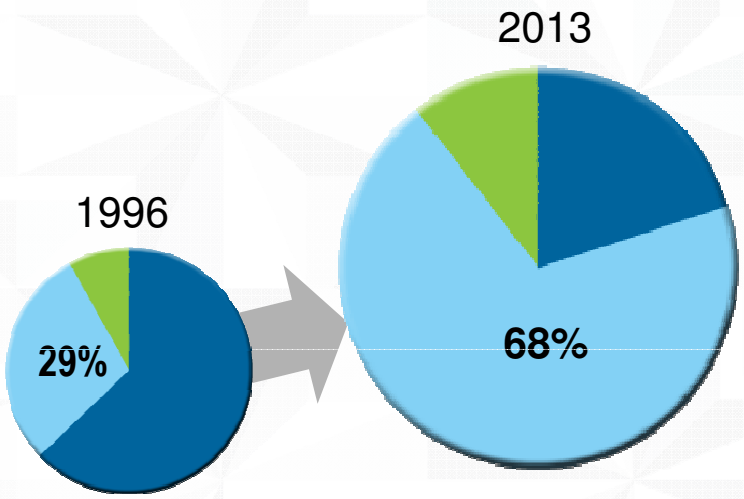
In a new era of IT, industries are being redefined

by an ability to process quickly unlimited volumes and variety of data



The real question…

Will your infrastructure block or enable this new era for IT?



68% of IT

operating costs in 2013 will be for **management and administration**

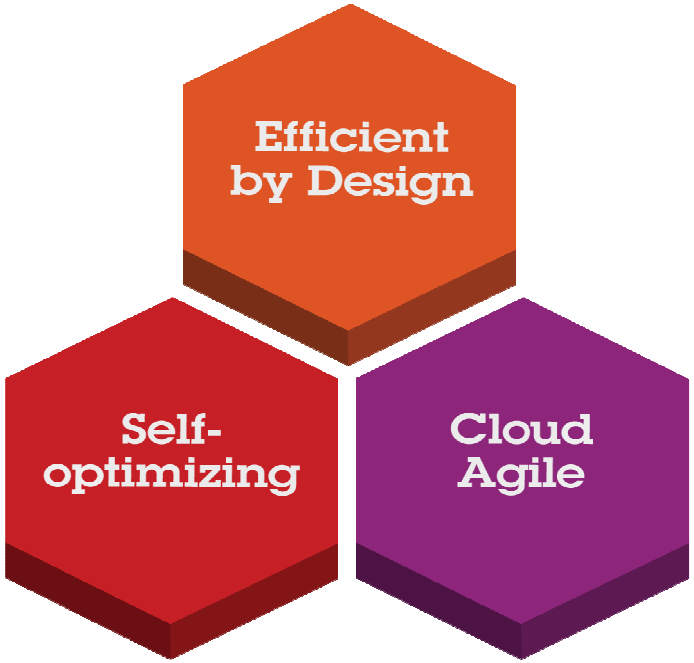
Only 1 in 5

organizations allocate more than **50% of IT budget to new projects**

Introducing IBM Smarter Storage for Smarter Computing

Efficient by Design

Manage cost and capacity growth



Self-optimizing

Improve performance and productivity

Cloud Agile

Increase information access and improve ROI

Efficient by Design

Manage Cost and Capacity Growth

- Decreases Space Requirements
  - Store more information in less space
  - Supports non-IBM storage, savings throughout the data center
- Simplifies Administration
  - Reduce complexity
  - Automate tasks
- Efficiency for Active Workloads
  - Efficiency for transaction processing, big data, clouds
  - Not just for inactive data
- Benefits
  - Reduce space requirements for active data up to 80%
  - Save up to 47% in administrator time
  - Reduce complexity by up to 30%

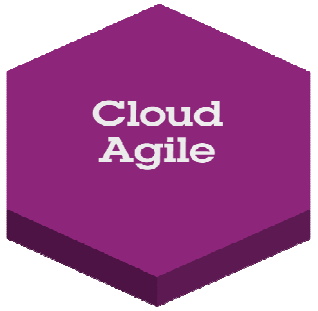
Self-optimizing

Improve Performance and Productivity

- Analyzes and adapts
  - Analyzes access patterns and adapts automatically
  - Flash optimization makes high performance affordable
- Automates performance tuning
  - Saves time, reduces errors and eliminates user disruption
  - Easy to match critical workloads with performance features
- Analyze Big Data Fast
  - Tuning and tiering are faster and more accurate
  - Optimization is a continuous automated process
- Benefits
  - Increase performance 3X with only 3% SSDs
  - Reduce storage costs by 50%

Cloud Agile

Increase Information Access and Improve ROI



- Adaptive
  - Storage adapts easily to unpredictable workloads
  - Data is automatically synchronized between facilities
- Automated
  - Self-service provisioning
  - Simpler and faster administration
- Deploy Clouds Faster
  - Administrators manage far more capacity
  - Leverage existing storage systems
- Benefits
  - Reduce disk space needs by up to 50%
  - Speed storage deployment up to 26%
  - Improve application availability by 29%

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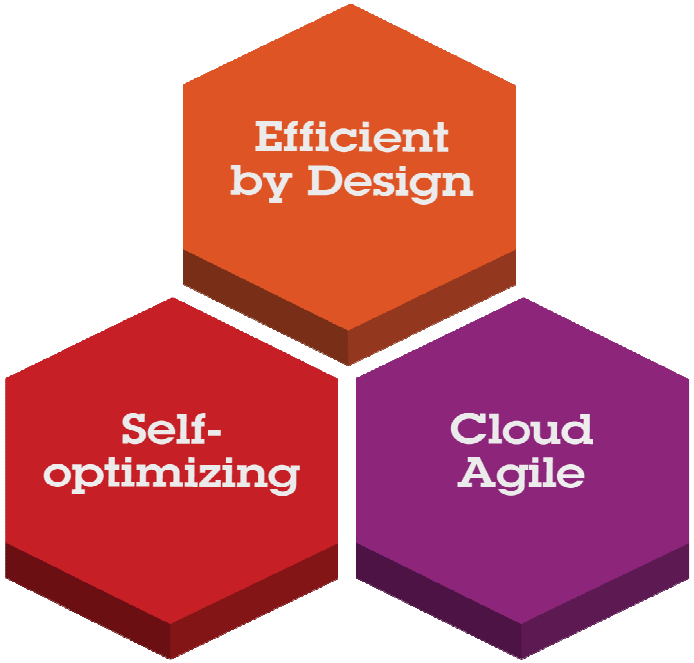
Manage cost and capacity growth



