Power Systems

IBM

OpenPOWER Platform

Altuğ Bocutoğlu
Power Scale-Out Brand Manager
Altugb@tr.ibm.com

A Time of Transition…

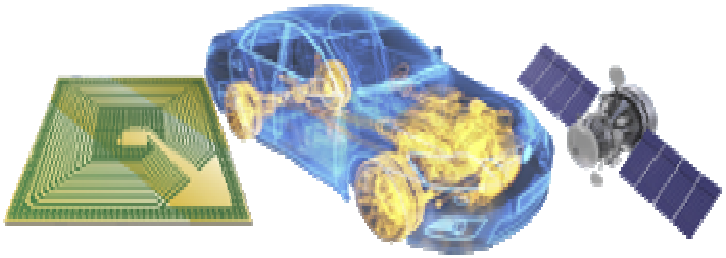
Cloud

Mobile

Big Data

Social

Internet of Things



IBM and Business Partner Use Only - Not for Customers

Leadership and innovation to support today's core business applications and next-generation solutions with strong financial benefits, industry leading support and a highly skilled and vibrant ecosystem

Next Gen Apps Big Data & Analytics

IBM WATSON

Cognos SPSS

DB2

Retail

Healthcare

Banking

Government

Telecom

Open Platform for Choice

OpenPOWER Foundation

IBM

Google

Mellanox

NVIDIA

TYAN

KVM

openstack

Linux

AIX

SmartCloud

Power Charter

Innovation that Matters

Client Value

Community Engagement

Linux

AIX

Power Systems delivering on the promise of open innovation

USD1 billion
Linux on Power investment

5 Power Systems
Linux Centers

Power development cloud

Watson

OpenPOWER
Foundation

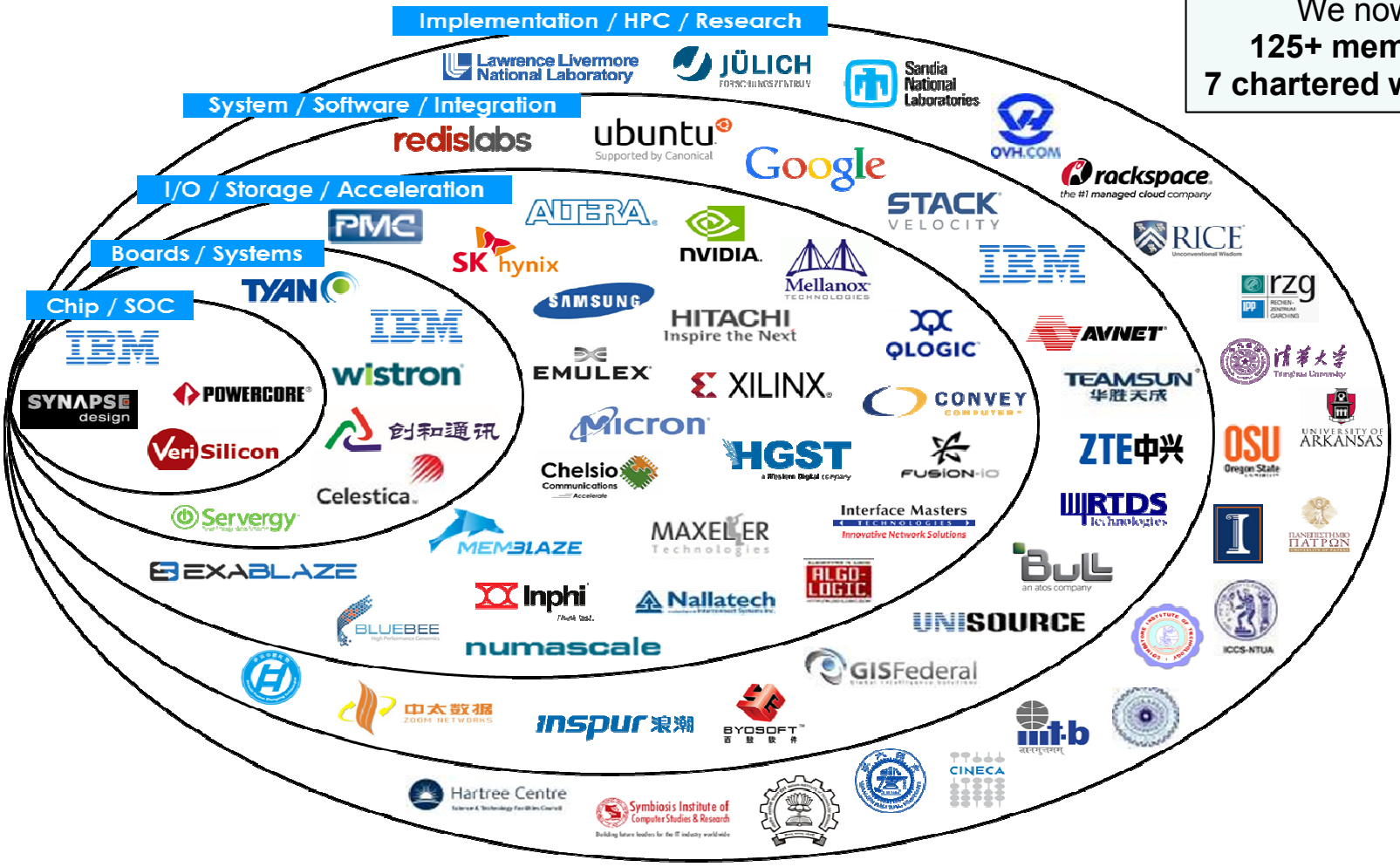
SoftLayer Integration

1000's of Engineers

More than **9,000** patents*

POWER8:
3 years USD2.4B R&D investment with hundreds of patents*

OpenPOWER -- Fueling an Open Development Community



We now have
125+ members and
7 chartered work groups!

