Revolucionando el mercado High End con las tecnologías System z & POWER7+

Patricio Zeida

Smarter Computing:
What's Next. Ready Now.

Smarter Computing es la infraestructura de TI que impulsa un mundo más inteligente.

Cloud Ready

Data Ready

Security Ready

Un completo portafolio de sistemas para atender exclusivamente sus necesidades en evolución

Cloud Ready

Data Ready

Security Ready

System z®
Cloud seguro para los datos

Power Systems™
Motor para velocidad de conocimiento

PureSystems™
Experiencia integrada para la mejora de la economía

System x®
Redefiniendo la innovación x86

System Storage
Soluciones más inteligentes para grandes volúmenes de datos y la nube

IBM Software and Services

Un completo portafolio de sistemas para atender exclusivamente sus necesidades en evolución

System z®
Cloud seguro para los datos

IBM Software and Services

Cloud Ready

Data Ready

Security Ready

Ampliamos Mainframe con nuevas capacidades

- **Energizar sus aplicaciones**

through integration, improved performance and networking innovations

- **Ahorrar Dinero**

by rightsizing without compromise, consolidation opportunities broadened and compression acceleration

- **Seguridad ante todo**

with confidence on a trusted and resilient infrastructure

An Integrated Data & Analytics Engine

Efficient, Agile Cloud Computing Foundation

Sophisticated platform for Mobile Computing

Ultimate in Trusted Security & Resiliency

Nuevo IBM zEnterprise BC12

Performance

36% de incremento de performance x core a velocidad de 4.2 GHz

58% mas capacidad para cargas de trabajo tradicionales

62% mas capacidad para Linux®

2X crecimiento en RAM

Networking and Hybrid

Latencia reducida entre Servidores bajo comunicaciones con z/OS V2.1 SMC-R and 10GbE RoCE Express

Gestión de Recursos bajo reglas de negocio

Investment Protection

Arranque con lo necesario y crezca fácilmente

Upgrade from z10™ BC and z114

Upgrade into zEC12

Upgrade zBX Mod 002 to Mod 003

Economics

Mismo precio de entrada que z114

27% de mejora para determinados motores

Compresión y aceleradores (zEDC) para mejor uso de recursos

20% increase in granularity

Security and Availability

Simplified TKE 7.3 workstation

z/OS 2.1 Crypto as a service

IT analytics with IBM zAware to improve availability

Flash Express helps reduce downtime from application availability lapses

* US prices, may vary by country

Performance y flexibilidad aumenteda a un bajo costo de adquisició para organizaciones de todos los tamaños

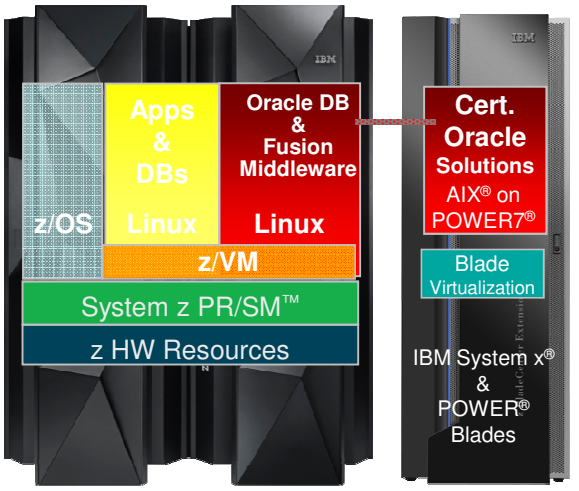
New innovations available on zBC12

NEW	NEW	ENHANCED	ENHANCED	NEW
Data Compression Acceleration	**High Speed Communication Fabric**	**Flash Technology Exploitation**	**Proactive Systems Health Analytics**	**Hybrid Computing Enhancements**
Reduce CP consumption, free up storage & speed cross platform data exchange	Optimize server to server networking with reduced latency and lower CPU overhead	Improve availability and performance during critical workload transitions, now with dynamic reconfiguration; Coupling Facility exploitation (SOD)	Increase availability by detecting unusual application or system behaviors for faster problem resolution before they disrupt business	x86 blade resource optimization; New alert & notification for blade virtual servers; Latest x86 OS support; Expanding futures roadmap
zEDC Express	*10GbE RoCE Express*	*IBM Flash Express*	*IBM zAware*	*zBX Mod 003; zManager Automate; Ensemble Availability Manager; DataPower Virtual appliance SoD*

Consolidar e Implementar Software en la Tecnología más adecuada: **"Best Fit"**

Correr cientos de cargas de trabajo distribuidas en un único servidor

- Consolidación extrema de servidores y redes
- Menos componentes y complejidad reducida
- Excelente relación precio-rendimiento desde el punto de vista de licenciamiento de software:
  - Un procesador System z = Un core x86/RISC
- La mayor confiabilidad y ancho de banda de I/O de la industria
- Niveles superiores de provisionamiento de servidores virtuales, monitoreo y gestión de cargas de trabajo
- Administración dinámica de recursos
- Integración con las soluciones de backup y Disaster Recovery de los Sistemas Centrales



IBM Enterprise Linux Server

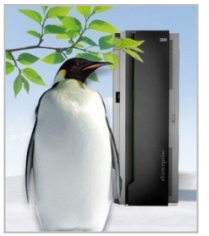
Una plataforma ideal para la implementación optimizada de cargas de trabajo

The Enterprise Linux Server (ELS) alias
The "Linux-only" System z server

- Combina el más moderno servidor System z con tecnologías de virtualización y Linux
- Provee alta escalabilidad, flexibilidad y seguridad
- Permite montar una infraestructura de IT completa dentro de un único servidor físico
- Permite el pricing basado en cantidad de procesadores para la mayoría de los productos de software para Linux, tanto de IBM como de terceros

ELS with up ro 101 cores running at 5.5 GHz

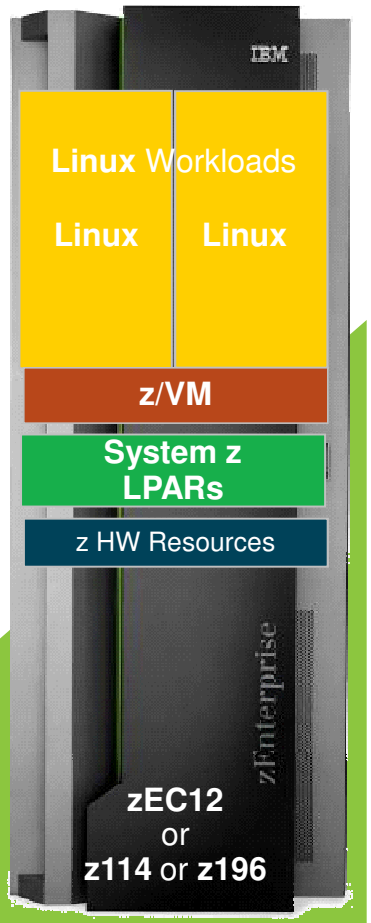
ELS with up to 80 cores running at 5.2 GHz



ELS with up to 10 cores running at 3.8 GHz

Seguridad Incorporada para Cargas Linux

- La máxima clasificación de seguridad (EAL5+) para el particionamiento lógico del hardware (LPAR)
- Clasificación de seguridad EAL4+ en z/VM ofreciendo niveles incomparables de virtualización y consolidación seguras
- Diseño integral rico en seguridad para proteger al sistema de malware, virus y amenazas internas
- Controles de acceso granulares integrados a través de toda la plataforma
- Recolección centralizada de registros de auditoría para una visión general de la empresa
- Características de seguridad de redes para ayudar a evitar amenazas externas
- Soluciones de cifrado para asegurar los datos ante robo o alteración tanto en línea como en reposo



Sólo System z puede ofrecer la combinación de hypervisores certificados EAL5+ y EAL4+ con la certificación de seguridad FIPS 140-2 Level 4 y asociadas

The Gold Standard for Security

* https://www.bsi.bund.de/ContentBSI/EN/Topics/Certification/newcertificates.html

Un completo portafolio de sistemas para atender exclusivamente sus necesidades en evolución

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Un completo portafolio de sistemas para atender exclusivamente sus necesidades en evolución

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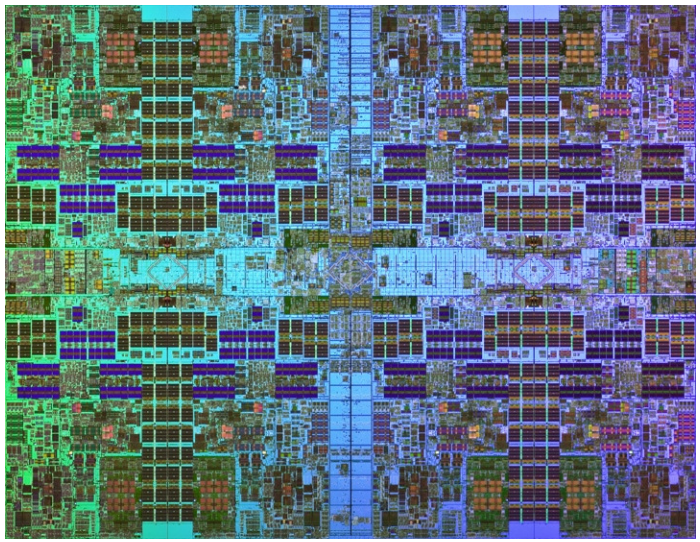
POWER



✓ 4, 6 y 8 núcleos por zócalo
✓ 3,0 a 4,42 GHz
✓ Hasta 4 threads por núcleo
✓ Cache L3 eDRAM integrado
✓ Optimización dinámica de energía

POWER es un modelo de negocios sustentable

En containers de carga, usando controladores integrados sellados antirrobo para seguir la carga

En grabadoras de DVD Sony

En teléfonos Motorola

En cámaras digitales Kodak

En la Microsoft Xbox 360 – Chip Power con 3 cores, a 3,2 GHz

Nintendo Wii

Sony PS3, chip de 9 cores

OnStar by GM

En lavasecarropas con acceso Web que en universidades y secundarios permitirán que los alumnos paguen pasando su tarjeta de identificación.

BUILT ON Power™

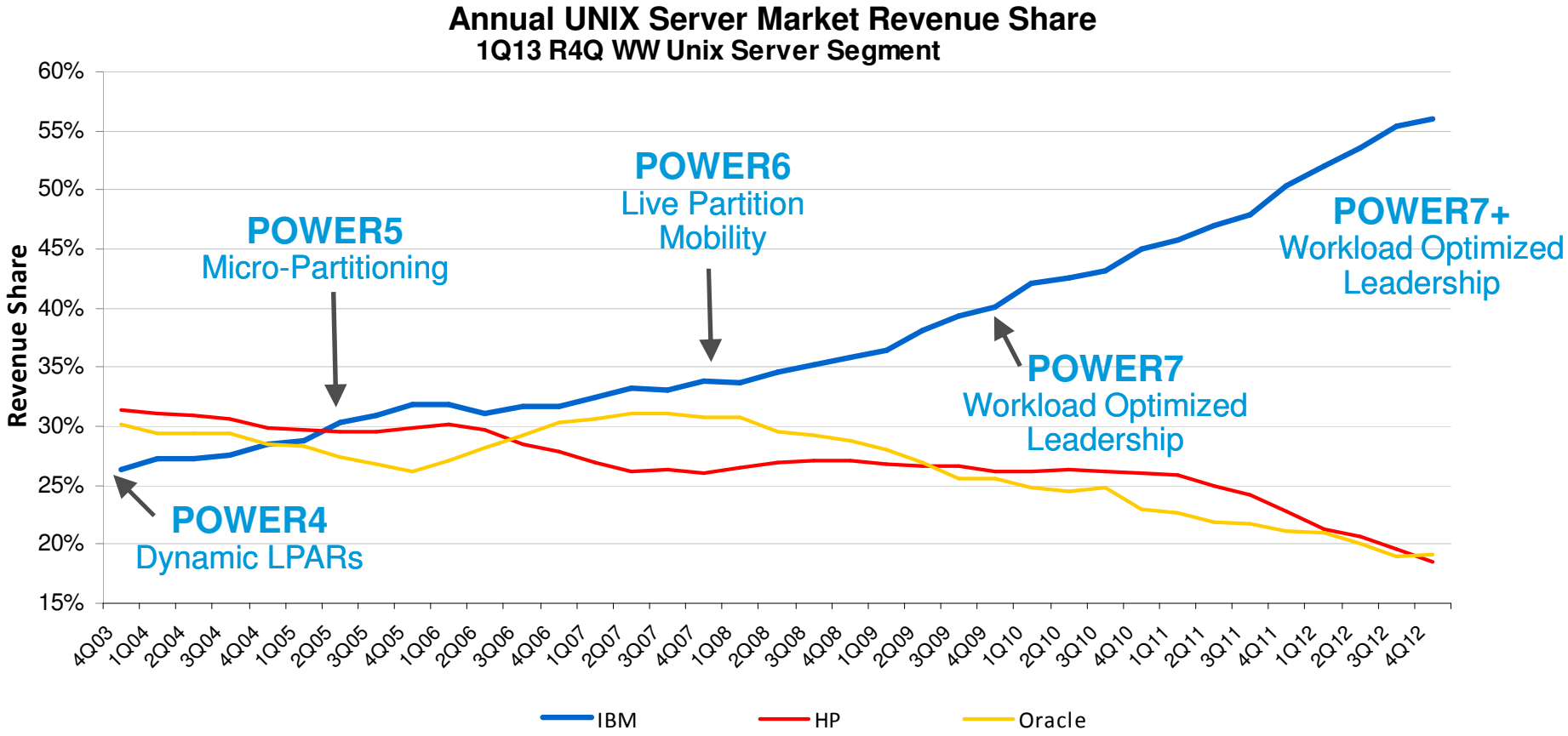
En los Symmetrix de EMC

En router CISCO; tan poderoso como para que la población mundial (6400 millones) pueda mantener una conversación telefónica simultánea usando Voz sobre IP

En GPSs, como el Garmin, TomTom, ALK

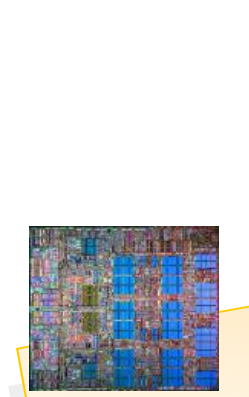
En el acelerador de particulas más poderoso del mundo en el laboratorio de física del CERN, y en muchos otros productos.

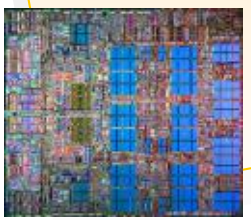
IDC: 10 años liderando el mercado de servidores UNIX 1Q03 – 4Q12



Source: IDC Server Tracker 1Q13

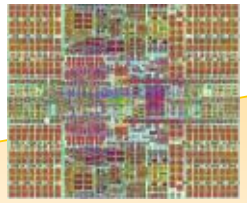
Roadmap de Procesadores POWER

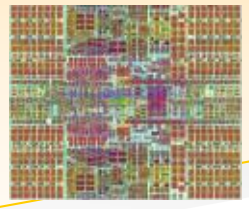




POWER5/5+
130/90 nm

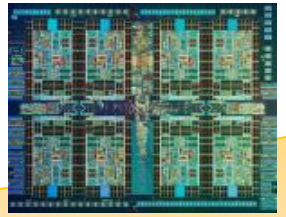
- ✓Dual Core
- ✓Enhanced Scaling
- ✓SMT
- ✓Distributed Switch +
- ✓Core Parallelism +
- ✓FP Performance +
- ✓Memory Bandwidth +
- ✓Virtualization

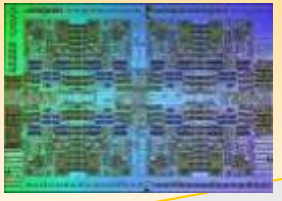




POWER6/6+
65/65 nm

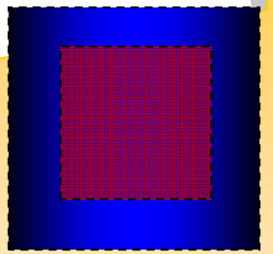
- ✓Dual Core
- ✓High Frequencies
- ✓Virtualization +
- ✓Memory Subsystem +
- ✓Altivec
- ✓Instruction Retry
- ✓Dynamic Energy Mgmt
- ✓SMT +
- ✓Protection Keys





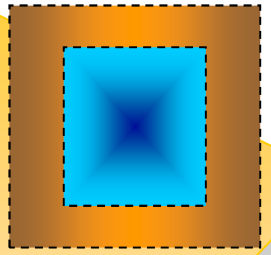
POWER7/7+
45/32 nm

- ✓Eight Cores
- ✓On-Chip eDRAM
- ✓Power-Optimized Cores
- ✓Memory Subsystem ++
- ✓SMT++
- ✓Reliability +
- ✓VSM & VSX
- ✓Protection Keys+



POWER8

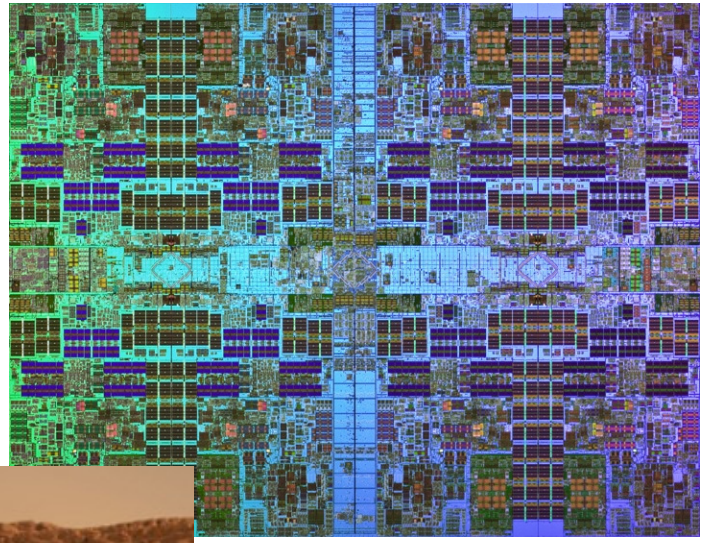
- ✓More Cores
- ✓SMT+++
- ✓Reliability ++
- ✓FPGA Support
- ✓Transactional Memory