Self-optimizing

Improve performance and productivity

Cloud Agile

Increase information access and improve ROI

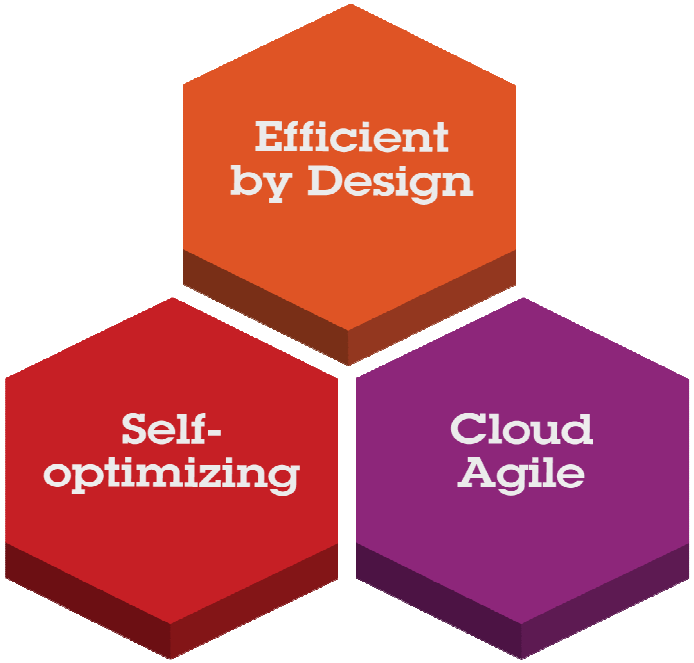
Introducing IBM Smarter Storage for Smarter Computing

Efficient by Design

- Real-time Compression integrated into Storwize V7000, and SVC
- TPC 5.1 improved GUI, enhanced reporting, tiering optimization, cloud support
- IBM Storage Hypervisor

Self-optimizing

Improve performance and productivity



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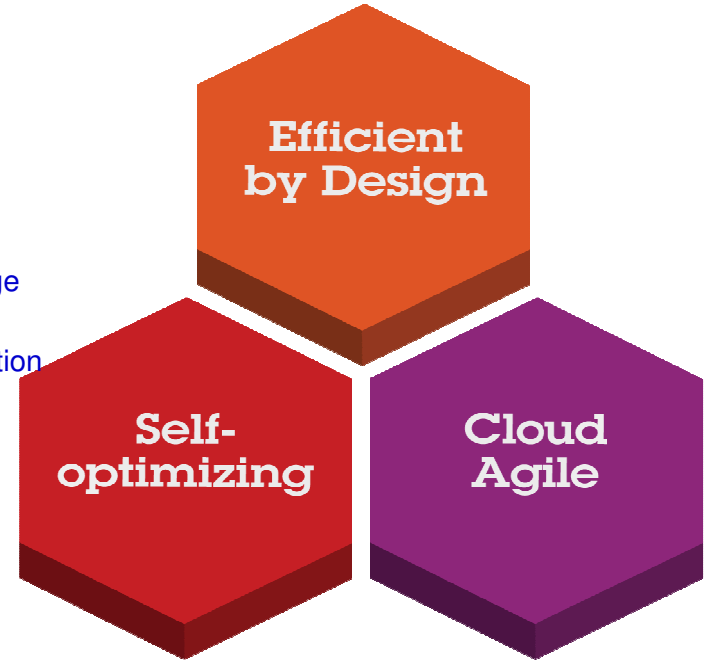
Self-optimizing

- DS8000 Easy Tier extended to server based storage
- DS8000 new high-density flash storage option (SoD)
- DS8000 Easy Tier support for application API



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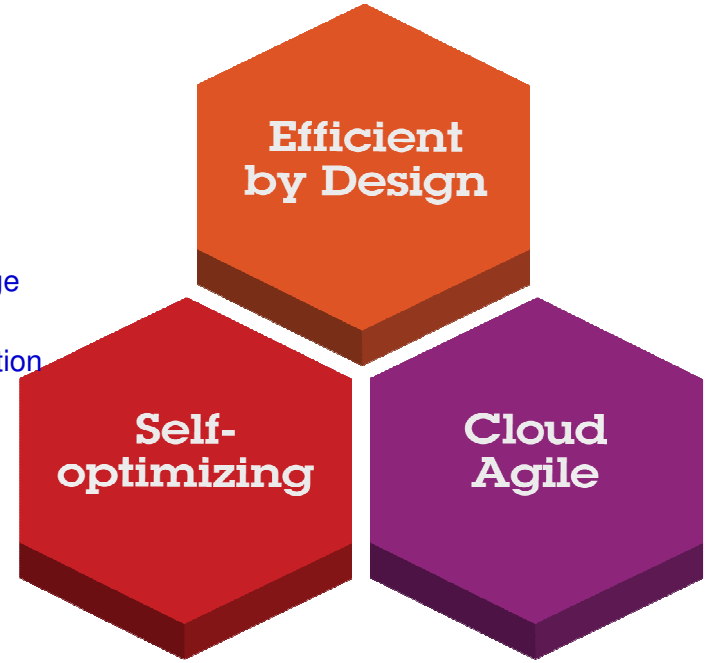


