

# Capitalize On The Power Of An IBM Solution

Power Systems Lead The Way

We need to find smarter ways to become more efficient. We have no room to grow and we need a platform with more processing power!



**Service Oriented Finance  
CIO**

## Power Systems Has A Complete Line Of Servers For Your Business\*



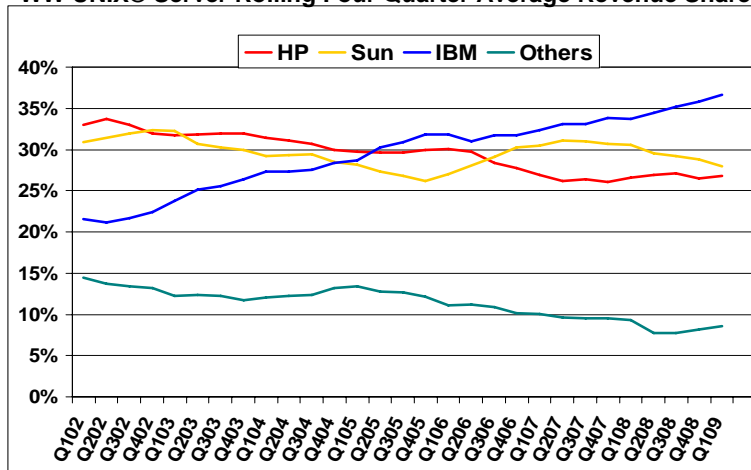
\* All the servers shown here are POWER6 based. This illustration does not include all available Power Systems models.

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## Power Systems UNIX Servers Out-Pace The Competition

WW UNIX® Server Rolling Four Quarter Average Revenue Share



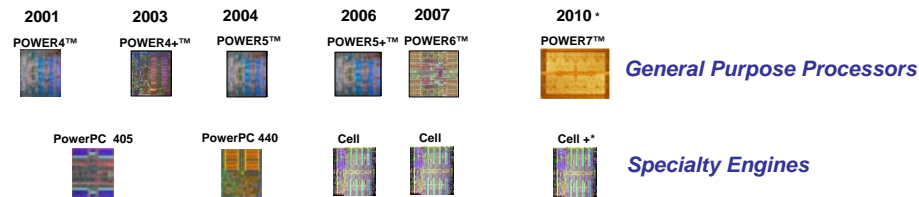
Source: 1Q2009 Worldwide Quarterly Server Tracker, IDC, May 2009.

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## The IBM POWER Processor Is The Nucleus Of Power Systems Servers

- POWER architecture was introduced in 1990
  - ▶ POWER2 was introduced in 1993
  - ▶ POWER3 was introduced in 1998
- POWER4 introduced Multi-core chips
- POWER5 added Simultaneous Multi-threading
- POWER6 exceeds 5GHz clock rate and energy efficiency
  - ▶ Breaks all speed records



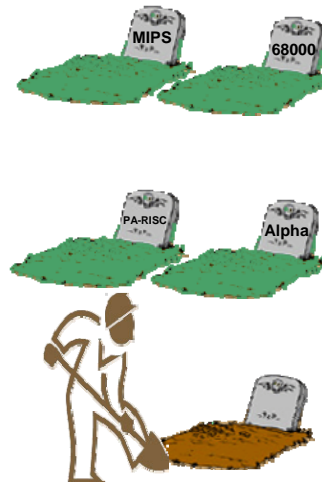
\*All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

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## HP Is Where Processors Go To Die ...

- Motorola 68000
  - ▶ Used in 1990's in Apollo servers
  - ▶ Shut down and migrated to PA-RISC in 1997
- MIPS
  - ▶ Used in HP NonStop server line
  - ▶ Migration to Alpha began in 1997
  - ▶ Shut down and migrated to Itanium in 2002
- Alpha
  - ▶ Used in HP AlphaServer line, some NonStop servers
  - ▶ End-of-sale April 27, 2007
  - ▶ Migrate to Itanium
- PA-RISC
  - ▶ Used in HP 9000 server line
  - ▶ End-of-sale Dec 31, 2008
  - ▶ Migrate to Itanium
- Itanium ?
  - ▶ Will HP and Intel invest in Itanium after Tukwila?
  - ▶ Will Intel drop Itanium to focus on x86-64?