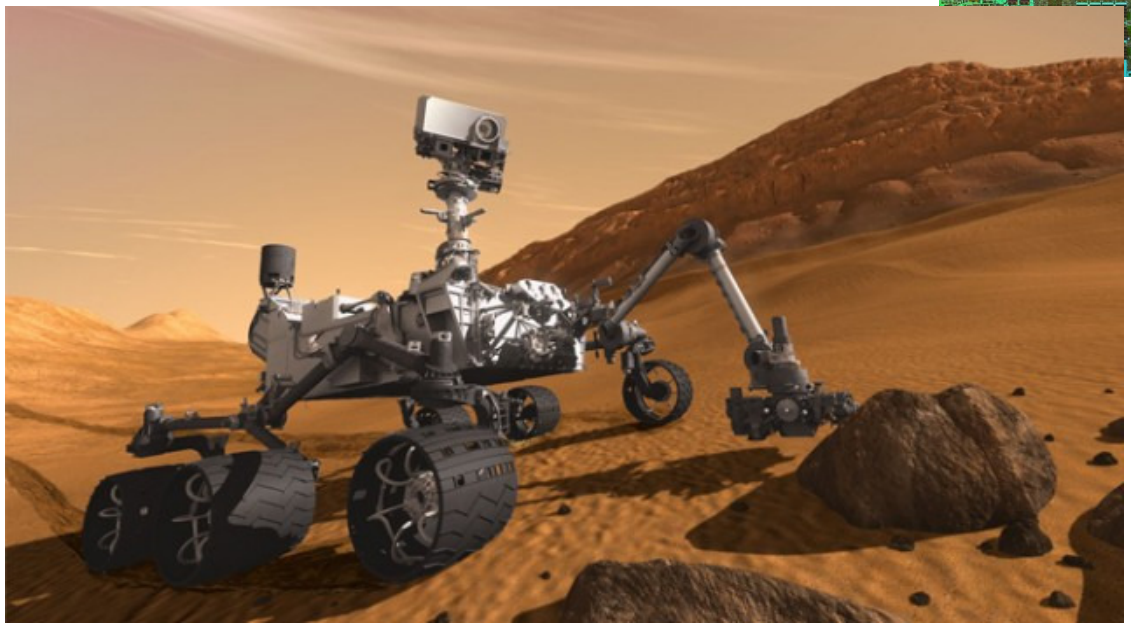


POWER9

2004 2007 2010 Future

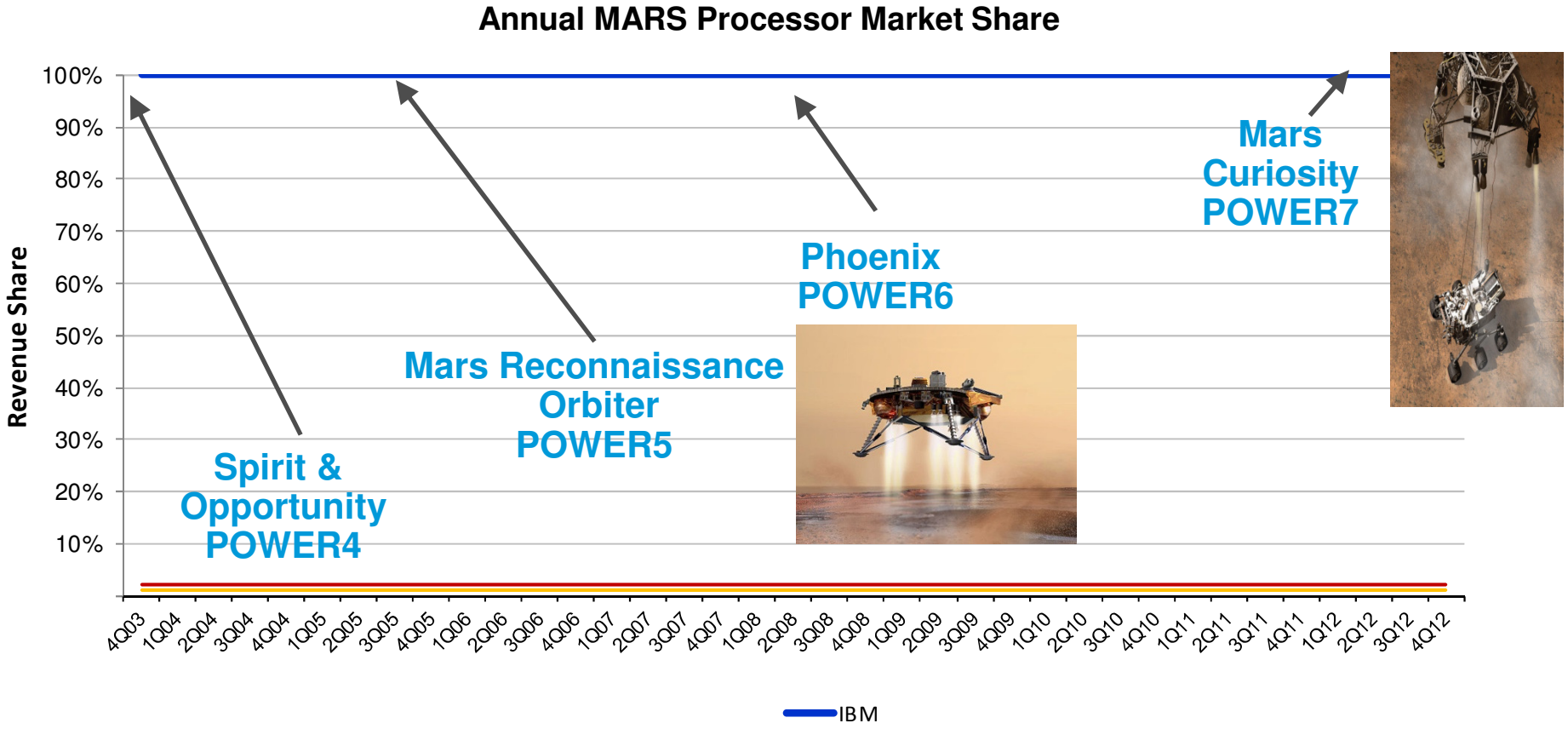
POWER en Marte
Mars Curiosity





PowerPC

IDC: 10 años liderando el mercado de servidores UNIX en MARTE 1Q03 – 4Q12



SOURCE Mars Index data provided by ET

Tecnología POWER de IBM: 10 años de innovación

Deep Blue
1,4 tons / 1.270 kg

15,53

Microprocesador POWER6

Deep Blue

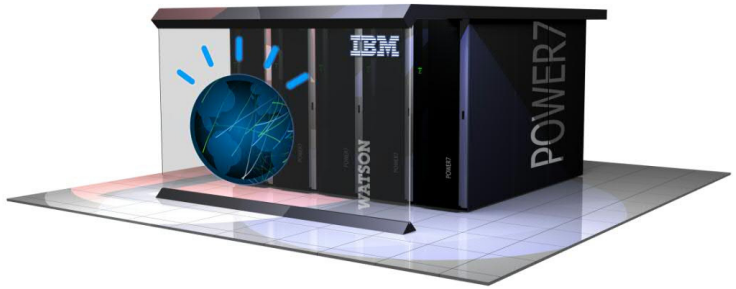
GFLOPS

All results current as of 5/21/07. Source: http://www.top500.org/list/1997/11/300 , IBM DEEP BLUE(R) 1.2 GHz, 32 NODE SP2 P2SC, Rpeak: 15.36 GFLOPS, Rmax: 11.38 GFLOPS. Source: http://www.netlib.org/benchmark/performance.pdf , IBM System p 570, 4.7 GHz POWER6, 1 core, Rpeak: 18.8 GFLOPS, Rmax: 15.53 GFLOPS

Watson y Power Systems

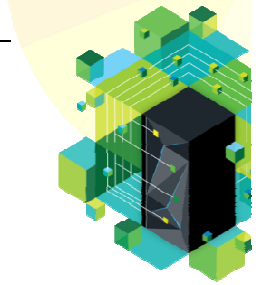
- Watson representa las cargas de procesamiento de una nueva era más inteligente, corre el software DeepQA desarrollado por IBM sobre un servidor POWER7 que se optimiza de acuerdo al tipo de carga.
- Watson responde las preguntas de Jeopardy en menos de 3 segundos usando el rendimiento de procesamiento paralelo masivo de los procesadores POWER7 para ejecutar miles de tareas complejas en forma simultánea.
- Watson usa servidores POWER7 disponibles comercialmente para las empresas que hoy los usan para procesar desde complejas estadísticas hasta sistemas transaccionales.
- http://ibmwatson.com

Power 750



Power Systems is the ultimate system for compute intensive workloads

IBM Watson	5 of top 10 Supercomputers	Power Systems
		
Personalized medicine; cancer research	Predicting weather patterns; human genome research	Transaction processing; compute intensive analytics
60% more java performance per core than x86[1]	**16** petaflops[2] Sequoia supercomputer	**88%** more SAP SD Users than best x86[3]



1. SPECjbb2005 66,341BOPS/core in submission published June 2011. Data valid as Sep 30, 2012
2. 16 petaflops – Sequoia ranks #2 on Top 500 supercomputers http://i.top500.org/system/177556
3. IBM Power 780 two-tier SAP SD Standard Application Benchmark. http://www.sap.com. Results current as of 1/25/13. See notes page for full details and certification.

Brindar servicios en forma rápida requiere una familia flexible / escalable de servidores y software.

POWER7+ Server Portfolio

AIX

for Business

Linux

PowerHA

PowerVM

IBM Systems Director

IBM Power Systems

Enterprise Servers

Power 795

Power 780

Power 770

Power 760

Entry Servers

Power 750

Power 720/740

Power 710/730

PowerLinux 7R2/7R4

PS 701- 704

Expert Integrated Systems

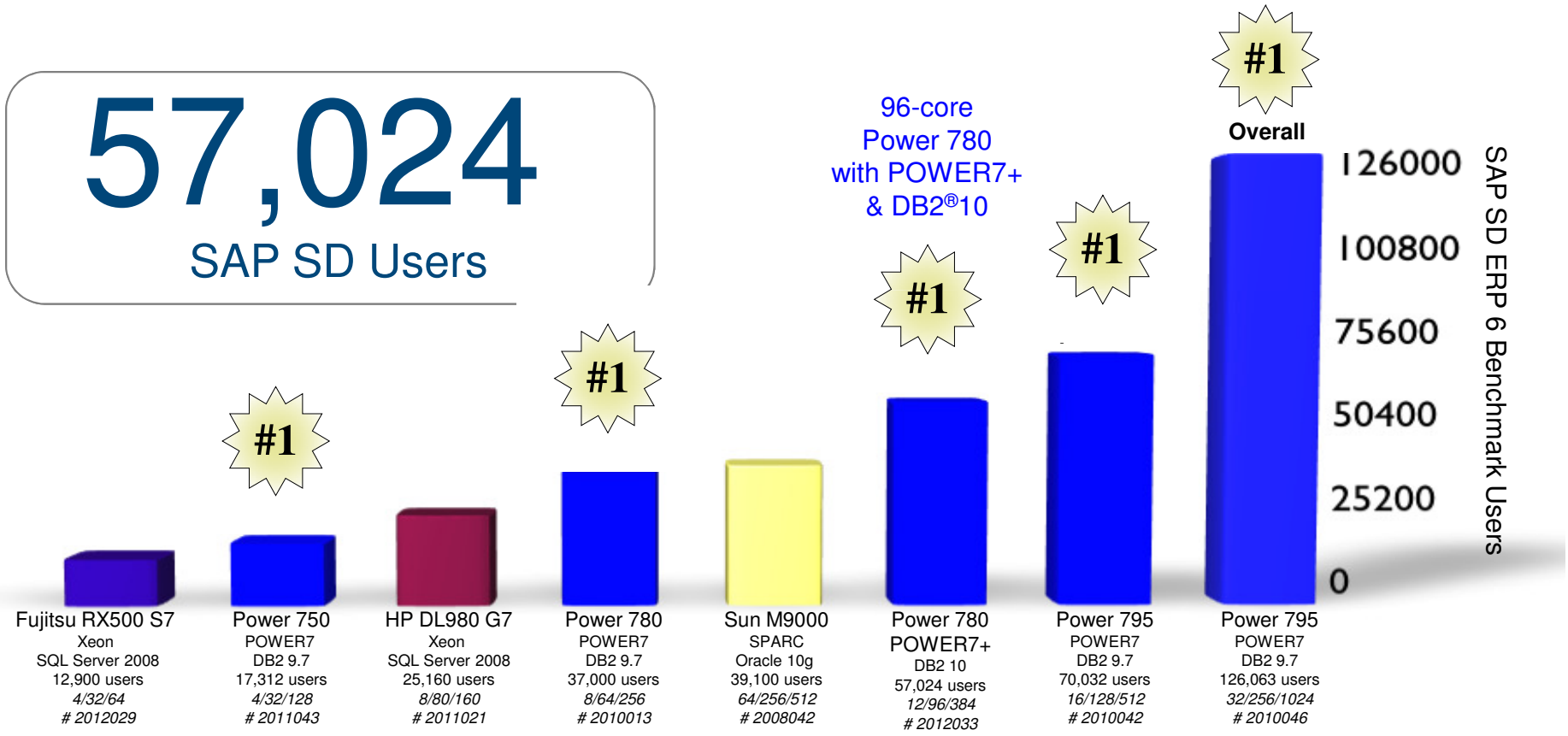
PureApplication System

Flex System PureFlex System

PureData System for Operational Analytics

Flex System p260/p460

Power 780 delivers over 2X the users and 88% more users per-core than HP DL980 G7 & 46% more users and 191% more users per-core than the Oracle M9000



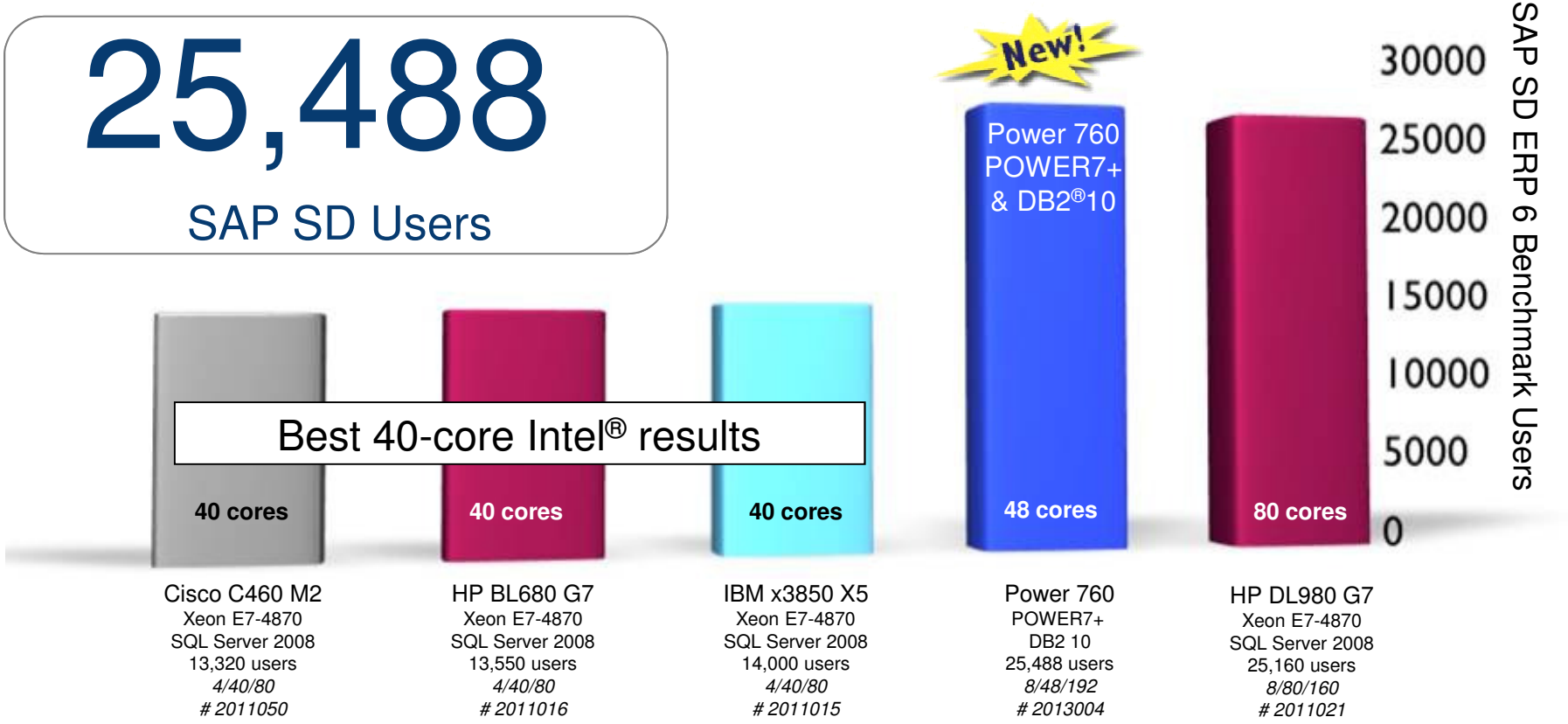
IBM Power System 780, 12 processors / 96 cores / 384 threads, POWER7+ 3.72 GHz, 1536 GB memory, 57,024 SD benchmark users, running AIX® 7.1 and DB2® 10, dialog resp.: 0.98s, line items/hour: 6,234,330, Dialog steps/hour: 18,703,000, SAPS: 311,720, DB time (dialog/ update): 0.009s / 0.014s, CPU utilization: 99%, Certification #: (1). Results valid as of 09/17/2012. Source: http://www.sap.com/benchmark. Source: http://www.sap.com/solutions/benchmark/sd2tier.epx