Cloud Agile

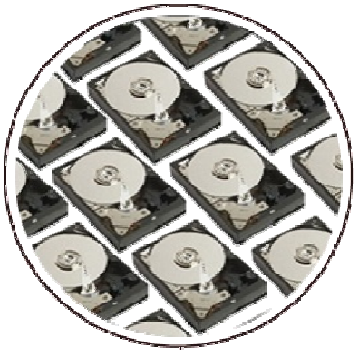
- SONAS and Storwize V7000 file storage virtualization (SoD)
- SONAS and Storwize V7000 ACE enables global file collaboration with multi-writer support (SoD)
- SONAS and Storwize V7000 Unified, cloud storage self-service service portal (SoD)
- Storwize V7000 support for Active Cloud Engine (SoD)
  - XIV clustering Hyperscale
- XIV Gen3 GTS Implementation Services
- IBM SmartCloud Virtual Storage Center will introduce analytics-based storage tier recommendations and automation to migrate data to the right tier (SoD)

IBM heritage of innovation and leadership in storage

1956

First magnetic hard disk drive

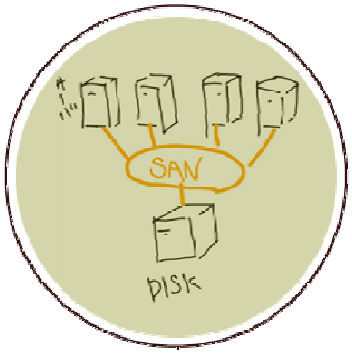
IBM 305 RAMAC (Random Access Method of Accounting and Control). Capacity of the 305's 50 two-foot diameter disks was 5 megabytes.



1993

First distributed storage

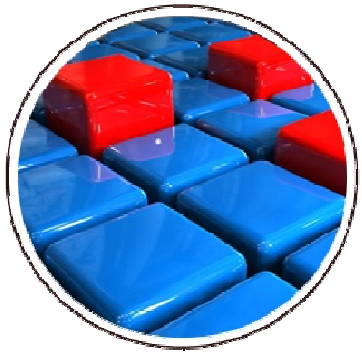
IBM 9337 Disk Array Subsystem is first reliable storage system using multiple, low-cost disk drives as single logical unit.



2003

Storage network virtualization

IBM SAN Volume Controller provides single, centralized point of control over data in heterogeneous storage environments.



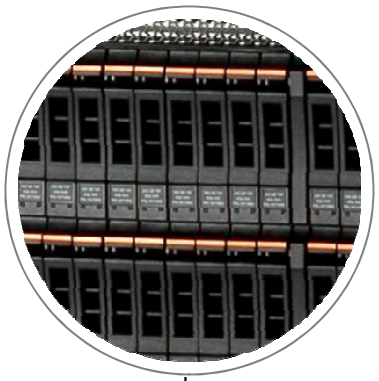
2010

First Intelligent data placement

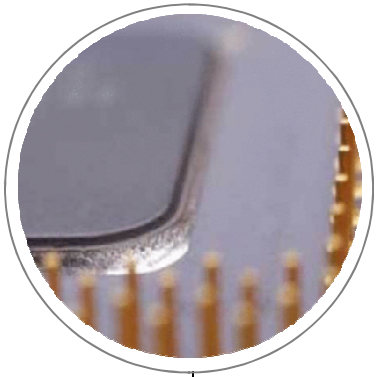
IBM System Storage Easy Tier first to automatically move most active data to faster solid-state drives for real-time analysis and less urgent data to tape.

Storage Acquisitions: 2007 Softek, Princeton Softech and Novus Consulting Group 2008 XIV, FilesX and Diligent 2010 Storwize, Inc, 2012 Texas Memory Systems.