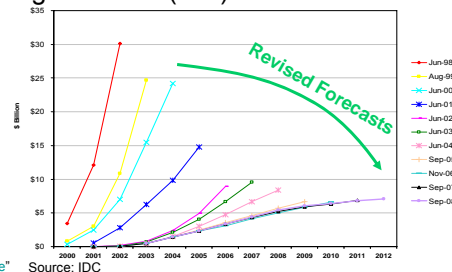


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## HP Does Not Own Its Own Processor Technology: Itanium Is The Wrong Approach

- HP claims that Itanium is an industry standard, But in fact:
  - ▶ HP themselves drive more than 95% percent of Itanium server shipments<sup>2</sup>
  - ▶ Itanium accounts for only 0.6 percent of all server unit shipments, according to [IDC](#)<sup>1</sup>
- Intel's Itanium delivery record on new technology is not dependable
  - ▶ Multiple delays (e.g. Montvale was 1 year later than promised)
  - ▶ Tukwila delays (e.g. Now 1Q/2010, originally promised in 2007)
  - ▶ Missed performance targets (e.g. Montvale was 40% slower than promised)
  - ▶ Cancelled function (e.g. Foxtan energy management)
- Intel appears more focused on delivering Nehalem (x86)
  - ▶ What will Intel's future investment priorities be?
- The following Microsoft software is not supported
  - ▶ BizTalk, Sharepoint, Exchange, Office, Dynamics, Hyper-V and others do not support Itanium



Source: 1. "Customer Perceptions of the Future of Itanium".  
 2. NY Times - "Ten Years After First Delay, Intel's Itanium Is Still Late"

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## IBM Performance Per Core Is Three Times Better Than The Competition

IBM Software on Power

DB2 9.5 EE  
AIX 5.3

Oracle on HP Integrity

Oracle 10gR2  
HP-UX 11iv3

Microsoft on Intel

SQL Server 2005  
x64 EE  
Windows Server 2003  
x64 EE

IBM Power 570

HP Integrity  
Superdome  
(Intel Itanium)