OpenPOWER press release Dec 16th - OpenPOWER Gains Momentum Heading into Second Year
Rackspace blog Dec 16th - OpenPOWER: Opening the Stack, All theWay-Down
Complete member list - www.openpowerfoundation.org

Power Systems

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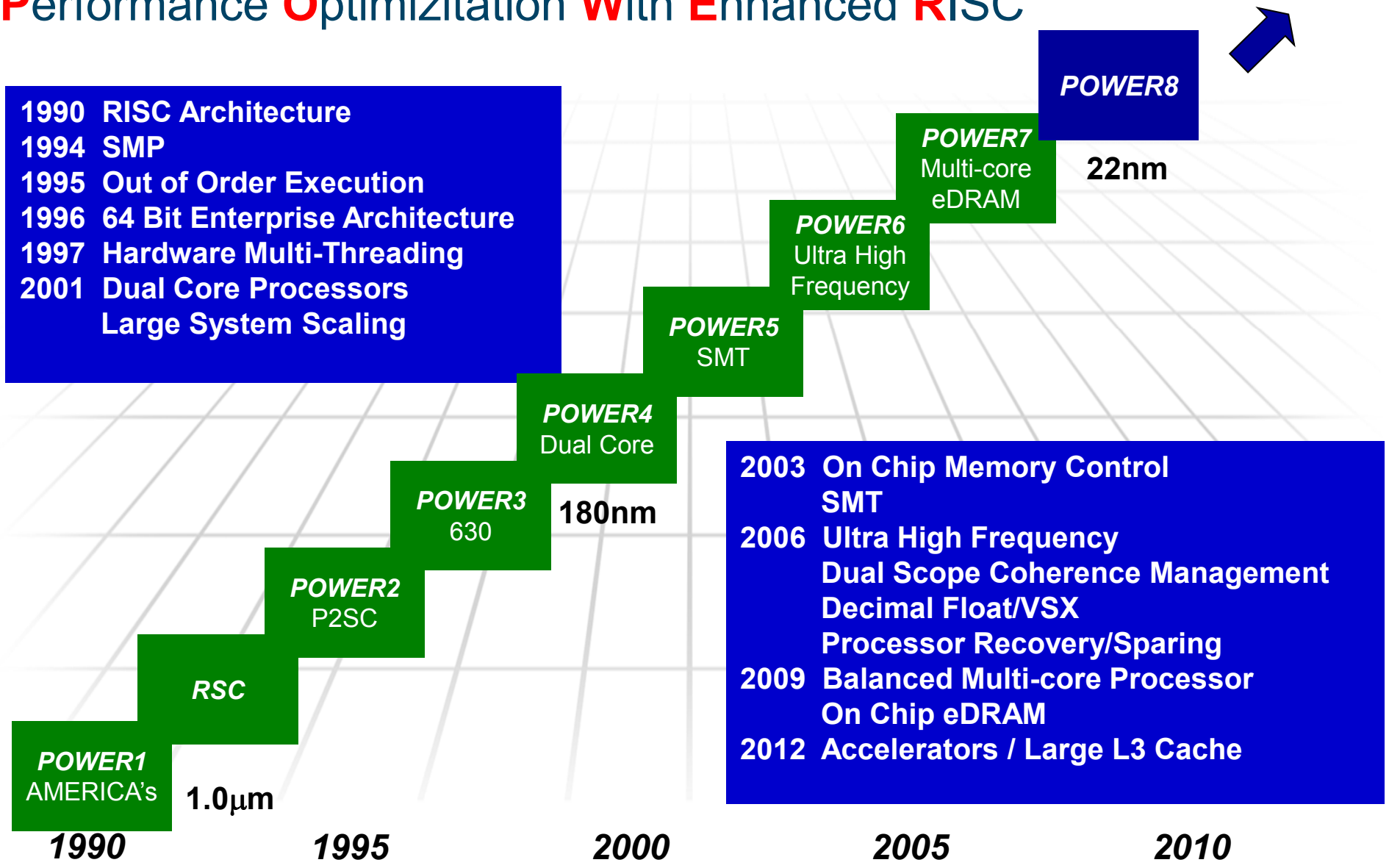
Performance Optimizitation With Enhanced RISC



Designed for Big Data: optimized Big Data & Analytics performance

Delivering insights 82x faster

4X
threads per core vs. x86

4X
memory bandwidth vs. x86

2.4X
more I/O bandwidth than POWER7

Processors
flexible, fast execution of analytics algorithms

Memory
large, fast workspace to maximize business insight

Data Bandwidth
bring massive amounts of information to compute resources in real-time