IBM storage innovation into the future

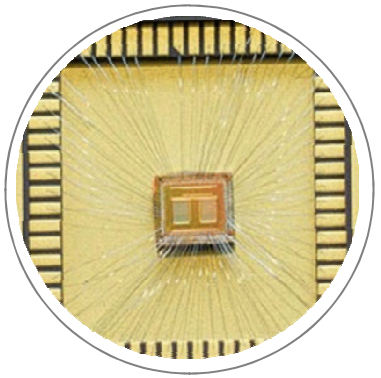


Easy Tier



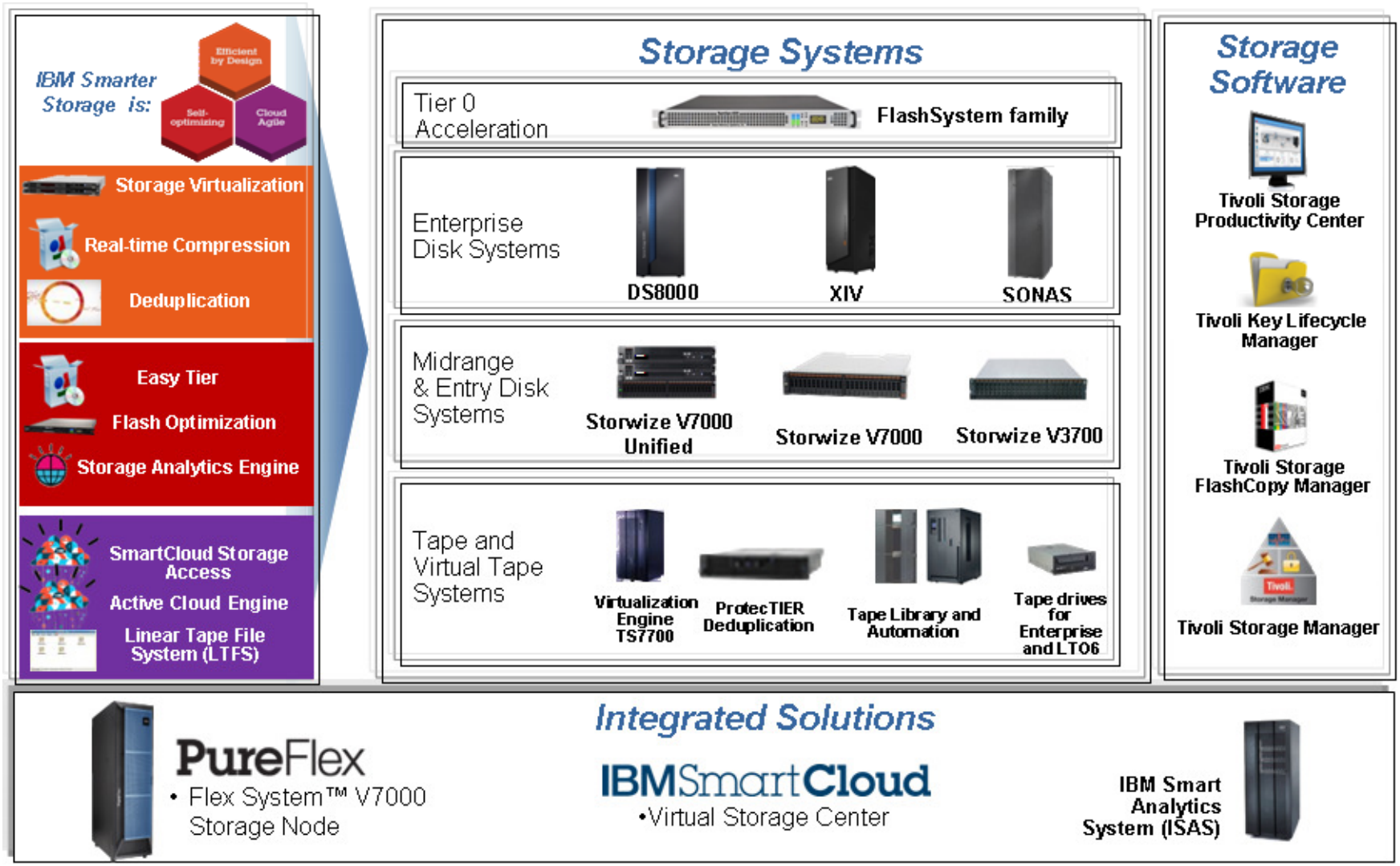
Racetrack Memory

120 Petabyte Drive



Phase Change Memory

IBM Smarter Storage is an approach for the design and deployment of storage

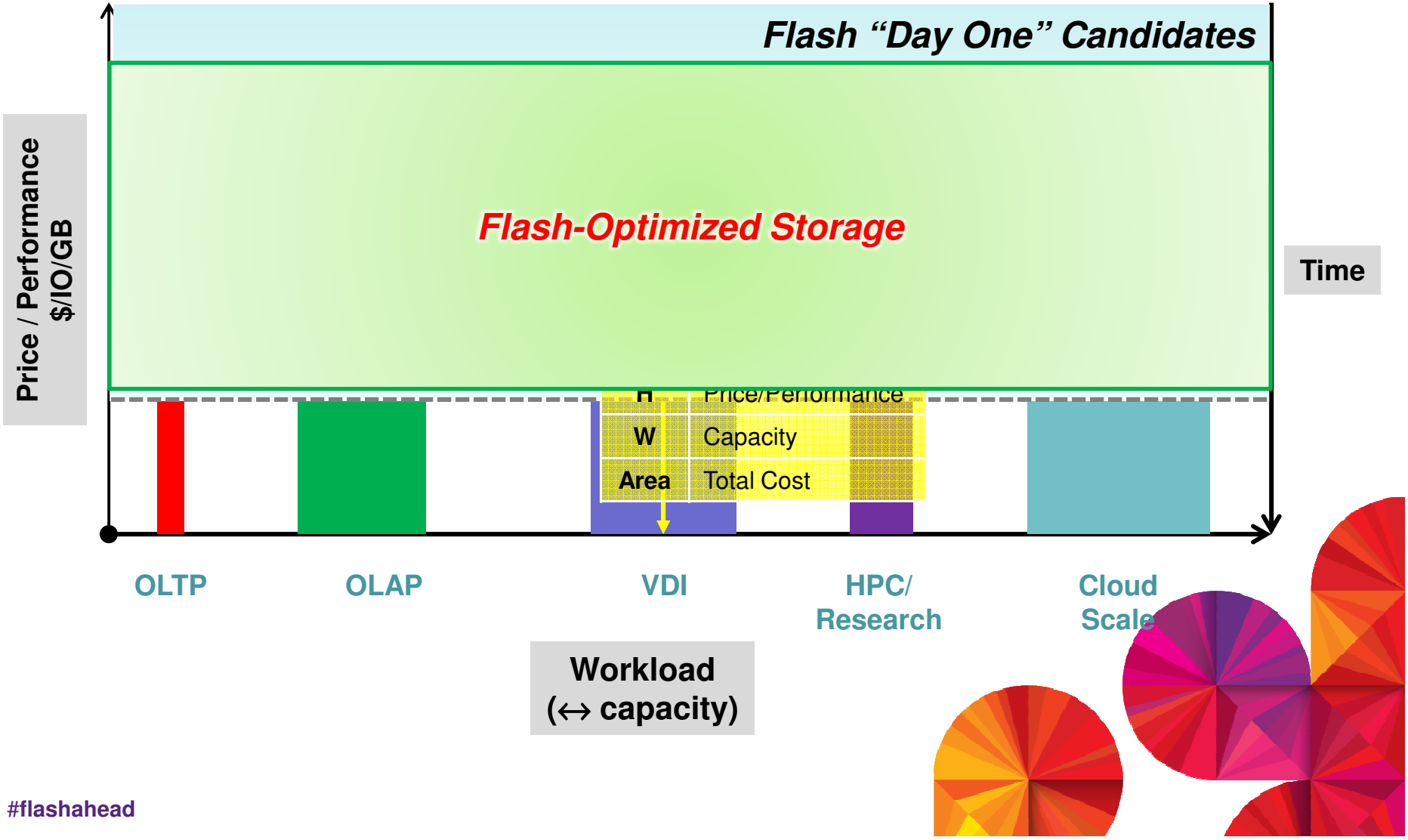


IBM FlashSystem Family

#flashahead

Source: IBM and Industry Estimates

Flash is Changing the Economics of Storage



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All-Flash is About Economics