Intel x86

101,011 tpmC  
per core

31,975 tpmC  
per core

34,394 tpmC  
per core\*

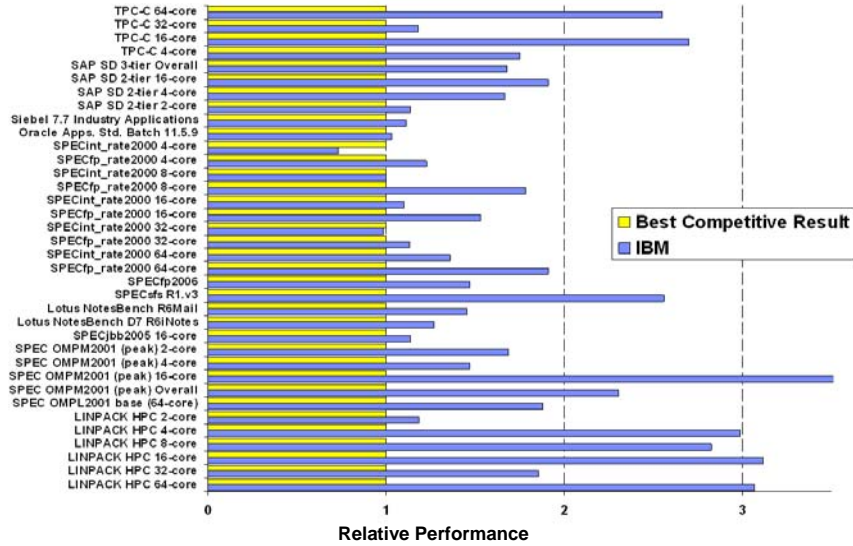
Source: <http://www.tpc.org>

\* HP Proliant ML370G5

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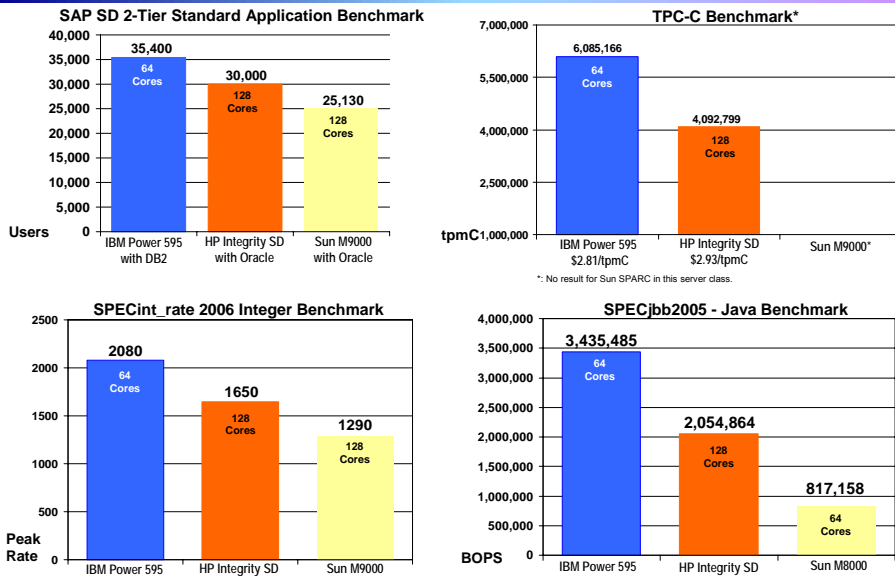
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# Power Servers Performance Slams The Competition



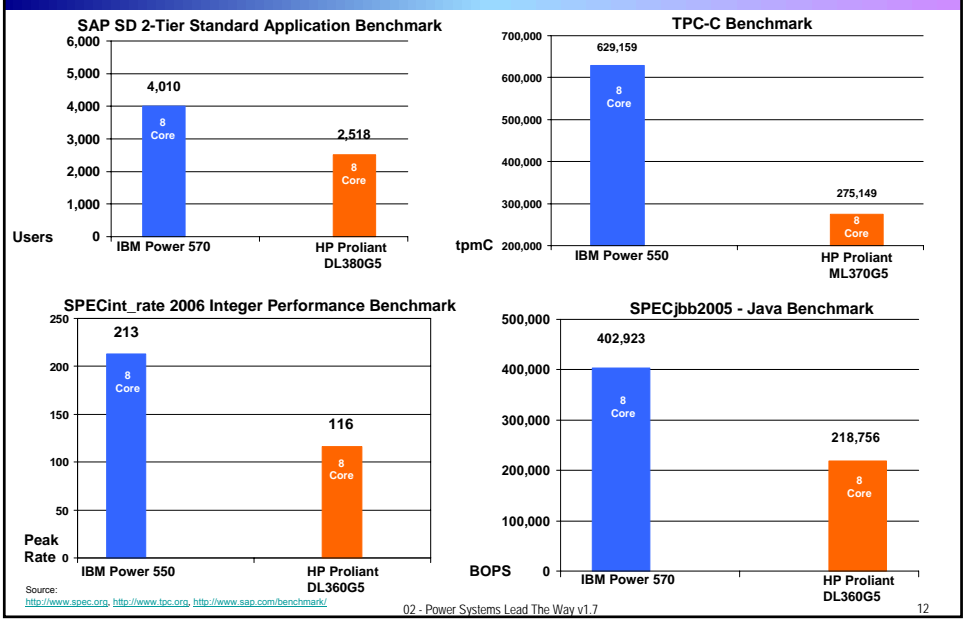
Source: <http://www.spec.org>, <http://www.tpc.org>, <http://www.sap.com/benchmark/>, <http://performance.netlib.org/performance/html/PDSreports.html> All results are as of June 1, 2009.  
 For a complete list of all #1 POWER results, go to <http://www.ibm.com/systems/power/hardware/benchmarks>  
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# HP Servers With Itanium And Sun Servers With SPARC Do Not Match The Performance Of POWER6 Systems



Source: <http://www.spec.org>, <http://www.tpc.org>, <http://www.sap.com/benchmark/>  
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# POWER6 Systems Out-Perform HP Intel x86 - Based Servers



# Power Systems Virtualization

The Virtual I/O server (VIOS) provides shared access to all disk data and external networks.

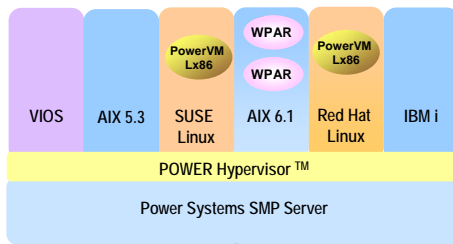
The Integrated Virtual Ethernet enables high speed memory to memory networking between partitions.