Optimized for a broad range of data and analytics:

Cognos SPSS

Industry Solutions

POWER8 Processor: Game-changing innovation that accelerates big data & analytics

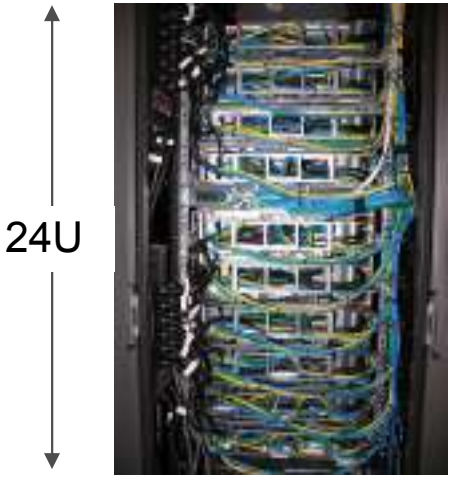
Smart Acceleration enabled by CAPI (Coherent Accelerator Processor Interface) **Technology**

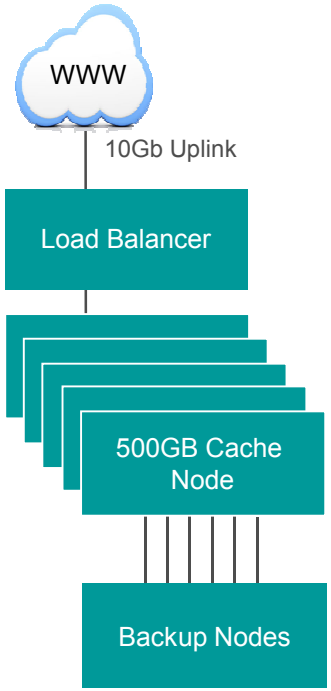
- Smart, simplified attach for accelerators: GPUs, flash memory, networking & FPGAs
- Connects directly to processor, sharing the same address space
- Improves performance, reduces latency, and provides more workload for your dollar

CAPI enables innovation from the OpenPOWER Foundation

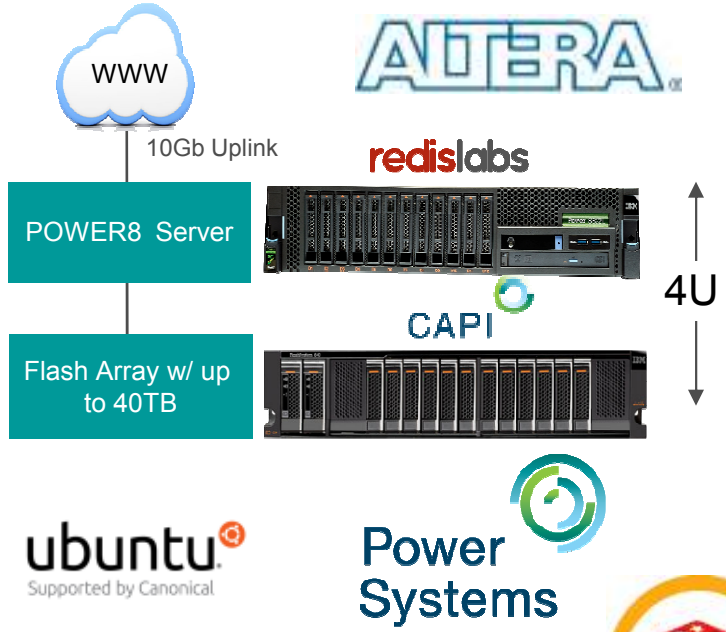
24:1 server consolidation
3x lower cost per user

Before: NoSQL in memory (x86)





After: NoSQL POWER8 + CAPI Flash



Less is More
24:1 physical server consolidation = 6x less rack space

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IBM Solution for Hadoop – Power Systems Edition

- ccelerate ROI: easy to procure, eploy, use and manage
- 2.5x faster insights than ompetitive hadoop solutions*
- Open Source Apache Hadoop
- etter reliability and resiliency ith 73% fewer outages and 92% ewer performance problems ver x86**

Faster time to insight, right-sized for your business needs

hadoop

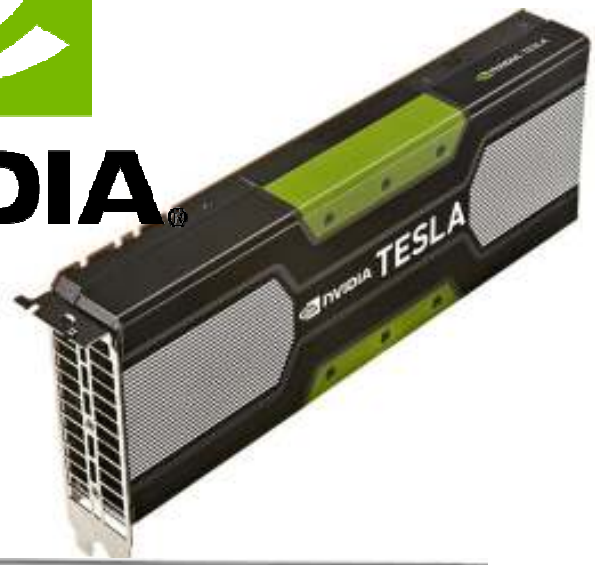
Linux

NVIDIA acceleration + IBM Power Systems

8x faster than x86 Ivy Bridge on pattern extraction

10x faster text search than CPU only

NVIDIA



IBM

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Power Systems

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Core Performance Comparison – POWER8 vs. x86