Greater Exploitation of Flash

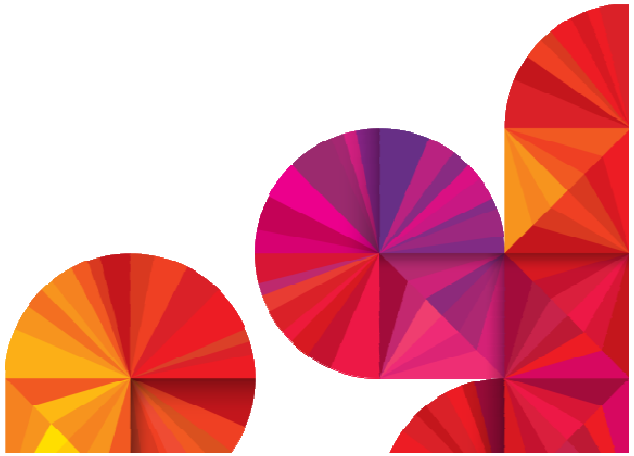
Improve Performance

Reduce Costs

Enable New Opportunities

Leverage the "Economies of Scale" of Flash

- Accelerate Application Performance
- Gain Greater System Utilization
- Lower Software & Hardware Cost
- Save Power / Cooling / Floor Space
- Drive Value Out of Operational Data



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All-Flash is About Economics

BANCO AZTECA

"spectacular"; processing huge number of transactions in one day, lower response times…

Core Financial Transactions

cloud access.net

…5TB in 3.5 inches of rack space vs.1,300 disk for 400K IOPs, less than 1/10th the cost…

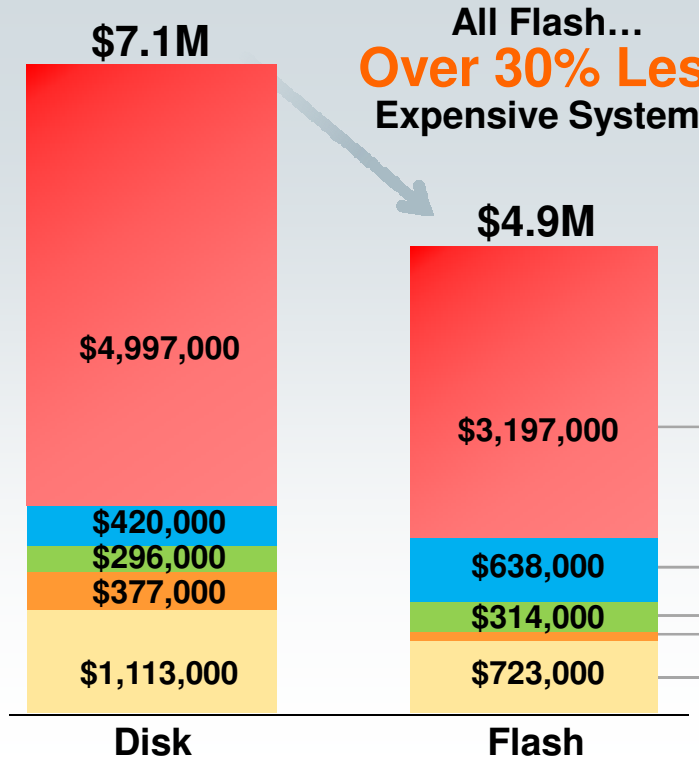
Cloud Storage

INTERSPORT

…75% less rack space, 90% less power, 83% faster data compression…

SAP

Source: IBM Client Experiences



- **38%** Lower Software License Costs
  - Fewer cores, lower maintenance
  - Database, infrastructure SW…
- **Higher** Storage Utilization
  - As much as 50%
  - Lower maintenance
  - Simplified management
- **17%** Fewer Servers
  - Fewer cores
  - Fewer network connections
  - Lower maintenance
- **74%** Lower Environmental Costs
  - Power / cooling, floor space
- **35%** Lower Operational Support Costs
  - Server / storage administration

Source: Wikibon, March 2013

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Why Flash…

In the last 10 years:

CPU Performance 8 - 10x increase

DRAM Speed 7- 9x

Network Speed 100x

Bus Speed 20x

Disk Speed 2X …and everything waits

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Source: IBM and Industry Estimates

Why Texas Memory Systems?

Vetted By IBM's World Class Research Team. IBM Research provides strategic "headlights" for the company as a whole. At the end of each year, our researchers prepare a **global technology outlook**, which presents senior management with an assessment and predictions about key technologies over the coming several years.
"It's not enough to see in the future, you have to act," *Source: The NY Times BITS, The Business of Technology*

Proven Industry Leadership

Highest **performance**, highest **reliability**, lowest **latency** and lowest **power** SSD solutions on the market

Deep Domain Expertise

34 years of designing high performance solid state storage; **strong IP** base with 30+ patents granted and pending

Global Enterprise Customers

Strong and growing enterprise customer base of **300+ customers** across many verticals in over 50 countries