Power 760 (with 48 cores) delivers 82% more users than leading x86 results (with 40 cores) in SAP S&D 2-Tier benchmark

- Power System result even surpasses leading non-IBM x86 80 core result

25,488

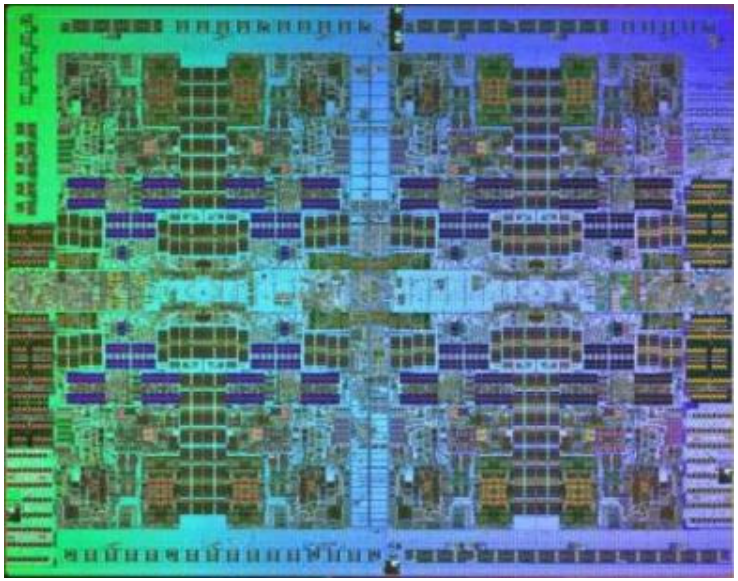
SAP SD Users



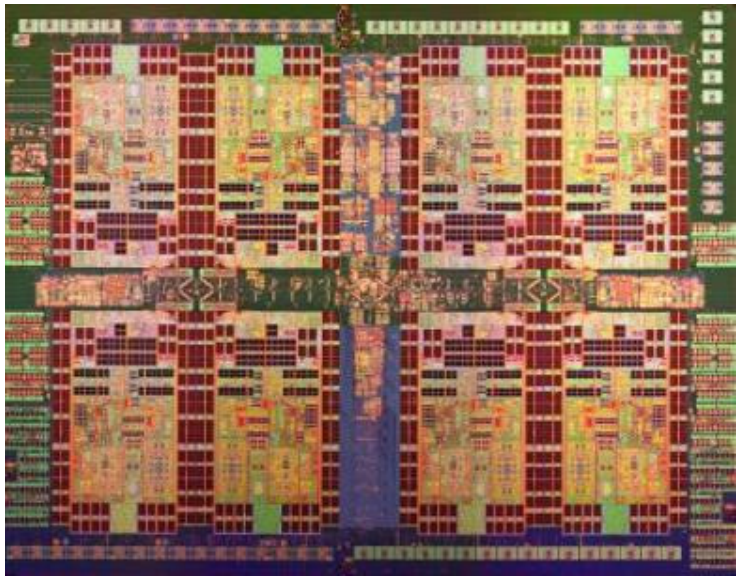
Cisco C460 M2	HP BL680 G7	IBM x3850 X5	Power 760	HP DL980 G7
Xeon E7-4870	Xeon E7-4870	Xeon E7-4870	POWER7+	Xeon E7-4870
SQL Server 2008	SQL Server 2008	SQL Server 2008	DB2 10	SQL Server 2008
13,320 users	13,550 users	14,000 users	25,488 users	25,160 users
4/40/80	*4/40/80*	*4/40/80*	*8/48/192*	*8/80/160*
# 2011050	*# 2011016*	*# 2011015*	*# 2013004*	*# 2011021*

(1) IBM Power 760 on the two-tier SAP SD standard application benchmark running SAP enhancement package 5 for the SAP ERP 6.0 application; certification number not available at press time and can be found at sap.com/benchmark*. IBM Power 760, 8 processors / 48 cores / 192 threads, POWER7+ 3.41 GHz, 1024 GB memory, 25,488 SD benchmark users, running AIX® 7.1 and DB2® 10, dialog resp.: 0.99s, line items/hour: 2,784,330, Dialog steps/hour: 8,353,000 SAPS: 139,220, DB time (dialog/ update): .009s/ .015s, CPU utilization: 99%, Certification 2013004; Results valid as of 02/05/2013. Source: http://www.sap.com/benchmark. Additional details in backup.

POWER7+



POWER7
45 nm



POWER7+
32 nm

Increase in GHz
2.5X more L3 Cache
Specialized hardware accelerators

IBM Power Systems

Enterprise Servers

Power 795

Power 780

Power 770

Power 760

Entry Servers

Power 750

Power 720/740

Power 710/730

PowerLinux 7R2/7R4

PS 701- 704

Expert Integrated Systems

PureApplication System

Flex System p260/p460

Flex System PureFlex System

PureData System for Operational Analytics

Enterprise servers designed for critical data & workloads

- Enabling utmost efficiency for the delivery of critical business services
- Making critical data available in real time across lines of business
- Providing ultimate security for critical data and business risk mitigation
- 88% More SAP Users per core with POWER7+ than x86[1]

IBM Power 770

- Up to 64-core POWER7+
- Up to 4 TB memory
- Elastic Capacity on Demand[1]
- Enterprise RAS features
- EasyOptimize
- Active Memory Mirroring[2]

IBM Power 780

- Up to 128-core POWER7+
- Up to 4 TB memory
- Elastic Capacity on Demand
- Enterprise RAS features
- EasyOptimize
- Active Memory Mirroring
- Power Systems Pools

IBM Power 795

- Up to 256-core POWER7
- Up to 16 TB memory
- Elastic Capacity on Demand
- Enterprise RAS features
- EasyOptimize
- Active Memory Mirroring
- Power Systems Pools

1. IBM Power 780 two-tier SAP SD Standard Application Benchmark. http://www.sap.com. Results current as of 1/25/13.
2. Optional

CONFIABILIDAD
RAS
Features

POWER7 RAS Feature Overview

● Standard
■ Optional
– Not Available

* Requires two or more nodes

RAS Item	Power 750	Power 770	Power 780	Power 795		Power 595
Redundant / Hot Swap Fans & Blowers	●	●	●	●		●
Hot Swap DASD / Media / PCI Adapters	●	●	●	●		●
Concurrent Firmware Update	●	●	●	●		●
Redundant / Hot Swap Power Supplies	■	●	●	●		●
Dual disk controllers (split backplane)	■	●	●	●		●
Processor Instruction Retry	●	●	●	●		●
Alternate Processor Recovery	●	●	●	●		●
Storage Keys	●	●	●	●		●
PowerVM™/Live Part. Mobility/Live App Mobility	■	■	■	■		■
Redundant Service Processors	–	●*	●*	●		●
Redundant System Clocks	–	●*	●*	●		●
Redundant / Hot Swap Power Regulators	–	●	●	●		●
Dynamic Processor Sparing	–	■	■	■		■
Memory Sparing	–	■	■	■		■
Hot GX Adapter Add and Cold Repair	–	●	●	●		●
Hot-node Add / Cold-node Repair	–	●*	●*	●*		●
Hot-node Repair / Hot-memory Add	–	●*	●*	●*		●
Dynamic Service Processor &System Clock Failover	–	●*	●*	●		●
Hot-node Repair / Hot-memory Add for all nodes**	–	●*	●*	●*		●
Enterprise Memory	–	●	●	●		●
Hot GX Adapter Repair	–	●	●	●		–
Midplane connection for inter-nodal communication	–	–	–	●		●
Active Memory Mirroring for Hypervisor	–	–	–	●		–

The new enterprise Power Systems with POWER7+

Power 770

- POWER7+ processors
- Up to 48 cores @ 4.2 GHz
- Up to 64 cores @ 3.8 GHz
- 12 or 16 core 4U Nodes
- Up to 4 Nodes per system
- Dynamic Platform Optimizer

✓ *Increased performance and scale*
✓ *Now up to 20 VMs per-core*
✓ *Increased energy efficiency*
✓ *Elastic Capacity on Demand*
✓ *Enterprise RAS*

Power 780

- POWER7+ processors
- Up to 64 cores @ 4.4 GHz
- Up to 128 cores @ 3.7 GHz
- 16 or 32 core Nodes
- Up to 4 Nodes per system
- Dynamic Platform Optimizer

✓ *Increased scalability to 128-cores*
✓ *Increased performance per-core*
✓ *Now up to 20 VMs per-core*
✓ *Increased energy efficiency*
✓ *Built-in Elastic Capacity on Demand*
✓ *Share resources in Power Systems Pool*
✓ *Enterprise RAS*

New features of the enterprise Power 795

Power 795

- High-end POWER7 server
- Up to 256 cores @ 4.0 GHz
- Up to 128 cores @ 4.25 GHz
- 1 - 8 processor books
- Up to 1,000 VMs
- Dynamic Platform Optimizer
- Active Memory Mirroring

✓ *Now up to 16 TB Memory*
✓ *Now up to 20 VMs per-core*
✓ *New Integrated Bus & I/O adapters*
✓ *Built-in Elastic Capacity on Demand*
✓ *Share resources in a Power Systems Pool*
✓ *Enterprise RAS*

Servers designed for consolidated & virtualized workloads

- ***New* IBM Power 760 and *enhanced* IBM Power 750 servers**
- Ideal for consolidating workloads and cloud efficiency
- Power 760 delivers leadership two-tier SAP Sales and Distribution performance with 82% more users than x86 results (40 cores)[1]
- Power 750 is the foundation for IBM Watson analytics industry solutions

AIX

i for Business

Linux

IBM Power 750

- Up to 32-core POWER7+
- Up to 1 TB memory
- SSD & high speed PCIe Gen2 I/O
- 3 Year 24x7 Support[2]

IBM Power 760

- 48-core POWER7+
- Up to 2 TB memory
- SSD & high speed PCIe Gen2 I/O
- Processor Upgrade on Demand
- 3 Year 24x7 Support[2]

PowerVM

- 20 VMs per POWER7+ core for maximum efficiency
- EasyOptimize for optimal VM placement and performance

1 IBM Power 760 on the two-tier SAP SD standard application benchmark running SAP enhancement package 5 for the SAP ERP 6.0 application; certification number not available at press time and can be found at sap.com/benchmark*. See notes page for full details.

2 3 years of 24x7 extended warranty services available in most countries

Power Entry System Highlights

Power 710, 7R1

2U - 1 Socket
4, 6, or 8 cores
POWER7+ up to 4.2GHz
256GB memory

Dense, attractively priced single-socket server

Power 720

4U or tower - 1 Socket
4, 6, or 8 cores
POWER7+ @ 3.6 GHz
512GB of memory

Affordable, flexible rack or tower server for a complete, integrated business system

Power 730, 7R2

2U - 2 Socket
8, 12, or 16 cores
POWER7+ up to 4.3 GHz
512GB of memory

Dense, high performance, energy efficient server ideal for multiple application and infrastructure workloads

Power 740

4U - 2 Socket
6, 8, 12, or 16 cores
POWER7+ up to 4.2 GHz
1TB of memory

High-performance, flexible, configurable and reliable midsize database and consolidation server

Unparalleled Linux performance meets superior economics

- ***Enhanced* IBM PowerLinux 7R1 and 7R2 servers**
- Optimized for traditional and emerging scale-out Linux workloads
  - Big data, industry solutions, application services
- 22% better SAP performance than Intel Xeon (Sandy Bridge class) processors[1]
- Up to 41% lower acquisition costs than x86 Linux servers with VMware[2]

IBM PowerLinux 7R1	IBM PowerLinux 7R2	PowerVM for PowerLinux
▪ Up to 8-core POWER7+ ▪ Up to 256 GB memory ▪ SSD & high speed PCIe Gen2 I/O ▪ 3yr 9-5, Next Business Day Support	▪ Up to 16-core POWER7+ ▪ Up to 512 GB memory ▪ SSD & high speed PCIe Gen2 I/O ▪ 3yr 9-5, Next Business Day Support	▪ 20 VMs per POWER7+ core for maximum efficiency ▪ EasyOptimize for optimal VM placement and performance

[1] IBM PowerLinux 7R2 on the two-tier SAP SD standard application benchmark running SAP. Certification #: certification number not available at press time and can be found at sap.com/benchmark. Results valid as of 02/05/2013. Source: http://www.sap.com/benchmark
[2] See substantiation chart for additional details. Performance based on IBM IT optimization studies

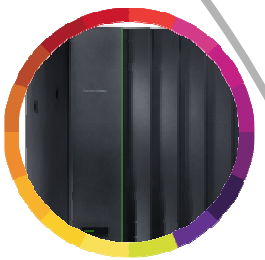
A comprehensive portfolio of IBM systems

System z®
Secure cloud
for data

Power Systems™
The engine for
faster insights

PureSystems™
Integrated expertise
for improved economics

System x®
Redefining x86
innovation



System Storage
Smarter solutions
for big data and cloud

Cloud Ready

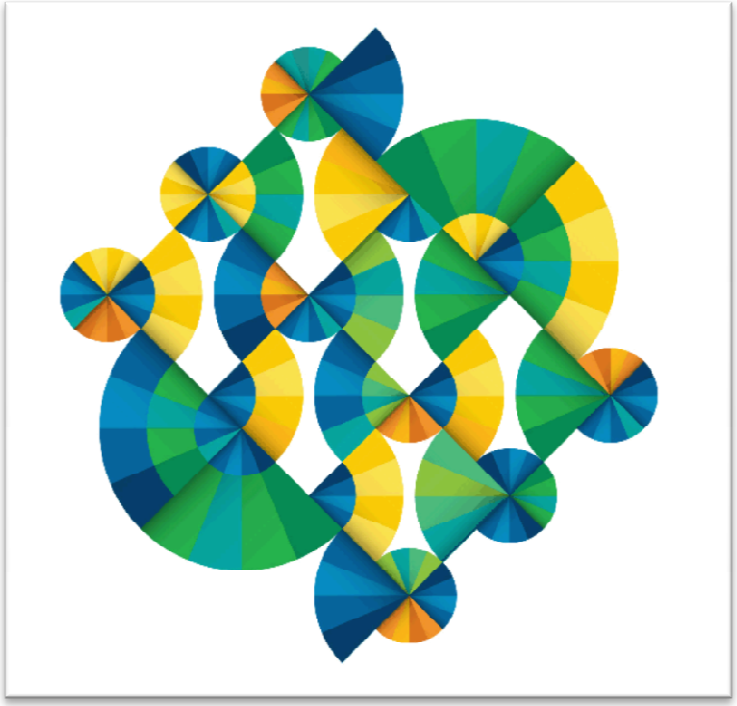
Data Ready

Security Ready

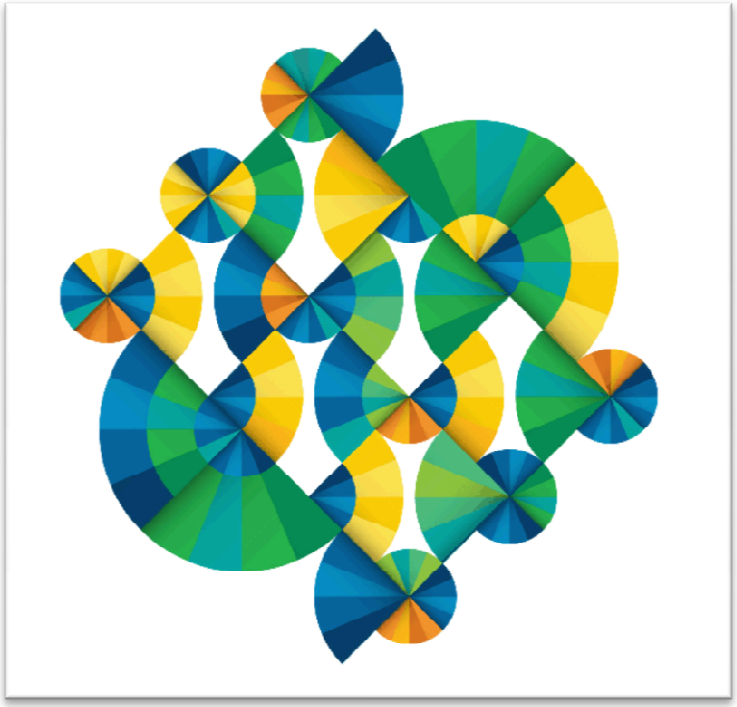
IBM Software, Services, Support, Financing