- IBM POWER8 core performance is up to 6.7x the x86 Xeon E5-2697 v2 core performance (typical customer utilization)
- Higher CPU utilization yields higher performance (IBM 65% Guarantee for sustained utilization running all workloads including Oracle)

	x86 "Ivy Bridge"	IBM Power S824	POWER8 vs. Exadata Core Performance Ratio	
	Intel Xeon E5-2697 v2	Power 8 @ 3.5 GHz	P8 Util: 100% Exa Util: 100%	P8 Util: 65% Exa Util: 20%
# Cores	24	24	Benchmark Utilization	Utilization with non virtualized Exadata
ERP SAP 2-Tier	10253	21212	2.1	6.7
SPECjbb2013 (max-jOPS)	63079	361293	5.7	18.6
SPECint_rate	1020	1750	1.7	5.6
SPECfp_rate	734	1370	1.9	6.0
SPECjEnterprise2010	11260	22543	2.0	6.5

- All Ivy Bridge performance numbers are published; IBM S824 performance numbers are published

1) IBM Power System S824 on the two-tier SAP SD standard application benchmark running SAP enhancement package 5 for the SAP ERP 6.0 application; 4 processors / 24 cores / 96 threads, POWER8; 3.52GHz, 512 GB memory, 21,212 SD benchmark users, running AIX® 7.1 and DB2® 10.5, Certification # 2014016. Source: http://www.sap.com/benchmark All results valid as of October 3, 2014
2) Dell PowerEdge R730, on the two-tier SAP SD standard application benchmark running SAP enhancement package 5 for the SAP ERP 6.0 application; 2 processors/36 cores/72 threads, Intel Xeon Processor 2699v3; 2.30 GHz, 256 GB memory; 16,500 SD benchmark users, running RHEL 7 and SAP ASE 16; Certification # 2014033. Source: http://www.sap.com/benchmark.
3) SPECcpu2006 results are submitted as of 9/8/2014. For more information go to http://www.specbench.org/cpu2006/results/
4) SPECjbb2013 results are submitted as of 10/15//2014. For more information go to http://www.specbench.org/jbb2013/results
5) SPECjEnterprise2010 results are valid as of 9/8/2014. For more information go to http://www.specbench.org/jEnterprise2010/results/
6) Oracle eBS 12.1.3 Payroll Batch Extra Large Kit and are current as of 3/24/2014. For more information go to http://www.oracle.com/us/solutions/benchmark/apps-benchmark/results-166922.html
7) Siebel 8.1.1.4 PSPP Kit and are current as of 3/24/2014. For more information go to http://www.oracle.com/us/solutions/benchmark/white-papers/siebel-167484.html

LEGEND: Published | Projected

Power Systems

IBM

PowerLinux 7R2 pricing is anchored directly to comparable Sandy Bridge systems with VMware running Linux

	DELL intel	hp intel	IBM Power
Server list price* -3-year warranty, on-site	**$10,483**	**$11,946**	**$11,628**
Virtualization - OTC + 3yr. 9x5 SWMA	**$9,374** VMware vSphere Enterprise 5.1	**$9,374** VMware vSphere Enterprise 5.1	**$7,840** PowerVM for IBM PowerLinux
Linux OS list price - RHEL, 2 sockets, unlimited guests, 9x5, 3 yr. sub./ supp.	**$5,697** Red Hat subscription and Red Hat support	**$5,697** Red Hat subscription and Red Hat support	**$4,489** Red Hat subscription and IBM support
Total list price: Server/Virtualization/Linux	**$25,554**	**$26,568**	**$23,957**

** Based on US pricing for PowerLinux 7R2 announced on 2/05/2013 matching configuration table below. Source: dell.com, hp.com, vmware.com: 1/15/13*

Compare prices online

Server model	Dell R720	HP Proliant DL380p G8	IBM PowerLinux 7R2
Processor / cores	**Two 2.9 GHz , E5-2690, Sandy Bridge, 8-core processors**		**Two 4.2 GHz POWER7+, 8-core**
Configuration	32 GB memory, 2 x 147GB HDD, 10 Gb two port		Same memory, HDD, NIC

Thank you for your patience

- Altuğ Bocutoğlu
- Email: Altugb@tr.ibm.com
- Phone: +905303171931

Questions?