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A Tipping Point in Systems

1 second =

1 million microseconds

Step Function Performance Gains

IBM FlashSystem

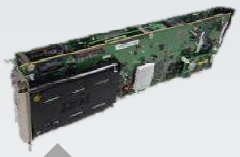
*100 **micro**seconds*

…consistent latency

1U up to 20TB

< 1 millisecond

PCIe SSD



Form Factor SSD

~1 milliseconds

HDD

5-15 milliseconds

Tape

Seconds

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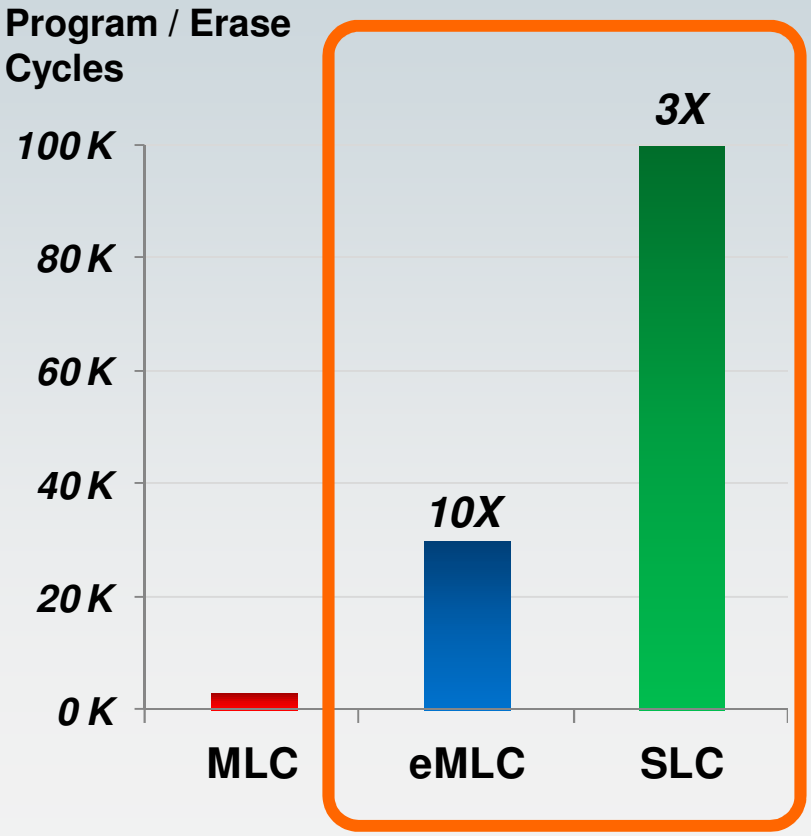
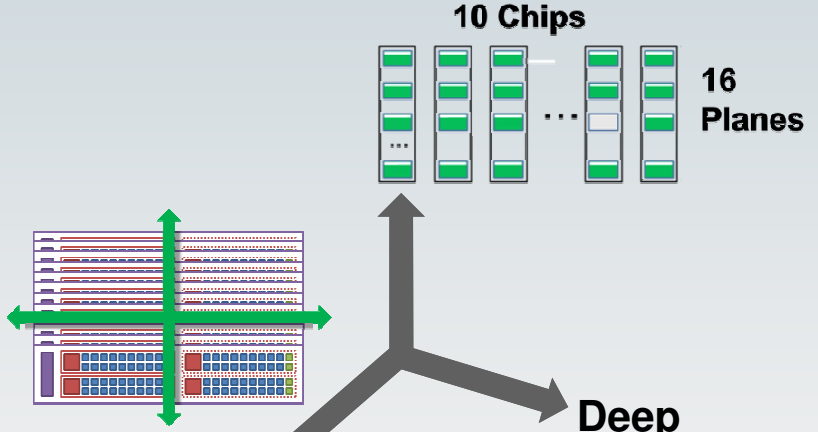
Best in Class Durability

Superior Technology
Using the Right Flash



Superior Engineering
Longer Life

Variable Striping
Restriping at the Die Level – No System Rebuild



Within & Across Flash Modules

Deep Engineering Innovation
Wear Leveling; Voltage & Timing Adjustments +++

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Source: IBM Estimates

1 Petabyte, 1 Rack, 22 Million IOPs. What it means…

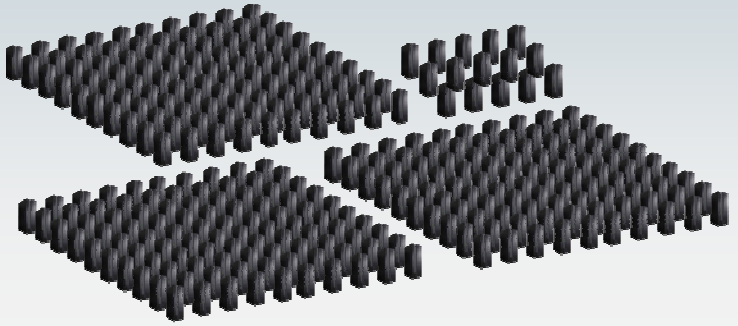
Or, solving for 22 Million IOPs…

IBM FlashSystem

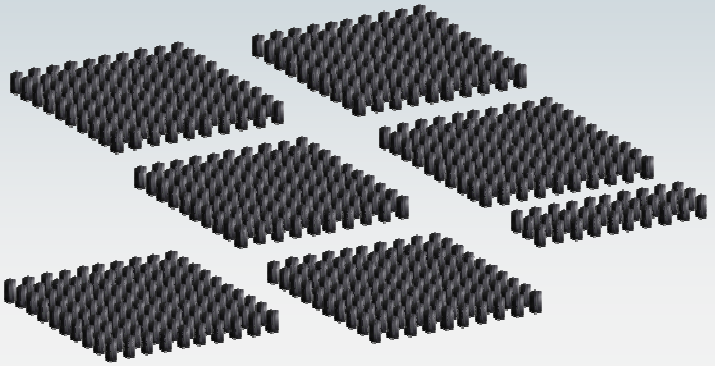
1 Rack

- **1** Petabyte: **1** Floor Tile
- 100 microsecond latency
- 22 Million IOPS
- 210 GB/s
- 12.6 KW power
  Less power than the average 200TB array

Either 315 Racks
Performance Optimized Disk…



Or 630 Racks
High Capacity Disk…



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Source: IBM Actual Results and Estimates

IBM FlashSystem Family

FlashSystem – 710/810	FlashSystem -720/820
SLC (7) / eMLC (8) Flash	SLC (7) / eMLC (8) Flash
100/25 us R/W Latency	100/25 us R/W Latency
1-5 or 2-10 TB	5, 10, or 20 TB w/HA (6/12/24 TB non-HA)
450K/400K IOPS (4K)	**500K/450K IOPS (4K)**
5/4 GB/s	5/4 GB/s
1U rackmount, 4x 8Gb FC ports, 4x 40Gb QDR InfiniBand	1U rackmount, 4x 8Gb FC ports, 4x 40Gb QDR InfiniBand