SmarterComputing

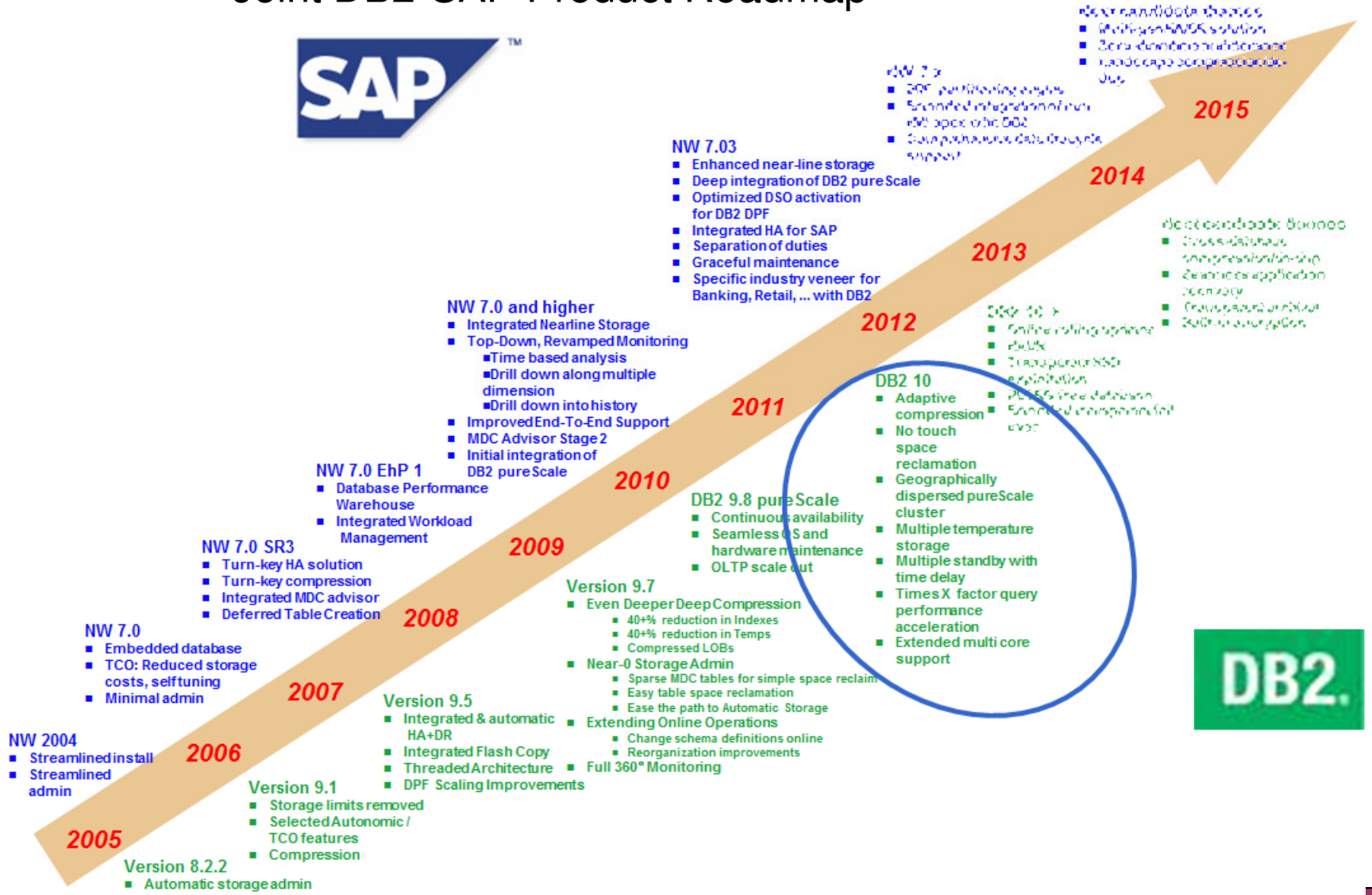
Power + IBM DB2 BLU
Power + IBM Flash
Power SCON IT Optimization



Power + IBM DB2 BLU



Joint DB2-SAP Product Roadmap



IBM DB2 & SAP Partnership

- Database Availability & Support -

Database version	Database GA	SAP DB GA	Delay between database and SAP GA (in months)	SAP DB support until
DB2 8.2	29.04.2005	03.06.2005	1	31.12.2015*
DB2 9.1	28.07.2006	31.08.2006	1	31.12.2017*
DB2 9.5	31.10.2008	20.12.2008	2	31.12.2017*
DB2 9.7	26.06.2009	28.08.2009	2	31.12.2022*
DB2 10.1	30.04.2012	16.07.2012	~2.5	31.12.2022*
DB2 10.5	14.06.2013			
MSSQL12	*06.03.2012*	*Exp. Q3-Q4*	*~6-9*	*10.07.2017*
Oracle 10g	January 2004	Q3/2006	31	31.07.2011
Oracle 11g	July 2007	Q2/2010	33	31.01.2015

*DB2 follows SAP's maintenance strategy 7+2, Status: 10th June 2012,
Source: SAP hint 1168456, 1174136, 1177356 , http://support.microsoft.com/lifecycle/?p1=14917, http://support.microsoft.com/lifecycle/?p1=16139, http://www.microsoft.com/en-us/news/press/2010/apr10/sql08rtmpr.aspx

Joint development and early tests during the implementation in Toronto IBM/SAP Integration Center and Walldorf Development during the Alpha&Beta stage

➔ DB2 between 1-3 months delay supported by SAP

➔ DB2 supports existing versions much longer (DB2 8.2 support ends after Oracle 11.2g de-support)

Relaxed long-term project planning combined with usage of most current technology

➔ Use so long as you like the older DB2 versions & Go as fast as you need to newer DB2 versions

DB2 10.5 with BLU Acceleration:

- Announcement: 3 April 2013
- General Availability: 14 June 2013

New

DB2® 10.5

with BLU Acceleration

Multi-workload database software for the era of Big Data

> *"IBM is working closely with SAP to certify DB2 10.5 in similar time frame as previous major releases. This usually occurs about 8 weeks, give or take, after we GA, so, assume late August for the certification statement from SAP. As with any release, this includes evaluation and exploitation of all features in this release where appropriate (including BLU acceleration). We would be happy to help arrange and participate in a joint meeting/call with you, SAP and IBM to discuss SAP's plans further."*
>
> *- Torsten Ziegler, Development Manager SAP DB2 porting Team, SAP*

SAP OEM DB2 License – includes DB2 BLU technology at No Additional Cost

Características del Acelerador DB2 BLU

Dinamico en Memoria

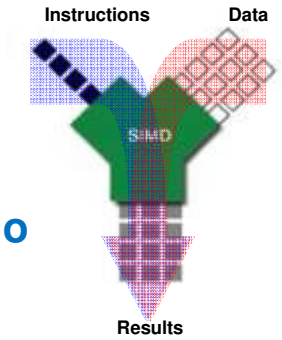
Procesamiento de columnas en memoria con movimiento dinámico de información desde el almacenamiento.

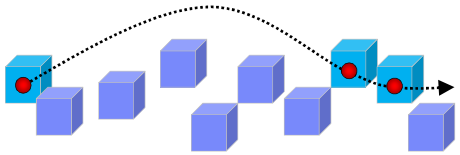
Compresión procesable

Técnicas de compresión patentadas que preservan el orden de la información y así puedan ser usadas sin descomprimirles.

Procesamiento Paralelo x Vectores

Toma provecho de multiples cores/threads al examinar la información





Salto de Datos

Evita procesar información irrelevante

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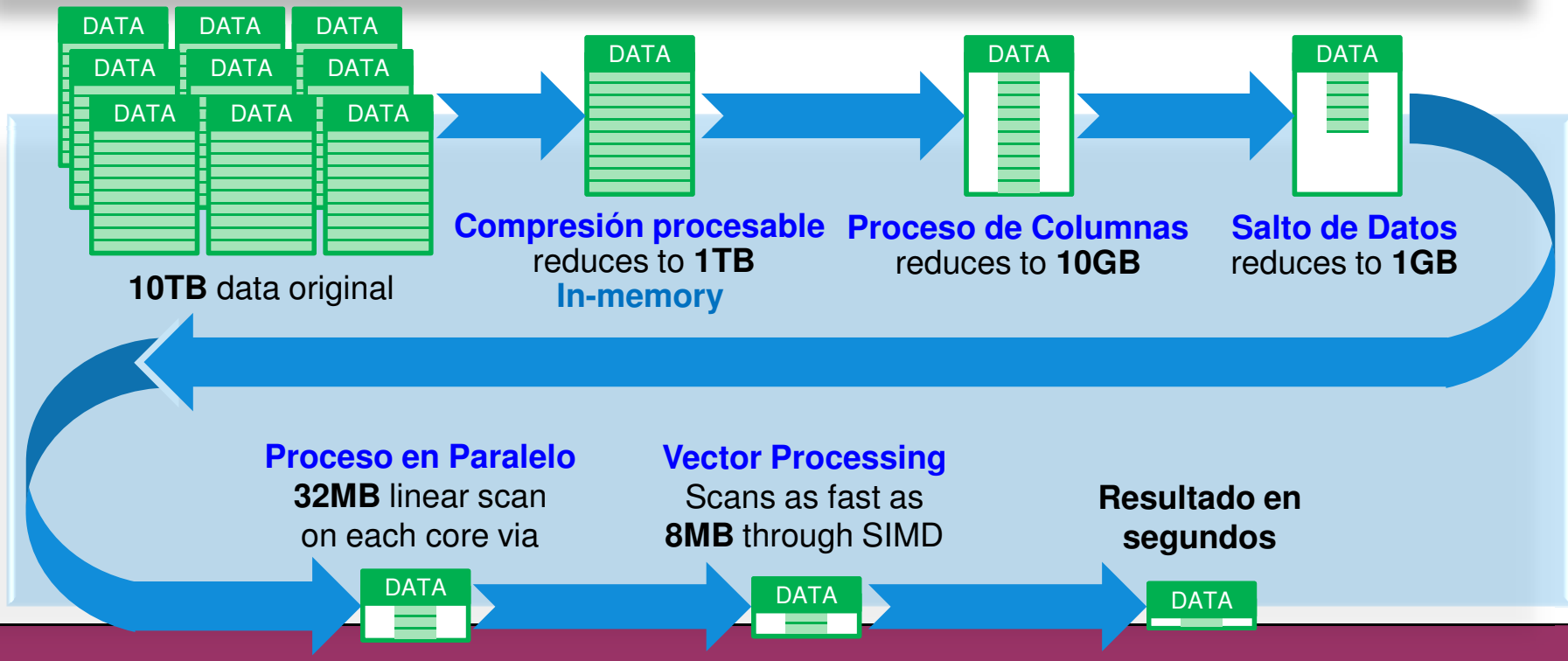
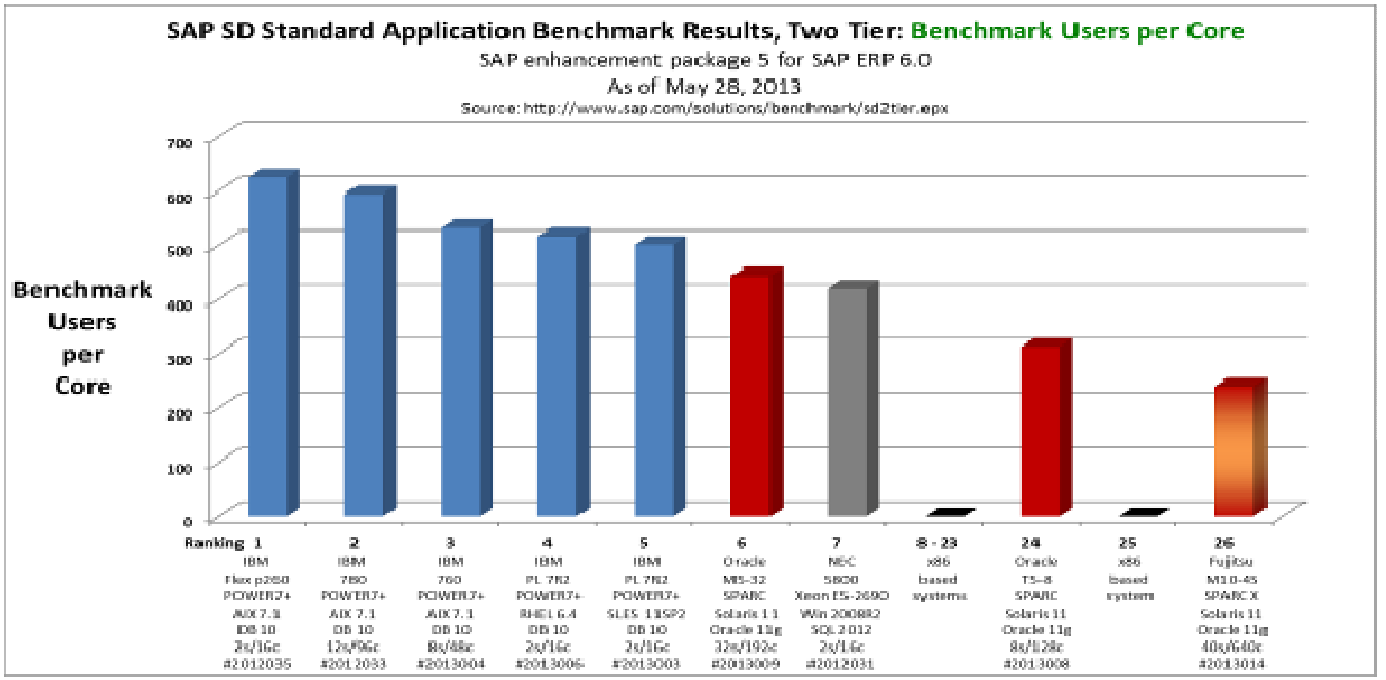
Ejemplo de operación de DB2 BLU
Respuesta sobre 10TB en algunos segundos

- Servidor: 32 cores, 1TB memoria, tabla de 10TBs con 100 columnas y 10 años de información
- Consulta: Cuantas ventas se hicieron en el año 2010?
  - `SELECT COUNT(*) from MYTABLE where YEAR = '2010'`
- El resultado: En segundos, dado que cada core examina solo 8MB de información



Power + IBM DB2

Lidera los Benchmarks de Usuarios x Core con SAP 2-Tier SD



SAP en x86 tiene

9 dias adicionales

De NO Disponibilidad al año vs SAP en sistemas Power[1]

SAP en Power puede alcanzar

2.2x mejor TCO

que SAP en x86[1]

© 2013 IBM Corporation

1 – Solitaire Interglobal – Business Impacts of SAP deployments 2013. 54,150 SAP production sites surveyed. (LINK)

The Value DB2 BLU on Power Provides is Unmatched

DB2 10.5 with BLU Acceleration Running on Power7+ Servers delivers

Up to 7x Better Performance
at
¼ the cost of SAP HANA on Intel

- SAP HANA requires 4x more memory
- SAP HANA requires 10x more storage
- SAP HANA requires 10x more cores
- SAP HANA software costs 32x more than DB2 AESE per TB

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IBM Confidential

Cost Comparison for DB2 on Power vs. HANA on Intel

- 10TB raw active user data

- DB2 10.5 BLU recommendation for 10TB of data is 500GB - 1TB of memory
- SAP recommendation for 10TB of data is 4TB - 5TB of memory

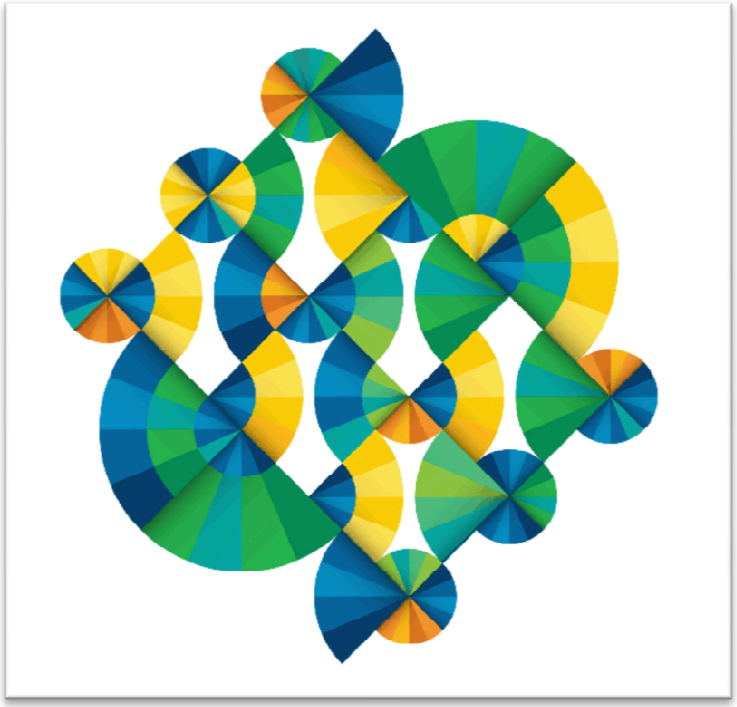
- DB2 10.5 BLU storage requirements for 10TB of SAP data is 1.4TB storage
- SAP storage requirements are = 5 * memory required = 20TB – 25TB

- DB2 10.5 BLU CPU requirements for 10TB is 32 cores of Power7+
- SAP HANA CPU requirements for same database is 320 cores of Intel

- Costs
  - DB2 10.5 on 32core 770+ server (1TB DRAM & 2TB SSD storage)
    - Software costs = DB2 AESE = $94K/TB = $188,000 (2TB of compressed data)
    - Hardware costs = $878,884
    - Total = $1,066,884 (including 1st year support)

© 2013 IBM Corporation

Power + IBM Flash



Why Flash…

In the last 10 years:

CPU Performance **8 - 10x** increase

DRAM Speed **7- 9x**

Network Speed **100x**

Bus Speed **20x**

Disk Speed 1.2

…and everything waits

Source: IBM and Industry Estimates

IBM Flash and IBM Power Systems

Do More, Do it Faster…Transact More Business

OLTP Databases

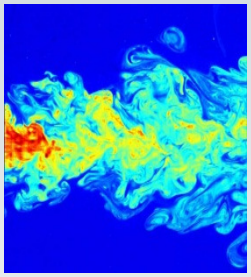
Financial, gaming, real-time billing, trading, real-time monitoring, query acceleration…

Analytical Apps

Business intelligence, batch processing, ERP systems, reporting, massive data feeds…