Core Performance Comparison – POWER8 vs T5

IBM POWER8 core performance is over 9x the T5 core performance (Typical customer utilization)

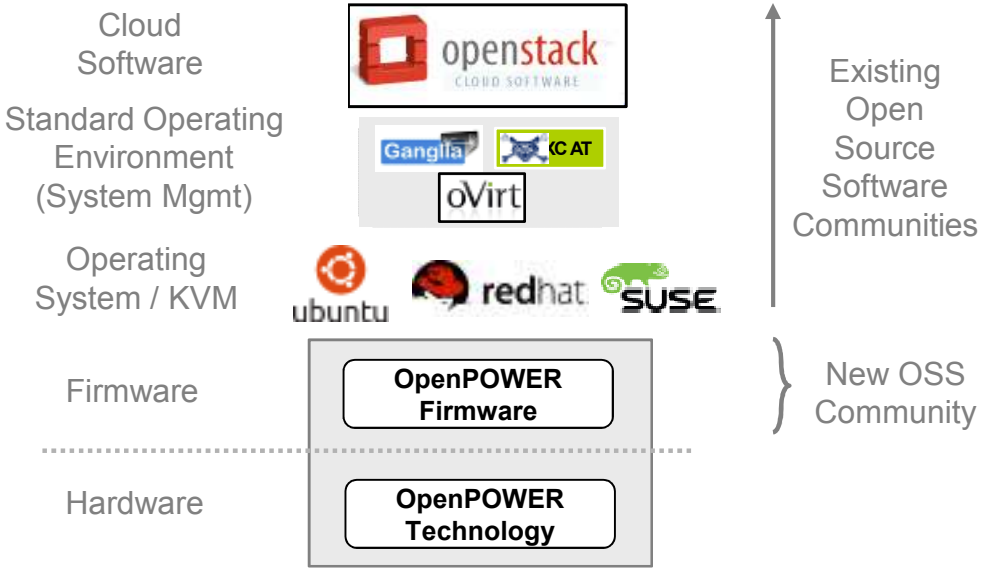
- Industry Standard Benchmarks –
- All Oracle performance numbers are IBM internal projections/measurements or publishes
- IBM S824 data is published unless otherwise noted

	Oracle T5-8	IBM Power S824	POWER8 vs. T5 Core Performance Ratio		
	T5 @ 3.6 GHz	Power 8 @ 3.5 GHz	P8 Util: 100% T Util: 100%	P8 Util: 65% T Util: 40%	P8 Util: 65% T Util: 20%
# Cores	128	24	Benchmark Utilization	Utilization with virtualized T	Utilization with non-virtualized T
OLTP	8552	NP	2.2	3.6	7.3
ERP SAP 2-Tier	40000	21212	2.8	4.6	9.2
SPECint_rate	3750	1750	2.5	4.0	8.1
SPECfp_rate	3020	1370	2.4	3.9	7.9
SPECjEnterprise2010	57422	22543	2.1	3.4	6.8

LEGEND:

Published	Projected

Solution stacks continuing to grow



ISV community of 1200+

All major Linux distros

Open sourced Power8 firmware stack

Resources for porting and optimizing: OpenPOWERFoundation.org

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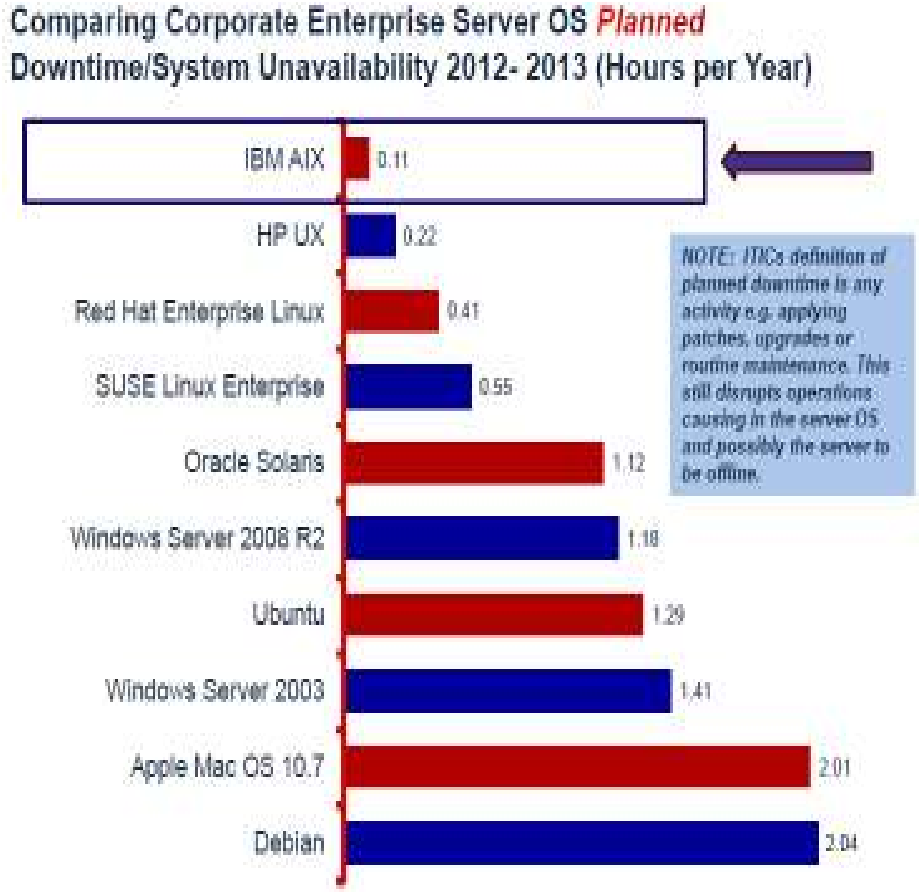
Power RAS is **built into** the platform so clients do not have to dedicate scarce resources to prepare for downtime