Introducing the IBM FlashSystem Solutions

Extreme Performance *with* **Enterprise Capabilities**

IBM FlashSystem

Extreme Performance with IBM MicroLatency
All Flash 20TB RAIDed data capacity
Macro Efficiency 1U form factor
Variable Stripe RAID and 2-D RAID for Enterprise Reliability

SAN Volume Controller with FlashSystem

Business Continuity with Copy Services
Flash Copy for Backup & Optimal Workload Availability
$/TB Value with Thin Provisioning & Real Time Compression
Drive Storage Efficiency with Easy Tier

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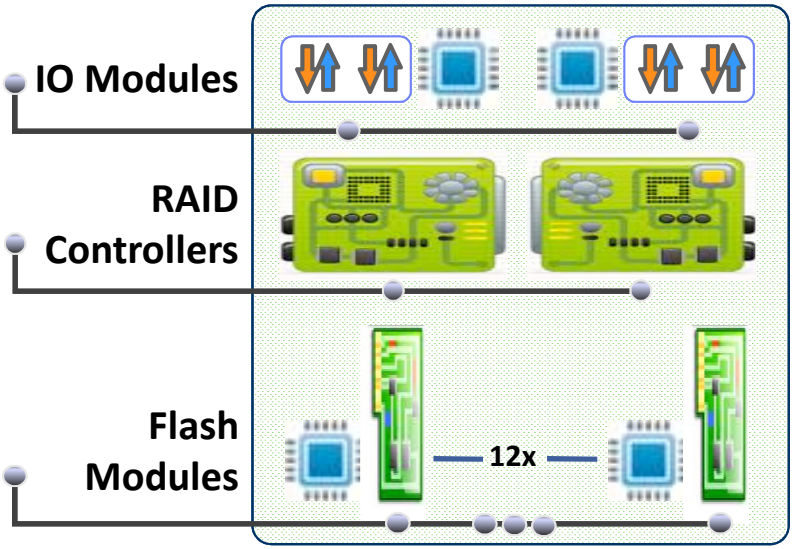
Core FlashSystem Performance Concepts

- RamSan systems provide a hardware-only data path
  - Custom FPGA-based data movement decreases latency vs. software
- Lower latency on standard SAN interfaces vs. competitors
  - Either on DAS (PCIe cards) or SAN!
- Distributed out-of-data-path CPU processing



"You cannot increase performance by adding lines of code."