Cloud-scale Infrastructures

VDI, Consolidated virtual infrastructure user profiles…



Computational Apps, HPC…

Simulation, modeling, rendering, FS metadata, scratch space, video on demand, thread efficiency…

Virtual Infrastructures

On-demand computing, content distribution, web, caching, metadata, active file management…

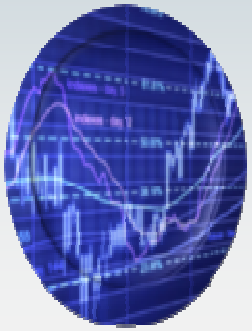
Financial | Government | E-Commerce | HPC | Telecom

Flash is About Economics

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

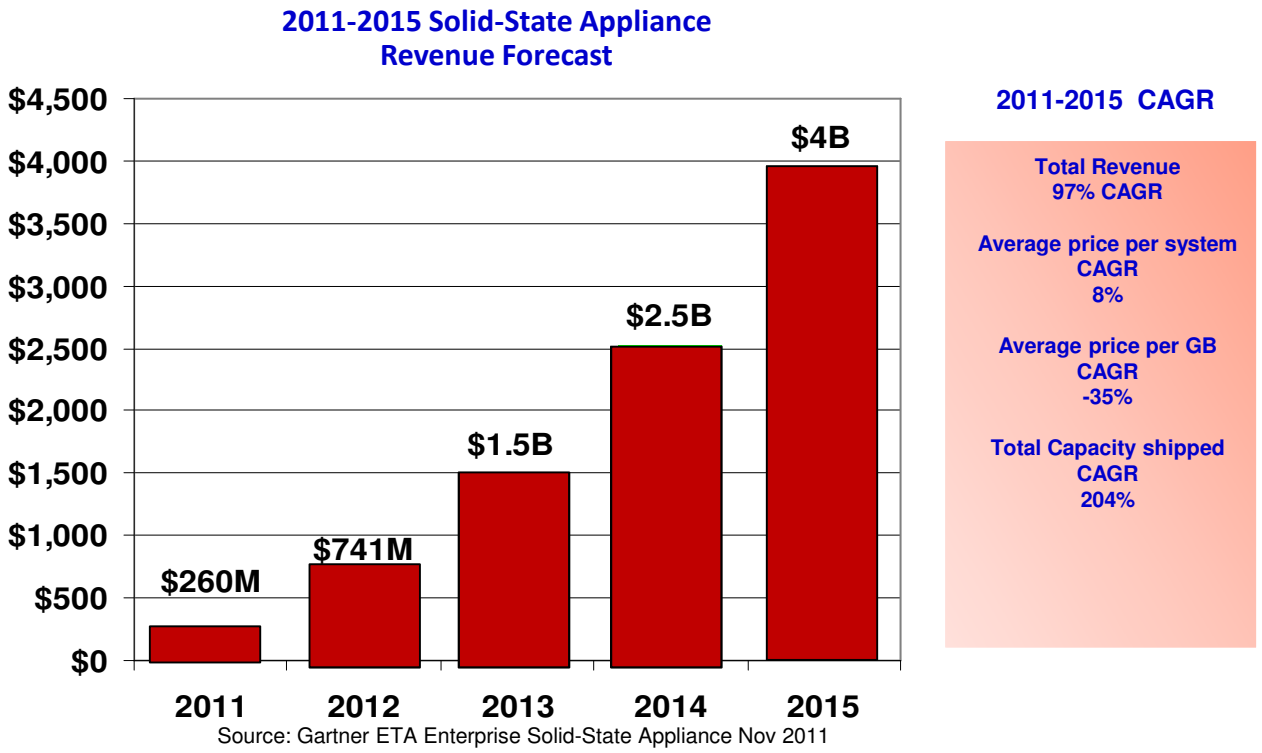
Flash into the Future

The evolution of flash technology and the resulting new use cases, will drive rapid adoption of flash optimized systems.

Flash technology offers superior performance, efficiency and reliability

Flash optimized systems are evolving to be less expensive than earlier technology

Flash creates new workload opportunities



Source: Gartner ETA Enterprise Solid-State Appliance Nov 2011

Flash on Power Systems

Significantly improves performance of a broad range of business critical workloads

- *On-line Transaction Processing*
- *Real-Time Analytics*
- *Database acceleration*
- *Virtualization*
- *Web Caching & Indexing*

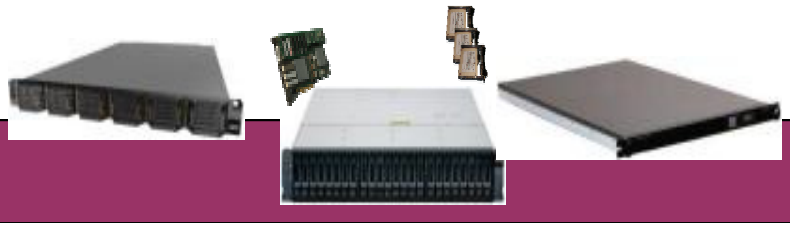
Customer Benefits:

- Better and faster business insights
- Increase revenue with faster transactions and better end user experience
- Improve processor utilization and application efficiency: do more with less.

✓capital expenses
✓floor space
✓maintenance costs
✓licensing costs

Multiple flash form factors for Power Servers to address customer needs:

- **EXP30 Ultra SSD Drawer**
- **Flash PCIe Cards**
- **SAS SSD in server or I/O drawer**
- **Solutions for AIX, IBM i & Linux**
- **Flash in IBM SAN Storage Systems**
- **IBM FlashSystem Drawers**
- **IBM Easy Tier Server Caching from DS8870 to Power SSD Drawers (June 2013)**



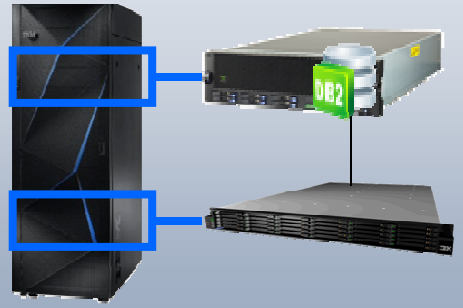
Proof Points/Use Cases

OLTP Throughput - IBM Flash Helps Power Beat Pre-Integrated Competitor

Brokerage Workload Maximum Throughput

1.5x Better Price/Performance

IBM DB2 Advanced Enterprise Server Edition v10



IBM Power 780+

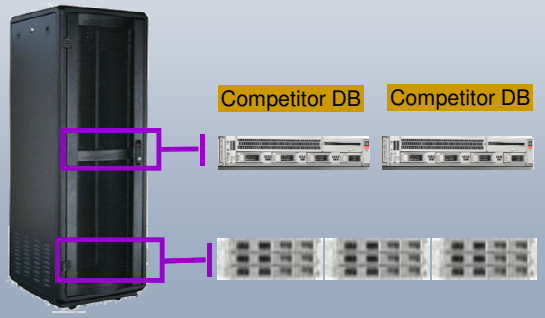
2S x 8c = 16 cores
AIX 7.1, 64-bit

EXP30 SSD Drawer
387GB SSDs

8,111 Transactions/sec

$285 per Trans/sec

Pre-integrated Database Competitor



Competitor Linux-¼ Rack
2 Data Nodes
(2s x 16c = 32 cores)
3 Storage Nodes
(3s x 12c = 36 cores)

5,400 Transactions/sec

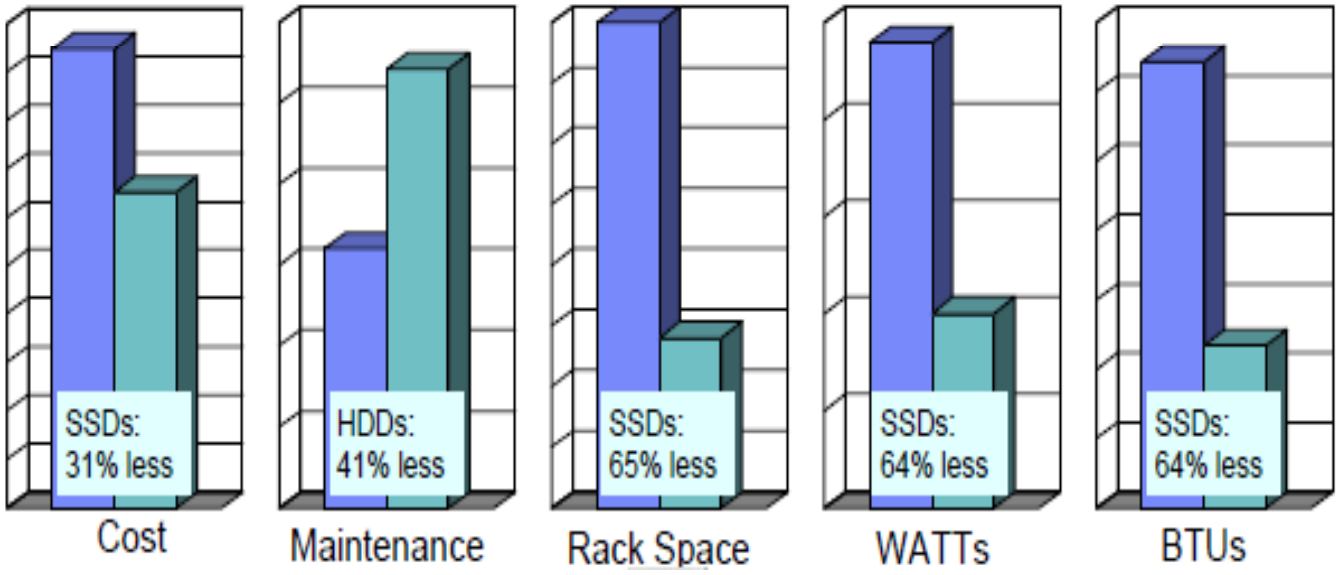
$710 per Trans/sec

Based on IBM internal tests comparing DB2 v10.1 on Power 780+ and EXP30 Ultra SSD storage with a 32c Pre-integrated Database Competitor (version available as of 01/01/2013) executing a materially identical online transaction processing workload in a controlled laboratory environment. Tests measured transaction throughput rate to execute identical SQL query workloads. More throughput is indicated by higher transactions/second. Cost per transaction per second calculated by dividing 3YR Total Cost of Acquisition (TCA) by transaction rate. 3YR TCA based on publicly available U.S. prices current as of January 15, 2013, including hardware, software, and maintenance. Compared prices exclude applicable taxes, and are subject to change without notice. Competitor configuration: ¼ Unit (usable uncompressed capacity = 9.5TB) including competitor recommended software options and features. IBM configuration: DB2 v10.1 16c LPAR on Power Sytstem 780+ with EXP30 UltraSSD storage (usable uncompressed capacity = 11TB). Results may not be typical and will vary based on actual workload, configuration, applications, queries and other variables in a production environment. Users of this document should verify the applicable data for their specific environment. Contact IBM and see what we can do for you.

IBM Flash helps IBM i Customer Realize Significant Cost Savings

- All HDDs for 5 LPARs
  - To meet capacity and performance requirements: 220 HDDs
  - 10 EXP24S disk enclosures
  - 4 5877 I/O enclosures
  - 1 5802 I/O enclosure
  - 18 feature 5913 disk IOAs
  - Plus cables

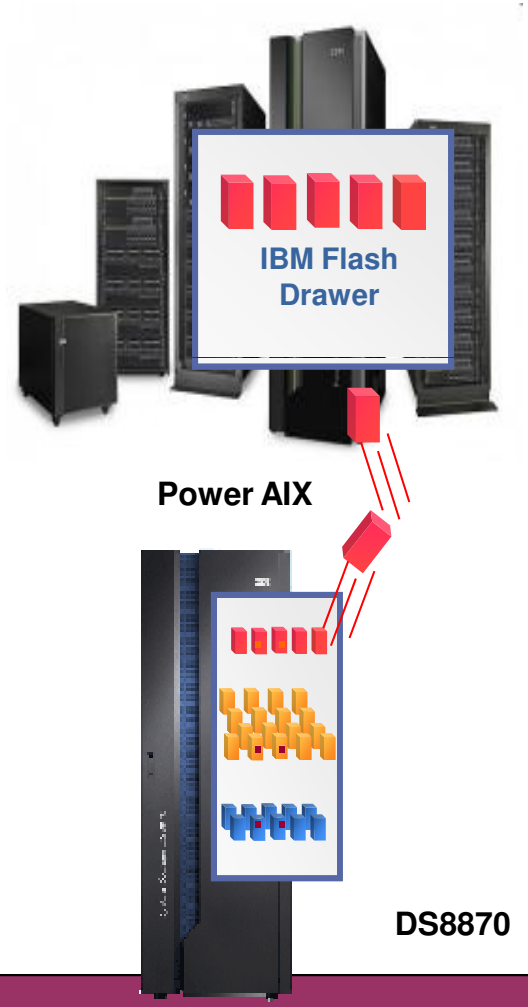
- All SSDs
  - To meet capacity and performance requirements: 48 SSDs
  - 3 EXP24S disk enclosures
  - 1 5877 I/O enclosures
  - 1 5802 I/O enclosure
  - 5 feature 5913 disk IOAs
  - Plus cables



https://www-950.ibm.com/events/wwe/grp/grp017.nsf/vLookupPDFs/PowerSystems_SSD/$file/PowerSystems_SSD.pdf

IBM Easy Tier Server – June 2013 Announce

Easy Tier Server – a new IBM Easy Tier feature that automatically places a copy of frequently accessed data on Flash Drawers attached to POWER7/7+ Servers running AIX



Up to **5X** faster performance

Caches the most frequently-accessed data to SSD cache on IBM Power AIX servers

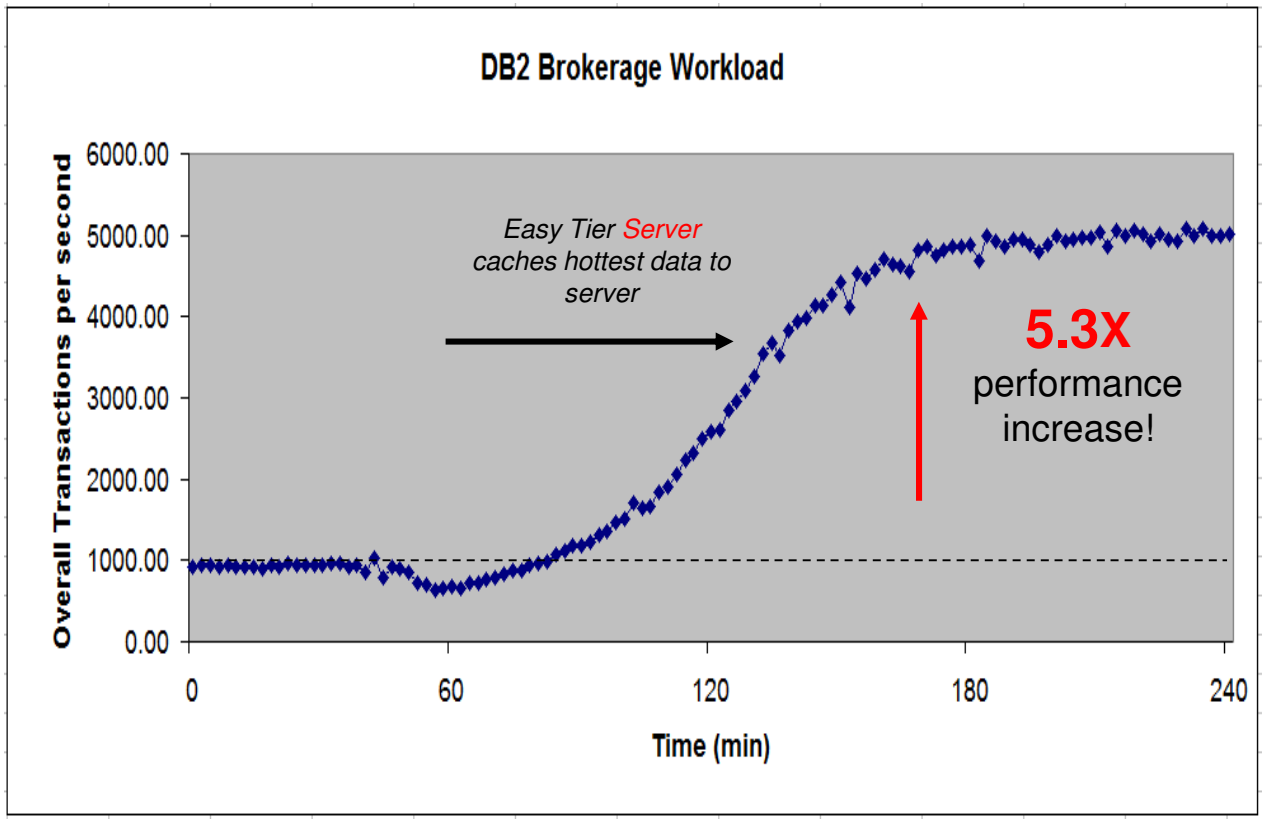
Accelerate your business with faster data access

Client benefits:

- Much faster response times by overcoming latency of the SAN
- Storage and network resources can now service other workloads faster
- Server and storage resources remain optimized for performance and cost objectives
- Preserves DS8870 advanced functions (e.g., disaster recovery, thin provisioning, QoS, etc.)
- Automation reduces administration costs and allows IT staff to focus on strategic initiatives
- Important notes
- Currently supports DS8870 with the following Power Systems and native AIX only
  - Power 720, Power 740, Power 750, Power 750, Power 760, Power 770, Power 780, Power 795
  - Power EXP30, EXP24S, and 12X I/O Flash Drawers
  - AIX 7.1 with the 7100-02 Technology Level or later
  - AIX 6.1 with the 6100-08 Technology Level or later
  - Servers cache data independently of each other