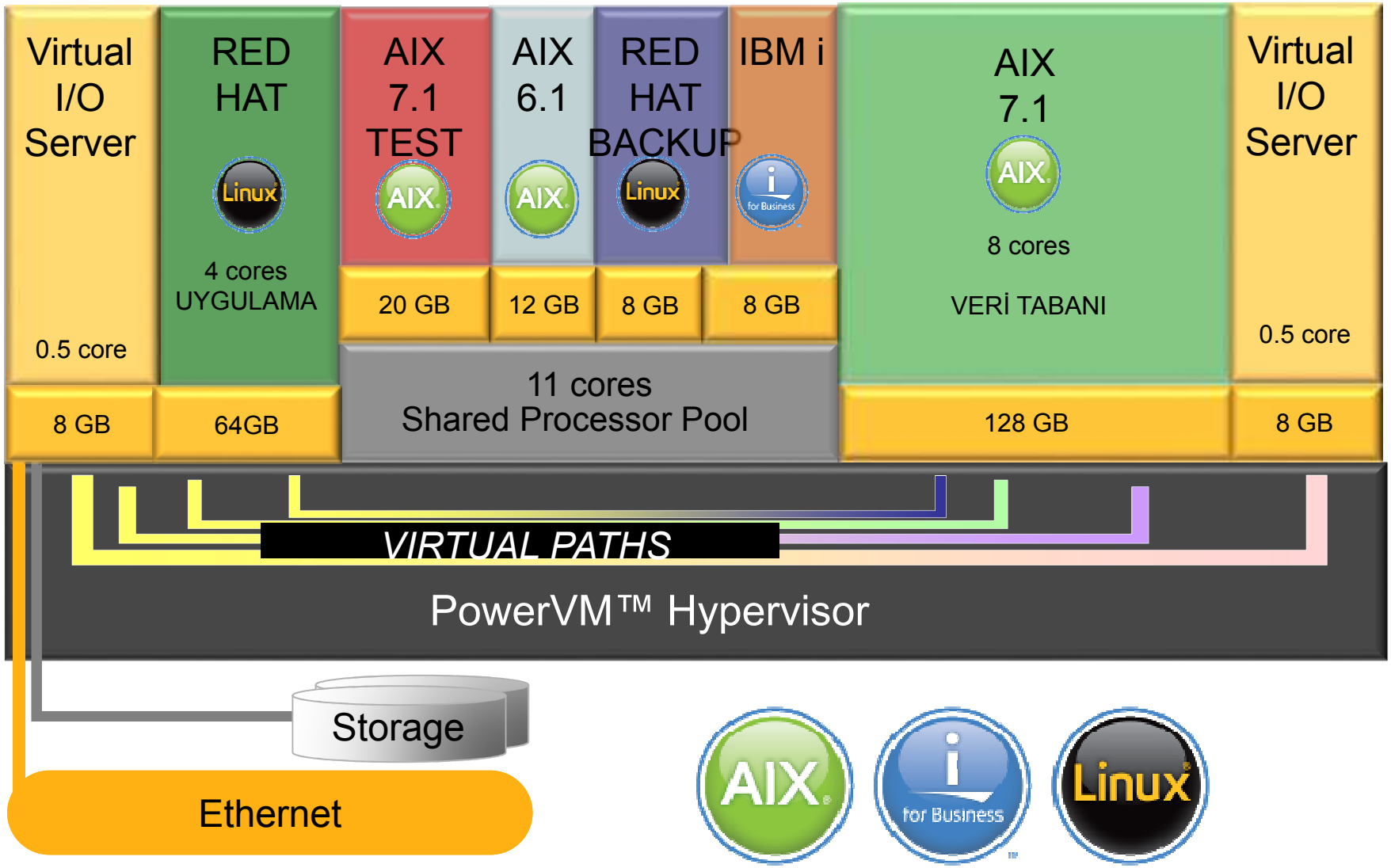
Power exhibits only 6.6 minutes of planned downtime per year

- With built-in RAS, the platform comes close to maintaining itself
- 67% of corporations now require a minimum of 99.99% uptime or better for mission critical hardware, operating systems and main line of business (LOB) applications
- AIX on Power consistently has the least amount of downtime in ITIC studies for several years
- Industry leading availability for all workloads, including SAP



Source: ITIC 2013 Global Server Hardware, Server OS Reliability Survey, ITIC, (All rights reserved); January 2013.