tms

*" Our Symmetrix-VMAX Enginuity consists of **millions of lines of code."***

EMC²

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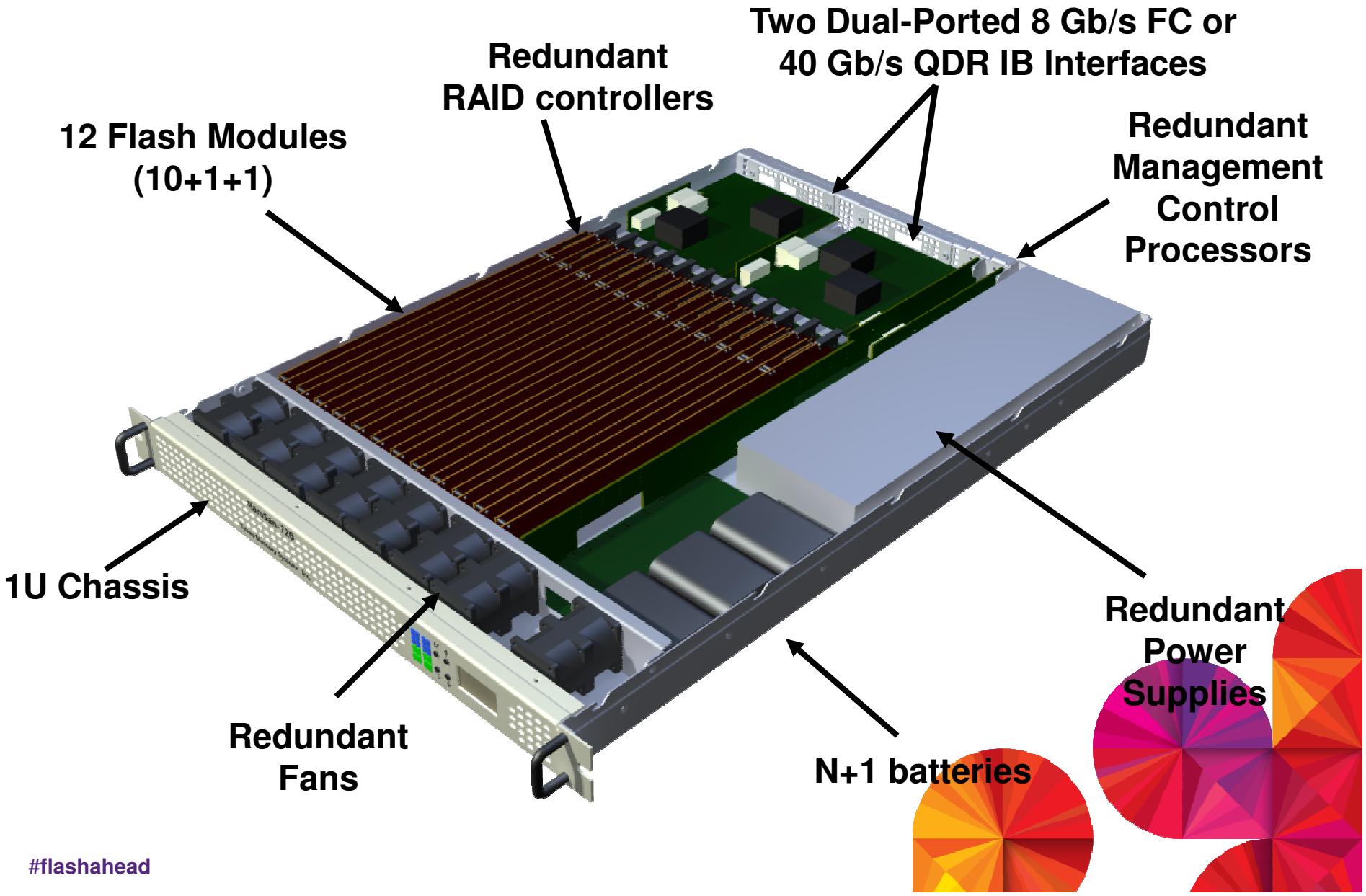
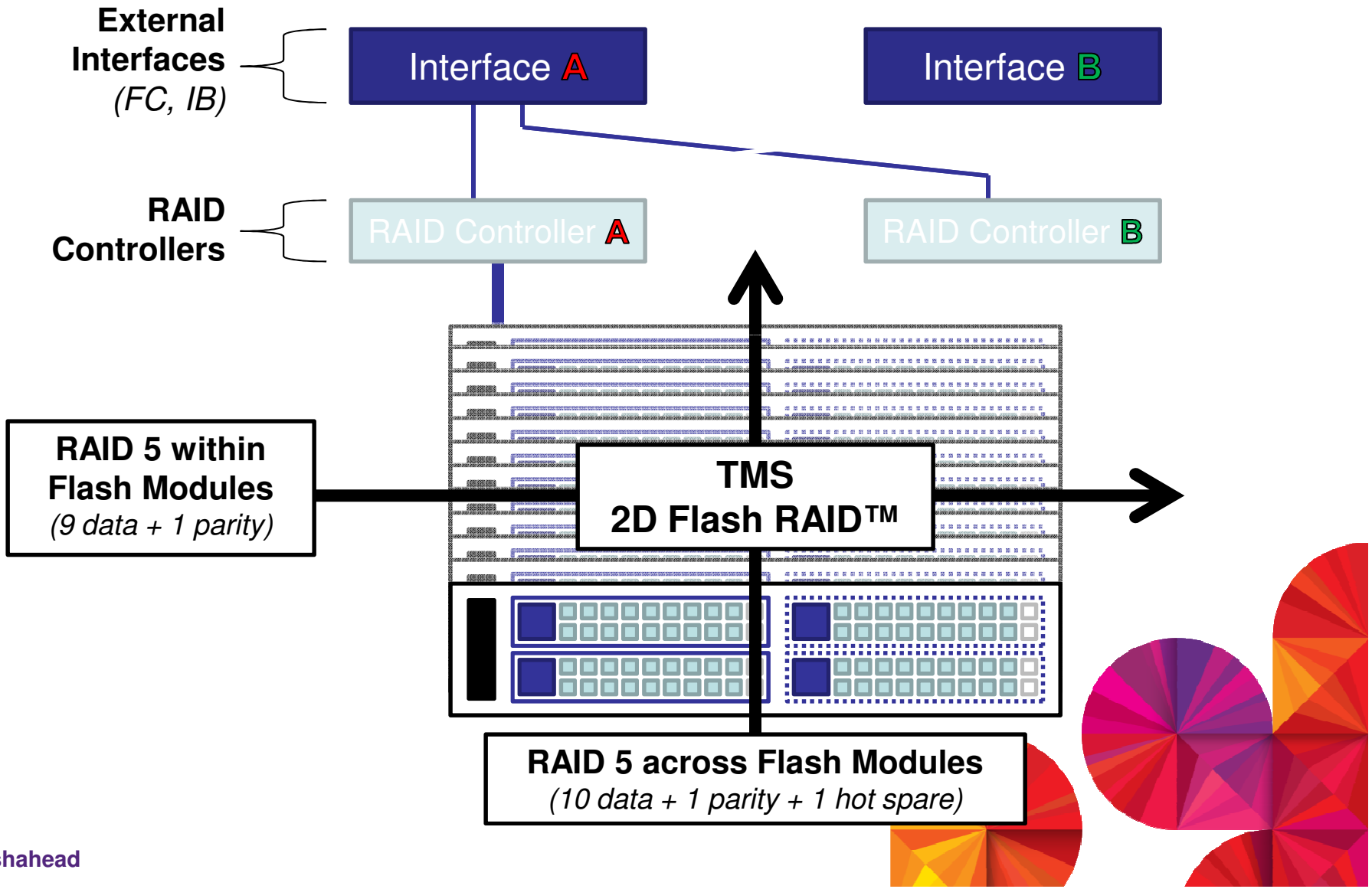
IBM FlashSystem-720/820 Architecture



2D Flash RAID™ (RamSan-720/820)



Storage Performance Council

- **Independent industry association**
  - Vendor-neutral with many vendors participating
  - Audited with full disclosure report (inc. pricing)
- **Two basic benchmarks: SPC-1™ and SPC-2™**
  - SPC-1: IOPS-focused OLTP workload
  - SPC-2: bandwidth-focused DW/OLAP workload
- **TMS systems in top 5 of each benchmark**
- **Routinely beat systems from EMC, HP, Oracle…**

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Results current as of February 20, 2012. Citations available at http://ramsan.com.

12 IBM Flash Centers of Competency…
around the world to help clients transform their systems…

- Proof of Concept
- Client Workload Benchmarks
- Tailored IT Optimization Assessments and TCO Studies

IBM Expertise Accelerates Value Delivery

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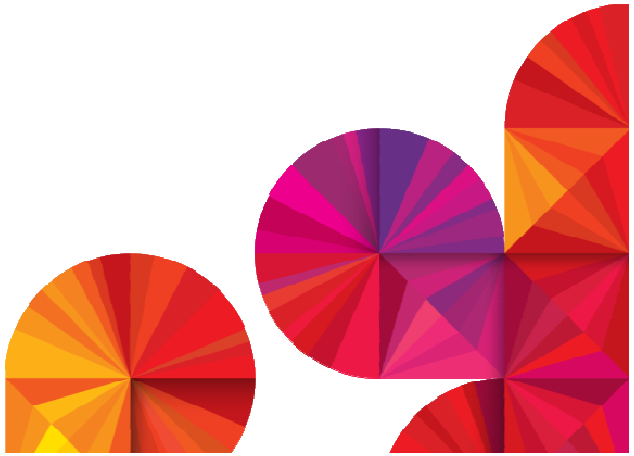
Thank You



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