Easy Tier Server boosts transactions dramatically

*Up to **5x** performance increase for DB2 banking brokerage workload*



Base configuration is all-HDD with Easy Tier Server not activated
IBM Power 770 server running AIX with 1 Ultra SSD I/O Drawer
DS8870 146GB 15K drives (RAID 5) with 2 1.3TB database volumes

IBM Power Systems and Storage Flash Products

EXP30 Ultra SSD Drawer

- **High density & performance with pay as you grow capacity granularity**
- **1U drawer, Up to 30 hot-plug SSD (up to 11.6 TB)**
- **Ultra performance**
  - **Up to 480,000 IOPS (100% read)**
  - **Up to 410,000 IOPS (60/40% read/write)**
  - **Up to 325,000 IOPS (100% write)**
  - **Up to 4.5 GB/s bandwidth**
- **Up to 48 drives & 43 TB downstream HDD with out extra Server slots**
- **ZERO PCIe slots used – direct connect to GX++ for max bandwidth**
- **Ultra enterprise RAS – example: multiple RAID options, hotplug, more**
- **Supports AIX, Linux, IBM i**

IBM FlashSystem 820 and SVC

IBM FlashSystem 820

Extreme Performance with IBM MicroLatency
All Flash 10 or 20TB RAIDed data capacity
Macro Efficiency 1U form factor
Variable Stripe RAID and 2-D RAID for Enterprise Reliability
Can be used with or without SVC
Use case examples: http://www.redbooks.ibm.com/technotes/tips0973.pdf

SAN Volume Controller with FlashSystem 820

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

IBM Storage Flash solutions for Power Systems

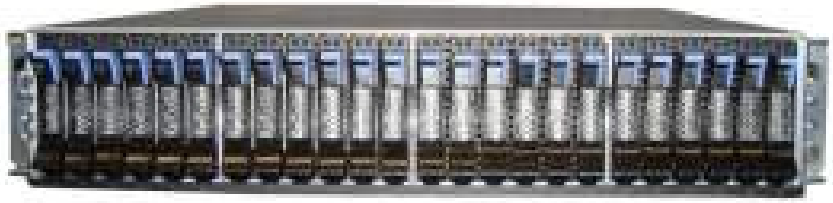
IBM SAN Storage Systems

- V7000 SSD & HDD
- DS8000 SSD & HDD
- XIV SSD & HDD
- DS3000 SSD & HDD
- San Volume Controller (SVC)

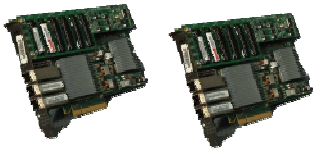
IBM FlashSystem all flash FC attached drawers

- IBM Flash System 710, 720, 810, 820
- High performance, capacity & density Flash drawers
- Fibre Channel attached
- Offers enterprise SAN functions when used with SAN volume controller

EXP24S SSD Drawer



EXP24S Drawer



SAS RAID adapters

387GB SSD, SFF (2.5”)

- High-performance, low-cost 2U drawer
- RAID SAS Adapters designed for SSD
  - Up to twenty four 387 GB SSD
  - 1.5 to 9.3 TB of SSD capacity
- Enterprise class RAS and functionality
  - 300,000 to 400,000 read IOPS
- Multiple protection options including RAID5, RAID6, mirroring, hot plug, hot spare ,
  - Supports AIX, Linux, IBMi

SFF (2.5”) SSD for Power Systems

387GB SSD SFF (2.5”)

There’s even an easy-to-order cost-saving 4-pack

Cost effective, configuration flexibility

- **use in SAS bay of a server or an I/O drawer**
- **Use from qty 2 or fully populate high performance SSD drawers**
- **Run under integrated SAS controller in system unit (lows entry price) or under a PCIe adapter (more growth/performance)**
- **Multiple protection options including RAID5, RAID6, mirroring, hot plug, hot spare , etc**

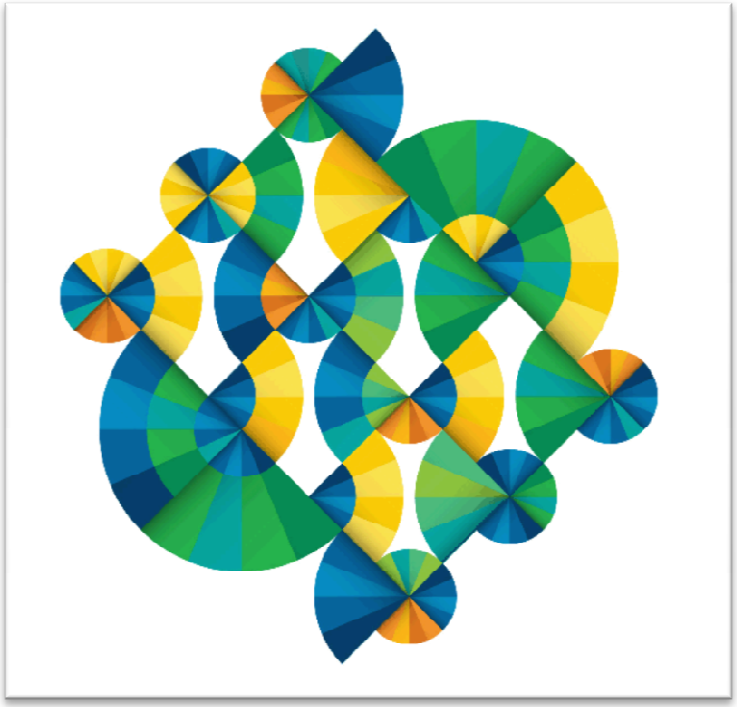
Power PCIe Flash Card

Double-wide PCIe adapter
For 1-to-4 177GB SSD
Up to 708GB

- For a small flash memory requirements
- When you are constrained on SAS bays and have PCIe slots available.
- Features:
  - Supports RAID-0, RAID-5, RAID-6, RAID-10, mirroring against another card
  - Supported by AIX, Linux and IBM i on POWER7 servers
  - Far faster than any HDD
  - Cost effective entry solution

15 de Agosto, 2013. IBM Argentina

Power SCON IT Optimization



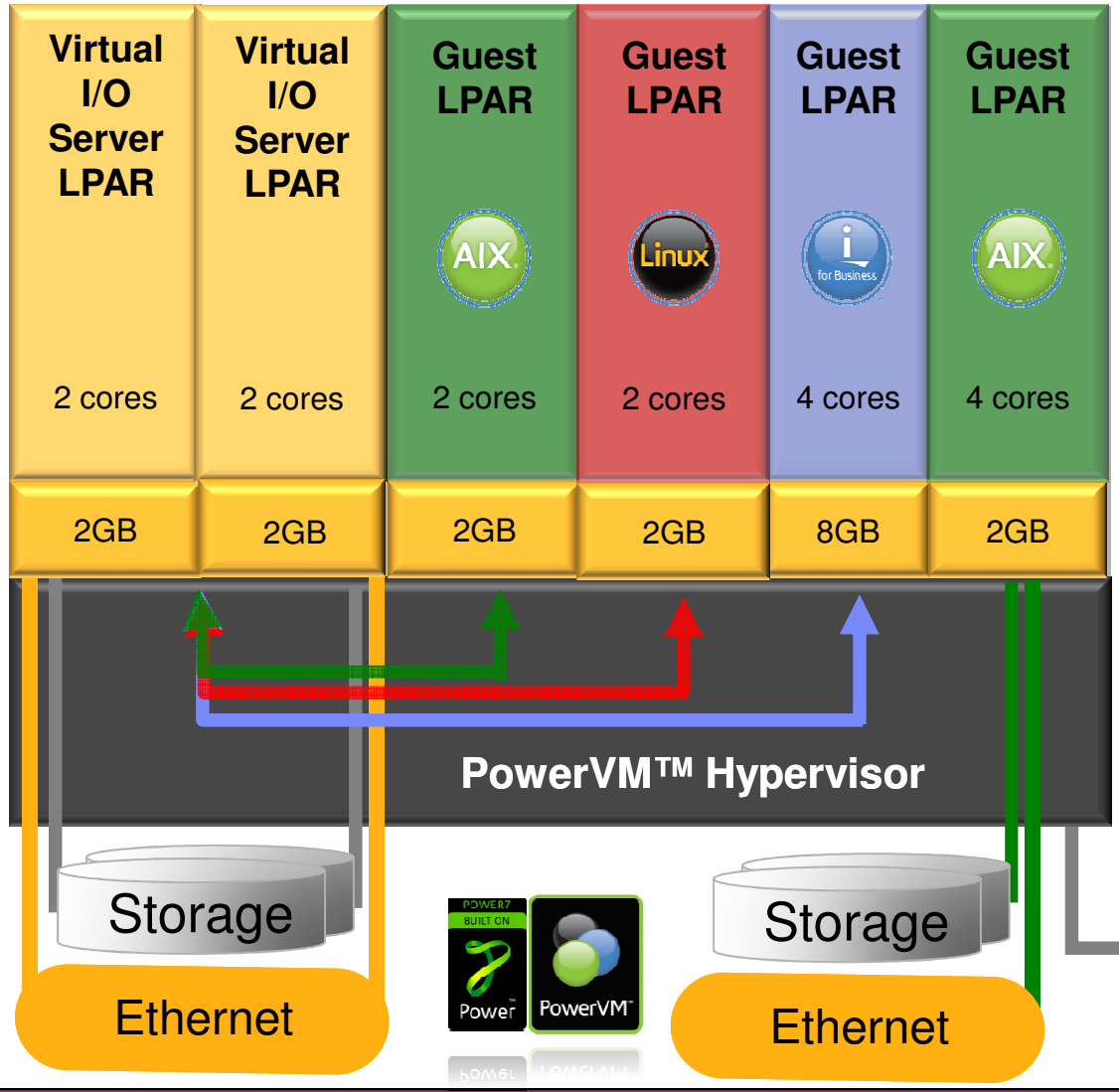
Ediciones de PowerVM

- **PowerVM Express Edition**
  - *Evaluations, pilots, PoCs*
  - *Single-server projects*
- **PowerVM Standard Edition**
  - *Production deployments*
  - *Server consolidation*
- **PowerVM Enterprise Edition**
  - *Multi-server deployments*
  - *Cloud infrastructure*

PowerVM Editions	**Express**	**Standard**	**Enterprise**
Concurrent VMs	**2 per server**	**20 per core** (up to 1000)**	**20 per core** (up to 1000)**
Virtual I/O Server	✓	✓ ✓	✓ ✓
NPIV	✓	✓	✓
Suspend/Resume		✓	✓
Shared Processor Pools		✓	✓
Shared Storage Pools		✓	✓
Thin Provisioning		✓	✓
Live Partition Mobility			✓
Active Memory Sharing			✓

** FW7.6 required

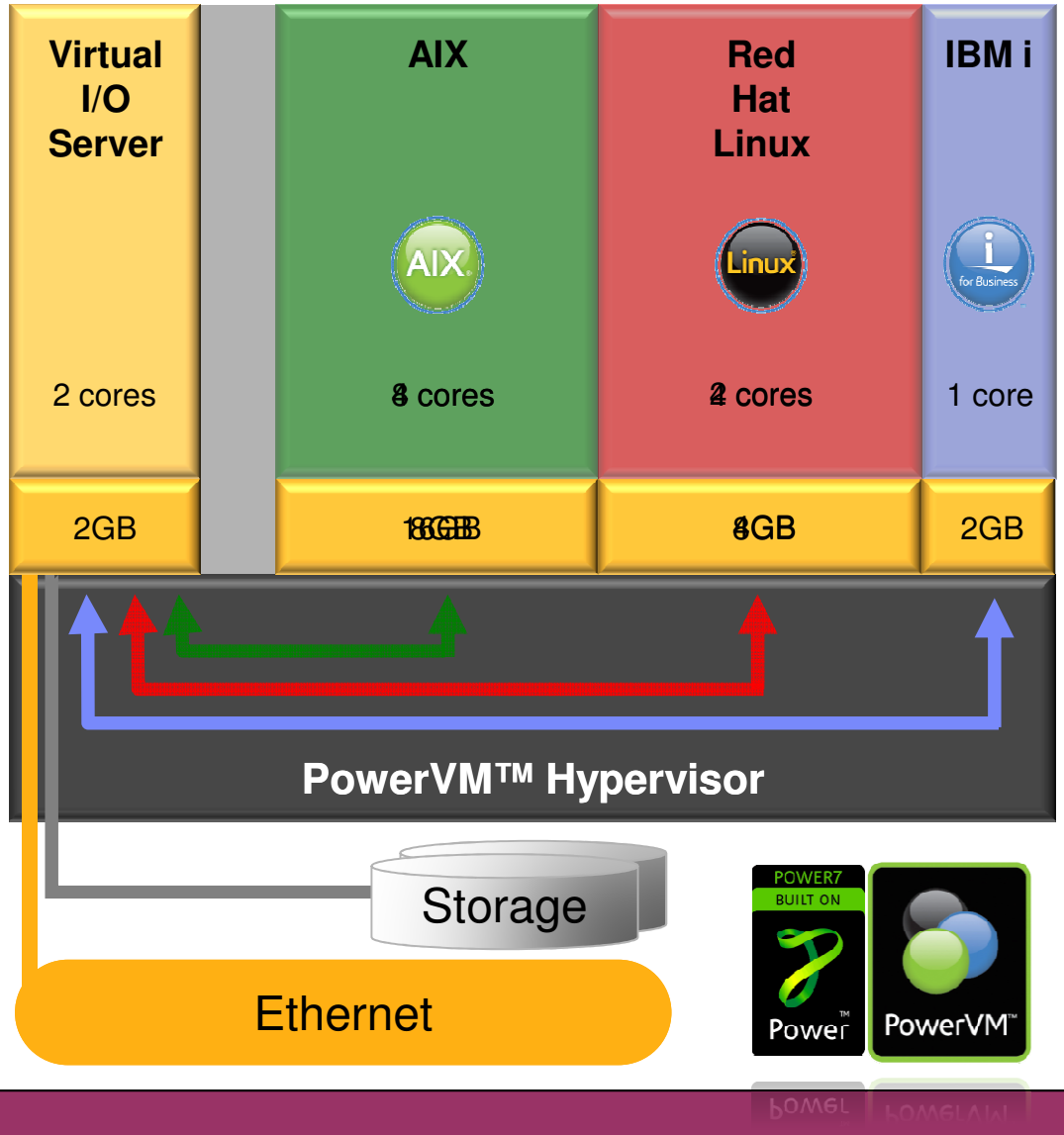
IBM PowerVM™ - Arquitectura



- Los recursos de I/O pueden ser dedicados a los LPARs si se desea.
- Se soportan múltiples sistemas operativos
- Los recursos de I/O pueden ser virtualizados y compartidos, en situación de redundancia
- La administración de las LPARs se realiza con equipos externos (HMCs) dispuestos en redundancia si se desea.

HMCs

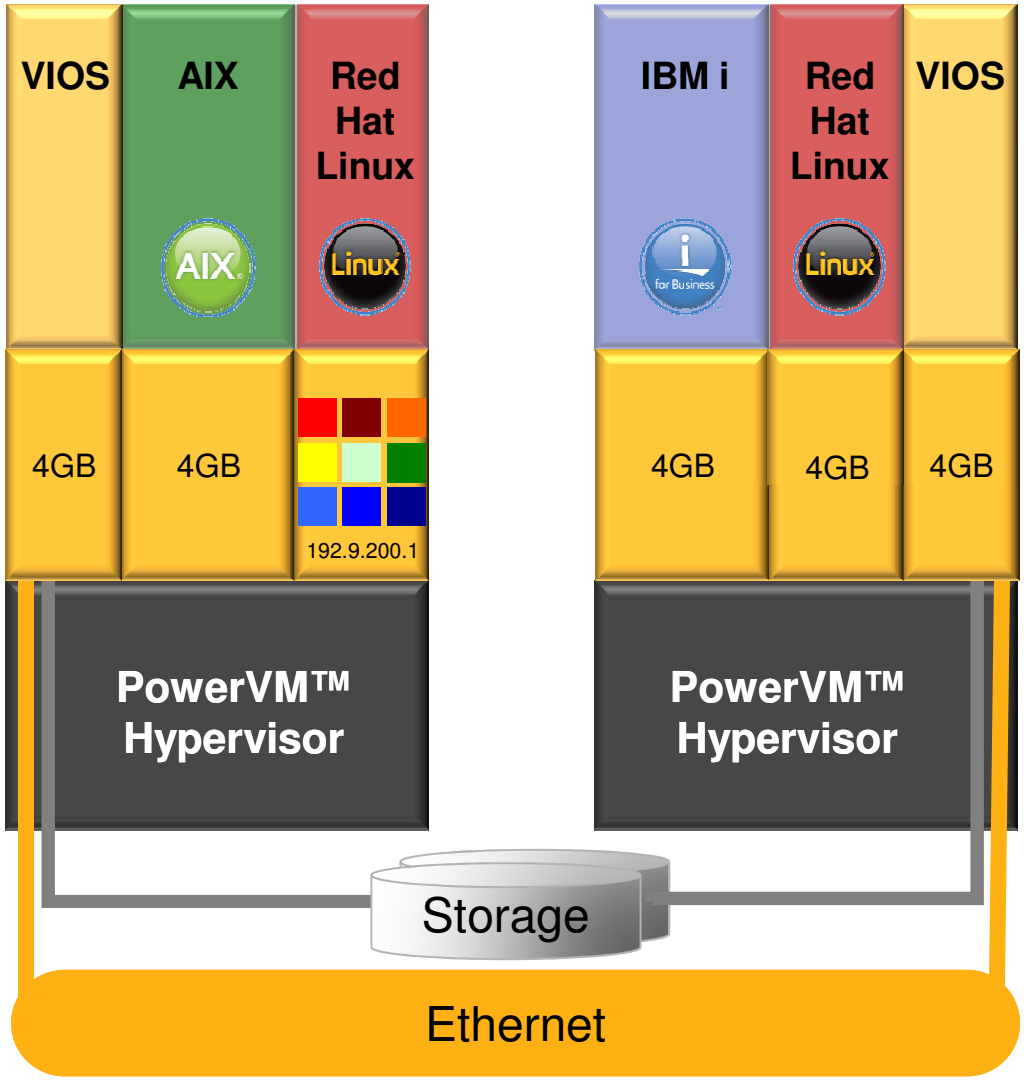
PowerVM™ - Particiones Lógicas (“LPARs”)



¿Que es?