IBM Power VM


Virtual I/O Server
0.5 core
8 GB
RED HAT
4 cores
UYGULAMA
64GB
AIX 7.1 TEST
20 GB
AIX 6.1
12 GB
RED HAT BACKUP
8 GB
IBM i
8 GB
11 cores
Shared Processor Pool
AIX 7.1
8 cores
VERİ TABANI
128 GB
Virtual I/O Server
0.5 core
8 GB
VIRTUAL PATHS
PowerVM™ Hypervisor
Storage
Ethernet
AIX
for Business
Linux

Over 1,200 Linux ISVs developing on Power

- Support for **little endian** applications
- PoCs available through the Power Development Platform
- 50 IBM Innovation Centers and Client Centers World Wide

ubuntu

suse

redhat

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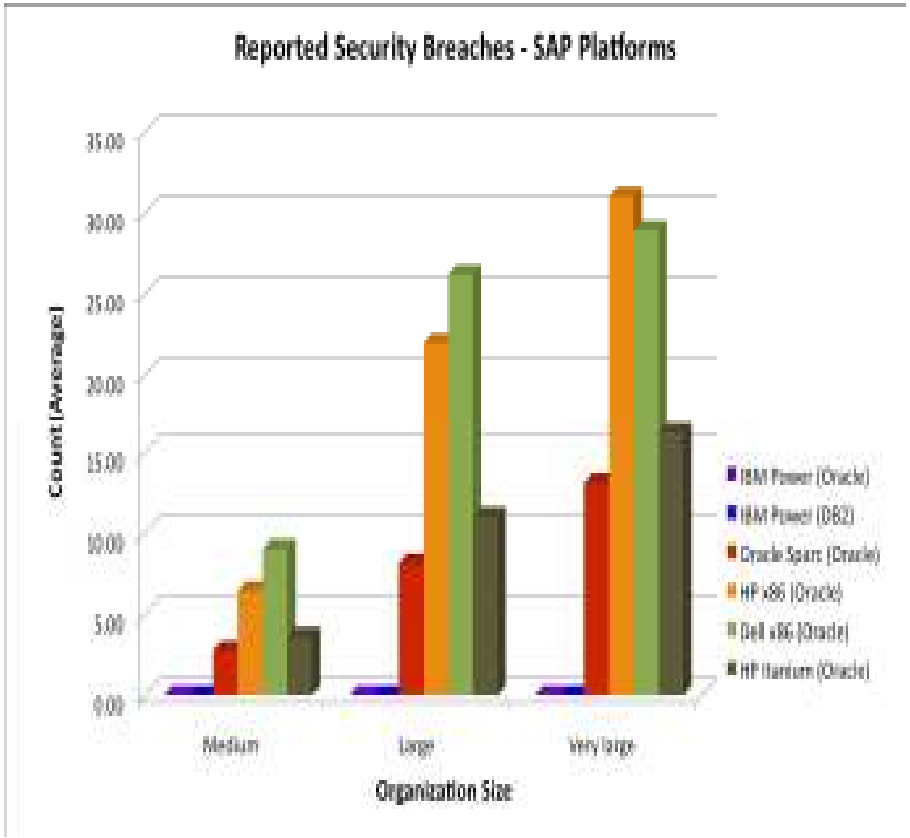
Security of critical workload (SAP) deployments on Power is beyond reproach

0

reported security breeches with SAP and IBM DB2 or Oracle on Power

- SAP on Power versus competitive SAP deployments study with over 54,150 clients analyzed
- The security for ERP systems, including SAP, can be very challenging – by nature, the mixture of application modules, user profiles, plug-in components and so on, provide many avenues for security breaches



Source: Business Impacts on SAP Deployments; Solitaire Interglobal Ltd (All rights reserved); January 2013.

Server virtualization security is critical for DB workloads since many are run in virtual environments

0

reported security breeches on the PowerVM hypervisor

- The PowerVM hypervisor has never had a reported security vulnerability and provides the bullet-proof security that customers demand for mission-critical workloads
- The VIOS, which is part of the overall virtualization has had 0 reported security vulnerabilities
- **Dare to compare – search any security tracking DB and compare Power against x86**

Search term or Hypervisor (unfiltered)	NIST NVD Results	Processor Architecture
VMware	640	x86
Xen	153	x86
VMware ESX	95	x86
KVM	58	x86
VMware vSphere	48	x86
Windows Server 2012	43	x86
Oracle VM	24	x86
Hyper-V	3	x86
PowerVM	0	POWER

Source: National Vulnerability Database, http://nvd.nist.gov/home.cfm, July 2013.

NVD is the U.S. government repository of standards based vulnerability management data. This data enables automation of vulnerability management, security measurement, and compliance. NVD includes databases of security checklists, security related software flaws, misconfigurations, product names, and impact metrics. NVD is a product of the NIST Computer Security Division, Information Technology Laboratory and is sponsored by the Department of Homeland Security's National Cyber Security Division.

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Performans bazında fiyat, gerçek IT ekonomisidir

Güvenilir sistem kullanım yüzdesi: %65 (min)

Sanallaştırma Oranı: 1/20

24 çekirdekli bir Power8:

Sanallaştırılmış 78 çekirdekli bir X86 ile aynı iş yükünü eritir.

Sanallaştırılmamış 100+ çekirdekli bir X86 ortamı ile aynı iş yükünü eritir.