- ✓ Solución de Particionamiento basado en Firmware como en la plataforma Mainframe.
- ✓ Permite implementar instancias de diversos Sistemas Operativos en un único servidor.
- ✓ Los sistemas operativos pueden ser AIX, IBM i, o Linux
- ✓ Los dispositivos de I/O pueden ser dedicados a un ambiente o virtualizados y compartidos por varios ambientes con redundancia.
- ✓ A los sistemas operativos pueden añadirse o retirarse recursos de CPU, memoria, y I/O sin ser reiniciados.

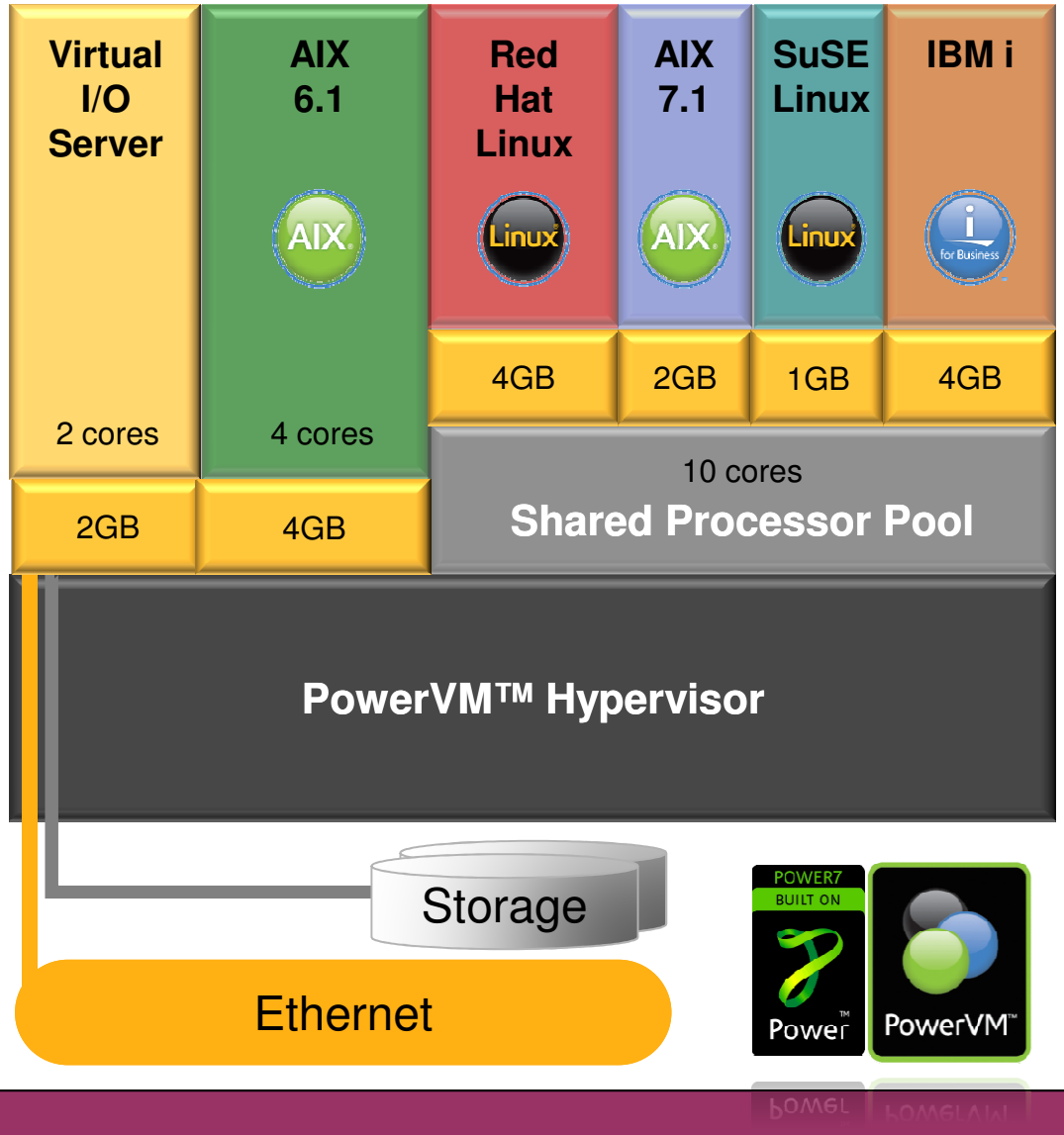
PowerVM™ - Live Partition Mobility



¿Que es?

- ✓ Permite reubicar una LPAR completa entre distintos servidores
- ✓ Se requiere tecnología POWER6™ o superior
- ✓ La LPAR continua operando en todo momento y los usuarios no se ven afectados
- ✓ 2 segundos es el tiempo máximo de suspensión percibido.

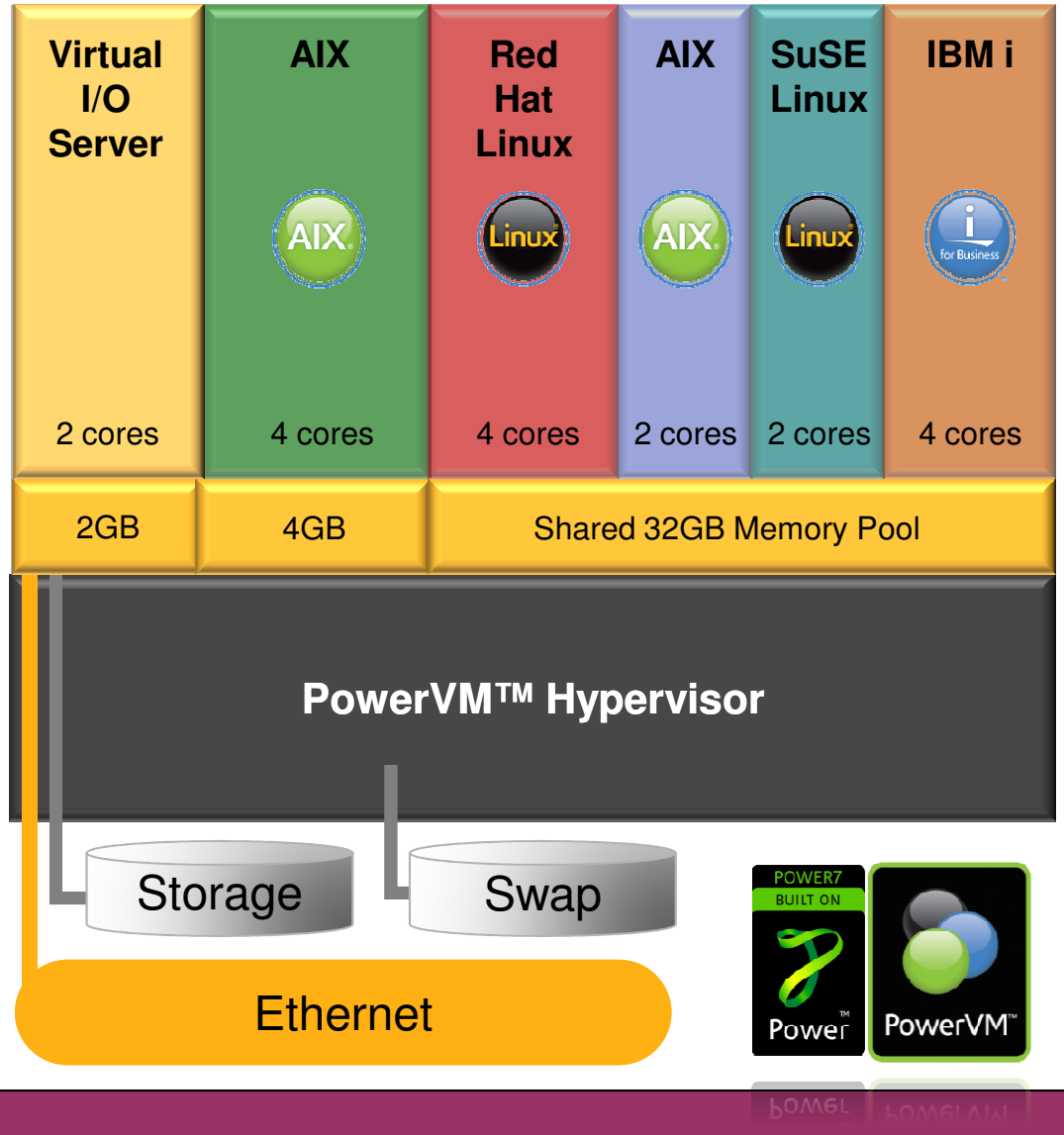
PowerVM™ - Shared Processor Pools



¿Que es?

- ✓ Bolsa de cores bajo la administración de PowerVM para ser compartida solo entre algunas LPARs.
- ✓ Requiere tecnología POWER6 o superior
- ✓ Se pueden definir múltiples bolsas en un mismo servidor
- ✓ Las LPARs pueden recibir distintas prioridades de asignación de capacidad.
- ✓ Las bolsas permiten limitar la cantidad de cores de diversos ambientes y así disminuir el licenciamiento por SW de diversas soluciones

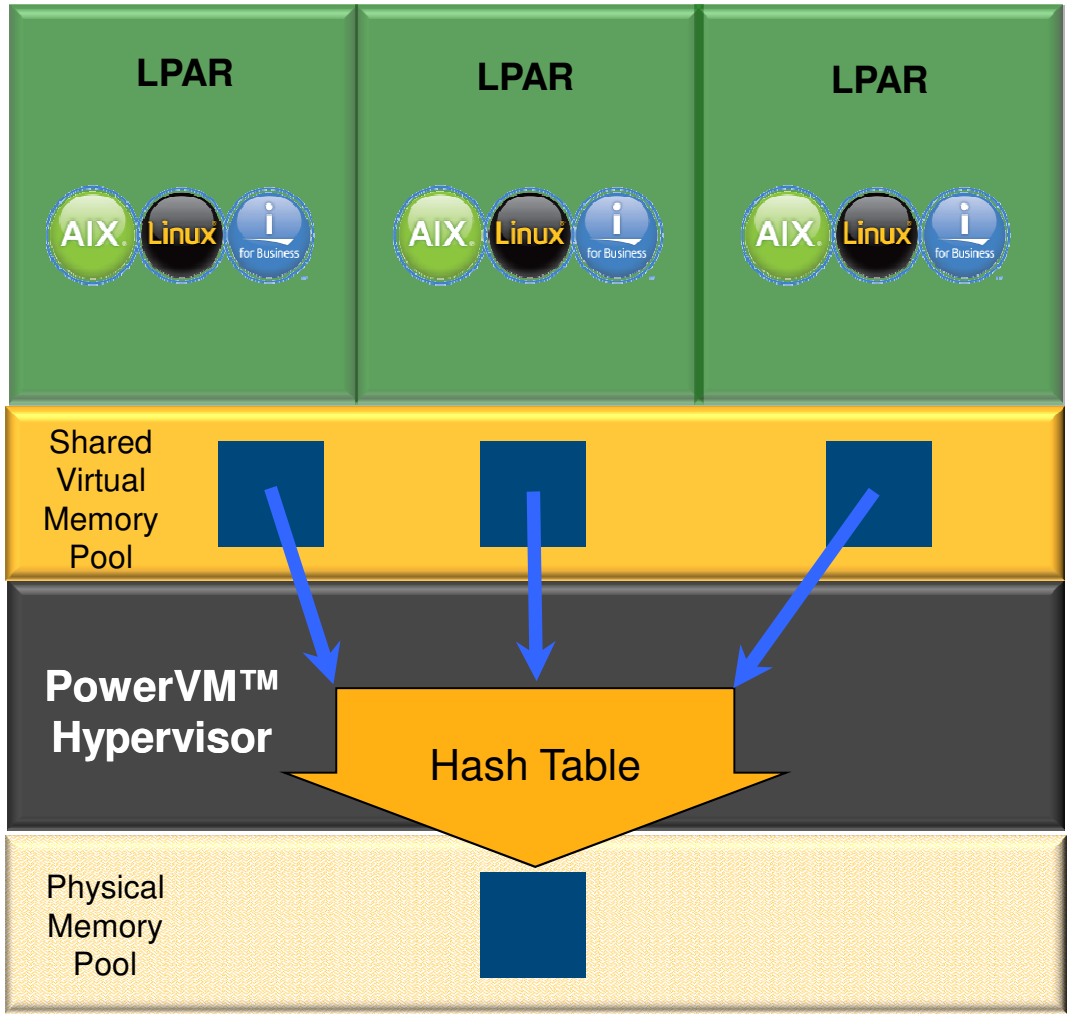
PowerVM™ - Active Memory Sharing



¿Que es?

- ✓ Bolsa de Memoria para ser compartida entre algunas LPARs
- ✓ Require tecnología POWER7 o superior.
- ✓ Permite una mejor utilización de la memoria al ser usada por múltiples ambientes con cargas de trabajo y picos variables en el tiempo.
- ✓ Un solo dispositivo de SWAP se hace necesario para todos los ambientes y ello lo puede administrar directamente PowerVM

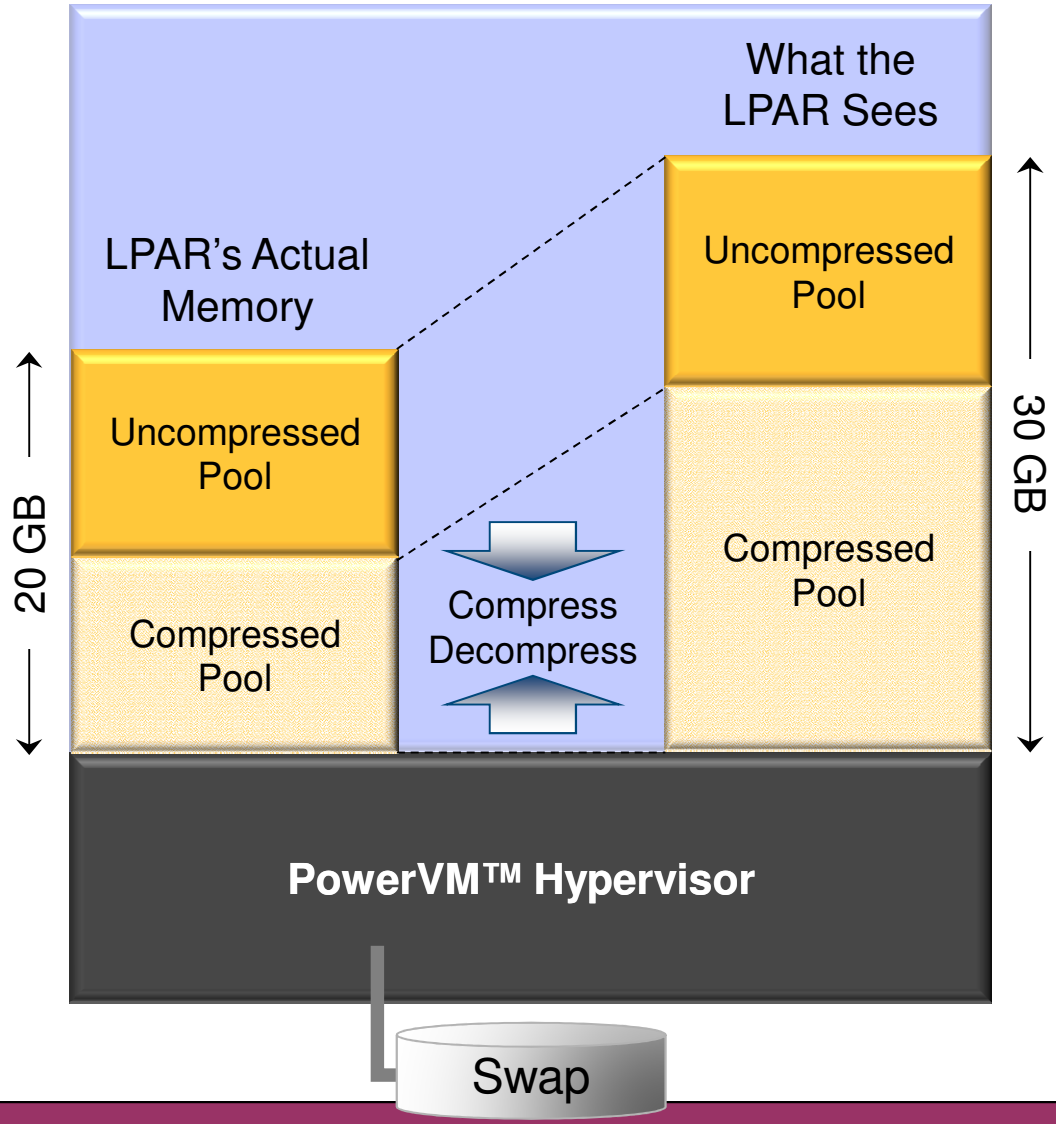
PowerVM™ - Active Memory Deduplication



¿Que es?

- ✓ Las páginas de memoria iguales entre distintas LPARs pueden ser compartidas reduciendo las exigencias de compra de memoria fisica.
- ✓ Require tecnología POWER7 o superior
- ✓ La deduplicación la ejecuta PowerVM™
- ✓ La virtud es disponible para cualquier sistema operativo funcionando en el servidor

PowerVM™ - Active Memory Expansion



¿Que es?