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System Performance = Processing Power + IO speed

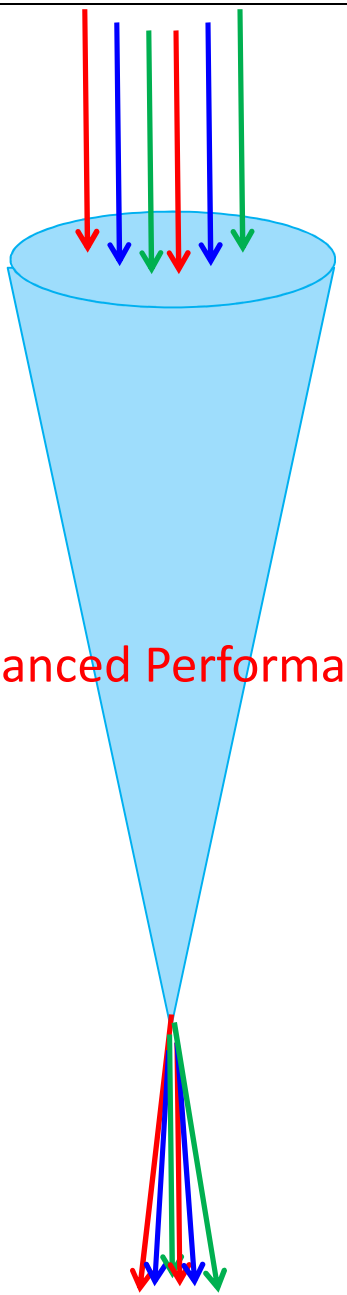
Server Side

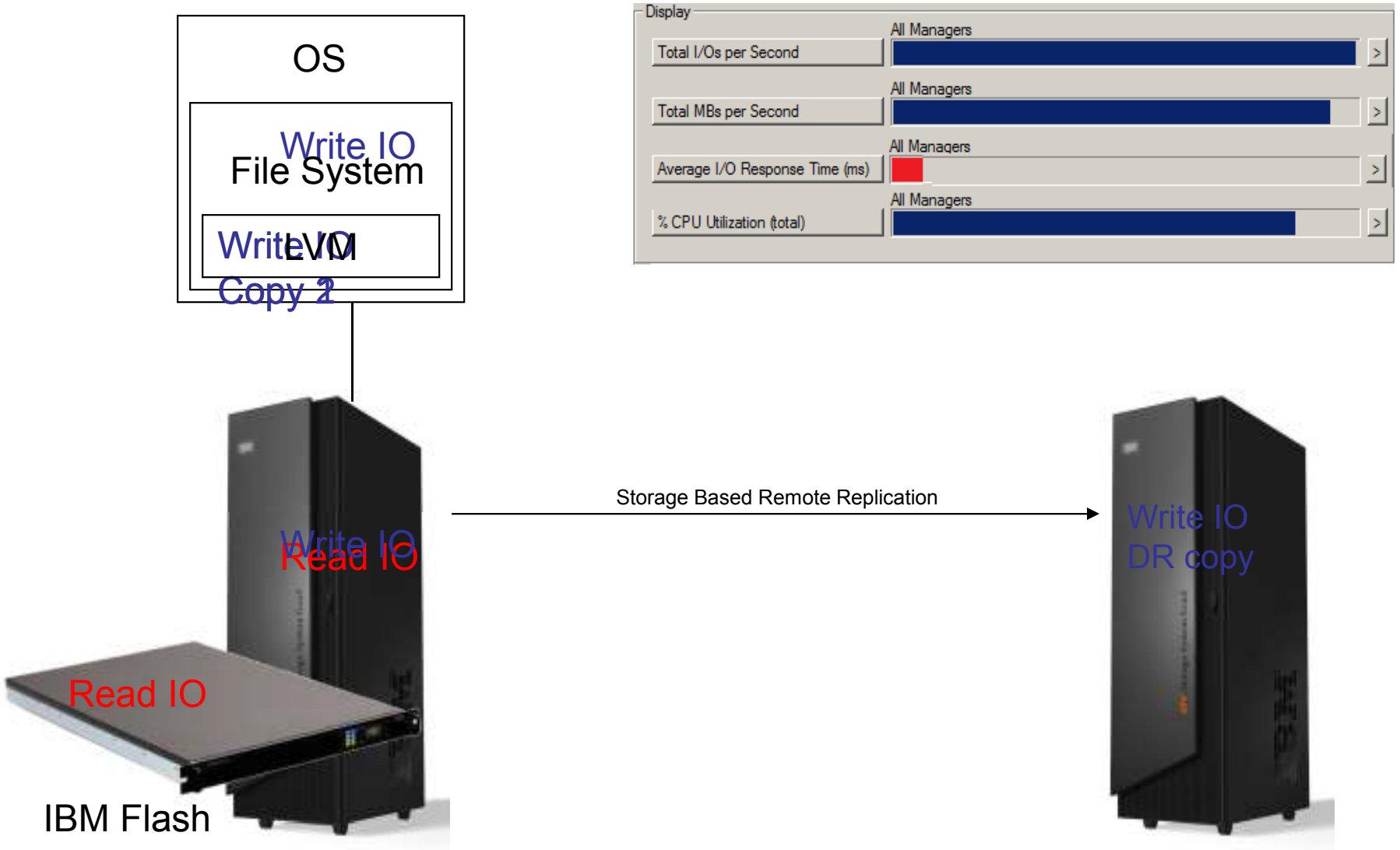
Processing Power (TPC)

Storage Side

Aplication IOs (SPC)

Balanced Performance



Un Balanced Performance

Preferred Read Mirroring – Remote Replication