- ✓ Compresión en línea de la memoria fisica de una LPAR para simular la existencia de mayor memoria
- ✓ Requiere tecnología POWER7 o superior.
- ✓ Permite acomodar mayor número de LPARs en un mismo servidor al disponer de mayor volumen de memoria efectiva a la real.

Muchas Gracias
¿ Preguntas ?

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FLASH en POWER

Power + IBM Flash

¿ Entonces cual ofrecer interno o en la SAN ?

	A favor	En contra
Use Flash Interno	1. El más rápido x menor latencia 2. Si el cliente no dispone de una SAN pues será más económico y requiere menos aprendizaje 3. Multiples opciones de configuración 4. Se comporta como otro disco interno más	1. Si el cliente ya dispone de una solución SAN NO IBM perdería funciones de HA/DR 2. Si el cliente dispone de una solución SAN IBM requiere DS8800 con Easy Tier para continuar explotando los beneficios de HA/DR que la SAN ofrece.
Use Flash Externo	1. Si ya existe una SAN y/o se busca mejorar el I/O de varios servidores 2. Ya se cuenta con DS8000 EasyTier	1. Si el cliente no dispone de una SAN y deberá realizar todas las inversiones iniciales en HW/SW y nuevas habilidades

Si el cliente dispone de SAN pero no dispone de discos FLASH y NO está usando ninguna función especial de HA/DR o de Backup en la SAN entonces combinar la SAN con discos internos FLASH es una buena idea.

The IBM i Business

More clients run IBM i than any other IBM system platform

- 100,000's of systems in 100,000+ enterprises
- 115+ countries
- Cross industry

Wholesale Distribution ***Computer Services***

Finance ***Retail*** ***Insurance***

Consumer Package Goods ***Travel & Transportation***

Agribusiness ***Automotive*** ***Construction***

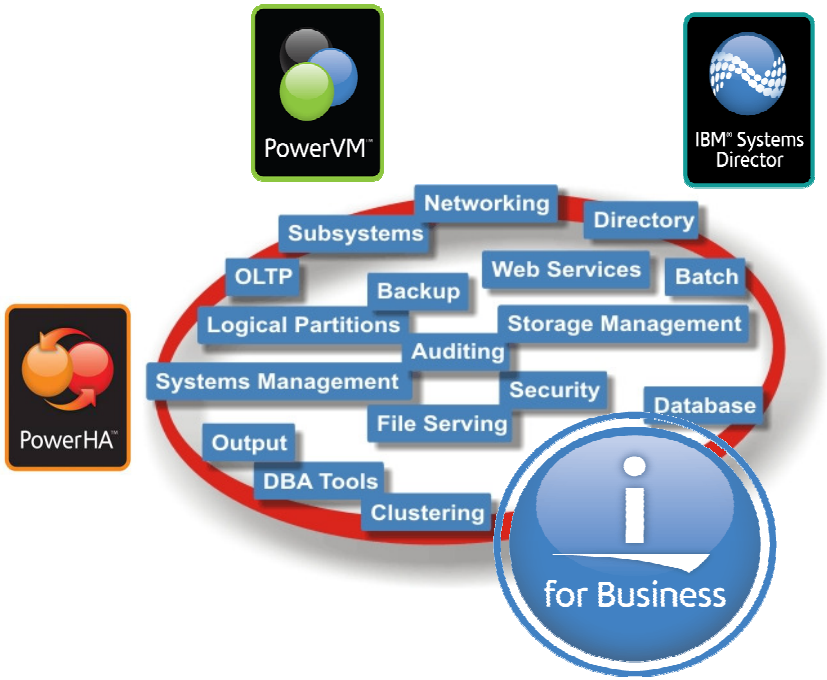
Manufacturing ***Lodging*** ***Healthcare***

Education ***Associations*** ***Local Government***

Legal Services ***Accounting Services***

Optimized for Business

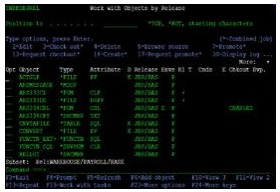
Total integration



- ✓ 41% lower TCO[1]
- ✓ 15x fewer security alerts[2]
- ✓ Proven business resiliency

1. Value Proposition for IBM Power Systems Servers and IBM i: Minimizing Costs and Risks for Midsize Businesses International Technology Group, Los Altos, California http://www.ibm.com/systems/power/software/i/strategy.html

2. Source June 2010 http://secunia.com/advisories/vendor/



RPG

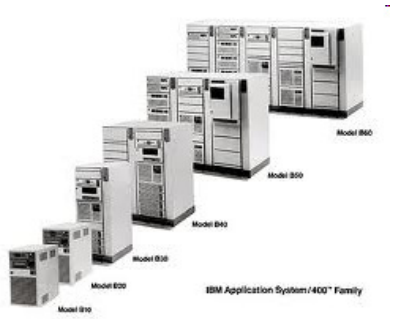
OS/400

OS/400 Hypervisor

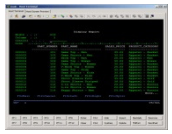
AS/400 Hardware

Internal Storage

Unique IOA/IOP



for Business



RPG Cobol Java PHP

AIX

for Business

Linux

PowerVM

PowerHA

IBM Systems Director

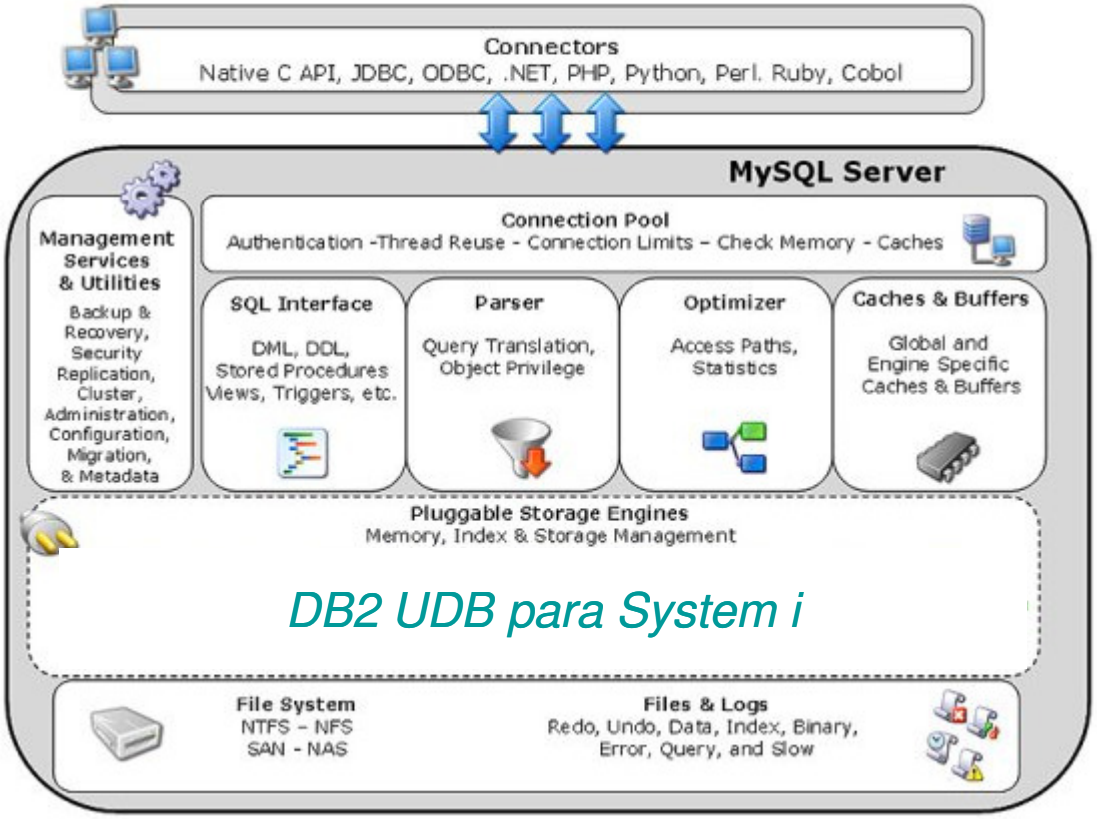
Power Hypervisor

Power System Hardware

Power Systems

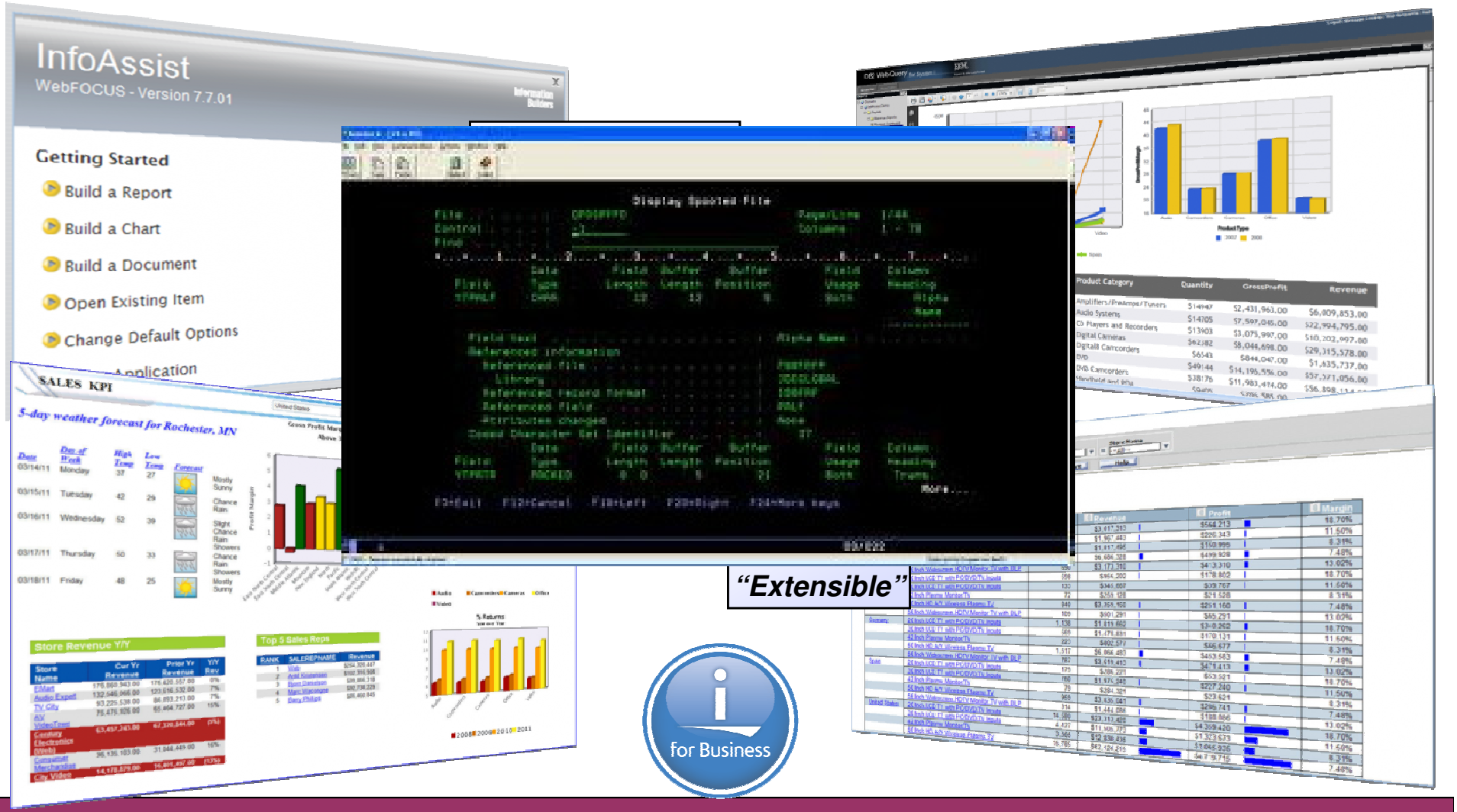
DB2 UDB para System i como Storage Engine de MySQL

MySQL®



DB2 Web Query – Intuitive, Insightful, Extensible

Fast, easy access to business information assets for query, reporting and analysis



Notes on benchmarks and values

The IBM benchmarks results shown herein were derived using particular, well configured, development-level and generally-available computer systems. Buyers should consult other sources of information to evaluate the performance of systems they are considering buying and should consider conducting application oriented testing. For additional information about the benchmarks, values and systems tested, contact your local IBM office or IBM authorized reseller or access the Web site of the benchmark consortium or benchmark vendor.

IBM benchmark results can be found in the IBM Power Systems Performance Report at http://www.ibm.com/systems/p/hardware/system_perf.html .

All performance measurements were made with AIX or AIX 5L operating systems unless otherwise indicated to have used Linux. For new and upgraded systems, AIX Version 4.3, AIX 5L or AIX 6 were used. All other systems used previous versions of AIX. The SPEC CPU2006, SPEC2000, LINPACK, and Technical Computing benchmarks were compiled using IBM's high performance C, C++, and FORTRAN compilers for AIX 5L and Linux. For new and upgraded systems, the latest versions of these compilers were used: XL C Enterprise Edition V7.0 for AIX, XL C/C++ Enterprise Edition V7.0 for AIX, XL FORTRAN Enterprise Edition V9.1 for AIX, XL C/C++ Advanced Edition V7.0 for Linux, and XL FORTRAN Advanced Edition V9.1 for Linux. The SPEC CPU95 (retired in 2000) tests used preprocessors, KAP 3.2 for FORTRAN and KAP/C 1.4.2 from Kuck & Associates and VAST-2 v4.01X8 from Pacific-Sierra Research. The preprocessors were purchased separately from these vendors. Other software packages like IBM ESSL for AIX, MASS for AIX and Kazushige Goto's BLAS Library for Linux were also used in some benchmarks.

For a definition/explanation of each benchmark and the full list of detailed results, visit the Web site of the benchmark consortium or benchmark vendor.

TPC	http://www.tpc.org
SPEC	http://www.spec.org
LINPACK	http://www.netlib.org/benchmark/performance.pdf
Pro/E	http://www.proe.com
GPC	http://www.spec.org/gpc
VolanoMark	http://www.volano.com
STREAM	http://www.cs.virginia.edu/stream/
SAP	http://www.sap.com/benchmark/
Oracle Applications	http://www.oracle.com/apps_benchmark/
PeopleSoft - To get information on PeopleSoft benchmarks, contact PeopleSoft directly	
Siebel	http://www.siebel.com/crm/performance_benchmark/index.shtm
Baan	http://www.ssaglobal.com
Fluent	http://www.fluent.com/software/fluent/index.htm
TOP500 Supercomputers	http://www.top500.org/
Ideas International	http://www.ideasinternational.com/benchmark/bench.html
Storage Performance Council	http://www.storageperformance.org/results

Notes on HPC benchmarks and values

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SPEC	http://www.spec.org
LINPACK	http://www.netlib.org/benchmark/performance.pdf
Pro/E	http://www.proe.com
GPC	http://www.spec.org/gpc
STREAM	http://www.cs.virginia.edu/stream/
Fluent	http://www.fluent.com/software/fluent/index.htm
TOP500 Supercomputers	http://www.top500.org/
AMBER	http://amber.scripps.edu/
FLUENT	http://www.fluent.com/software/fluent/fl5bench/index.htm
GAMESS	http://www.msg.chem.iastate.edu/gamess
GAUSSIAN	http://www.gaussian.com
ANSYS	http://www.ansys.com/services/hardware-support-db.htm
	Click on the "Benchmarks" icon on the left hand side frame to expand. Click on "Benchmark Results in a Table" icon for benchmark results.
ABAQUS	http://www.simulia.com/support/v68/v68_performance.php
ECLIPSE	http://www.sis.slb.com/content/software/simulation/index.asp?seg=geoquest&
MM5	http://www.mmm.ucar.edu/mm5/
MSC.NASTRAN	http://www.mscsoftware.com/support/prod%5Fsupport/nastran/performance/v04_sngl.cfm
STAR-CD	www.cd-adapco.com/products/STAR-CD/performance/320/index/html
NAMD	http://www.ks.uiuc.edu/Research/namd
HMMER	http://hmmer.janelia.org/
	http://powerdev.osuosl.org/project/hmmerAltivecGen2mod

Notes on performance estimates

rPerf for AIX

rPerf (Relative Performance) is an estimate of commercial processing performance relative to other IBM UNIX systems. It is derived from an IBM analytical model which uses characteristics from IBM internal workloads, TPC and SPEC benchmarks. The rPerf model is not intended to represent any specific public benchmark results and should not be reasonably used in that way. The model simulates some of the system operations such as CPU, cache and memory. However, the model does not simulate disk or network I/O operations.

- rPerf estimates are calculated based on systems with the latest levels of AIX and other pertinent software at the time of system announcement. Actual performance will vary based on application and configuration specifics. The IBM eServer pSeries 640 is the baseline reference system and has a value of 1.0. Although rPerf may be used to approximate relative IBM UNIX commercial processing performance, actual system performance may vary and is dependent upon many factors including system hardware configuration and software design and configuration. Note that the rPerf methodology used for the POWER6 systems is identical to that used for the POWER5 systems. Variations in incremental system performance may be observed in commercial workloads due to changes in the underlying system architecture.

All performance estimates are provided "AS IS" and no warranties or guarantees are expressed or implied by IBM. Buyers should consult other sources of information, including system benchmarks, and application sizing guides to evaluate the performance of a system they are considering buying. For additional information about rPerf, contact your local IBM office or IBM authorized reseller.

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CPW for IBM i

Commercial Processing Workload (CPW) is a relative measure of performance of processors running the IBM i operating system. Performance in customer environments may vary. The value is based on maximum configurations. More performance information is available in the Performance Capabilities Reference at: www.ibm.com/systems/i/solutions/perfmgmt/resource.html