Logical Partitions (LPARs) are virtual servers that provide operating system and application isolation.

AIX 6 allocates resources to Workload Partitions (WPARs).

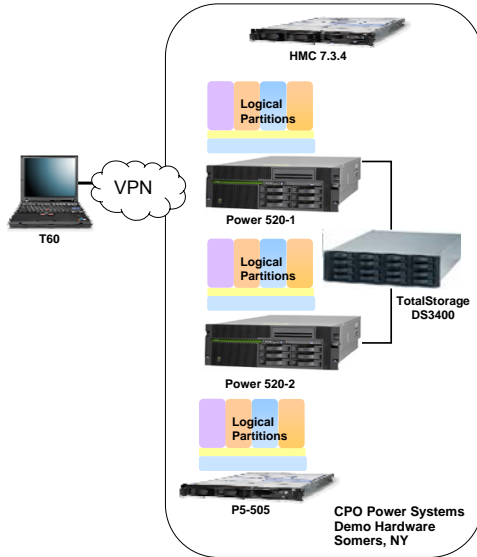
Run 32-bit Linux x86 applications with no changes using PowerVM Lx86.

Share access to all disk data and to external networks.



The Power Hypervisor shares processing resources among LPARs with up to 128 dispatchable threads on 64 processors.

## DEMO: Manage Power Systems With IBM Systems Director



- Tour demo platform
- Create LPAR
  - ▶ Configure processor and memory entitlements
  - ▶ Define virtual devices

Virtual Servers and Hosts (View Members)

Select	Name	Proble	CPU Utilizati
<input type="checkbox"/>	Power-520-1	OK	5%
<input type="checkbox"/>	Accounting	OK	10%
<input type="checkbox"/>	Application Server 1	OK	-
<input type="checkbox"/>	Application Server 2	Warning	1%
<input type="checkbox"/>	Director	Minor	7%
<input type="checkbox"/>	LDAP	OK	5%

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## Processors And I/O Devices Are Virtualized And Shared

- Physical processors are either
  - ▶ Dedicated to a specific LPAR, or
  - ▶ Assigned to a pool for sharing by LPAR's
- The Power Hypervisor distributes shared processor pool capacity to LPARs when and where it is needed
  - ▶ Ensures each LPAR receives its processor entitlement
  - ▶ Restricts physical processor utilization to the number of virtual processors assigned to the LPAR
- Dedicated processors can lend available processing units to the shared pool
- The Virtual I/O Server (VIOS) is a special purpose LPAR that virtualizes and shares I/O resources among the LPARs

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## Memory Is Shared Between LPARs

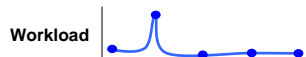
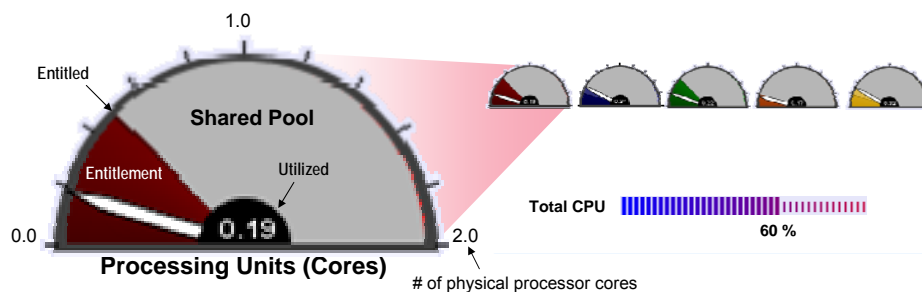
### Active Memory Sharing

- Enables dynamic sharing of physical memory
  - ▶ Pools of memory can be shared by LPARs
    - Similar to shared processor partitions
  - ▶ Provides the ability to over-commit physical memory
    - Overflow of memory request is paged to system disk
  - ▶ Includes “automated ballooning”
    - Expansion and contraction of an LPARs’ physical memory footprint based on workload demands

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## DEMO: PowerVM Allocates Processor Resources As Needed



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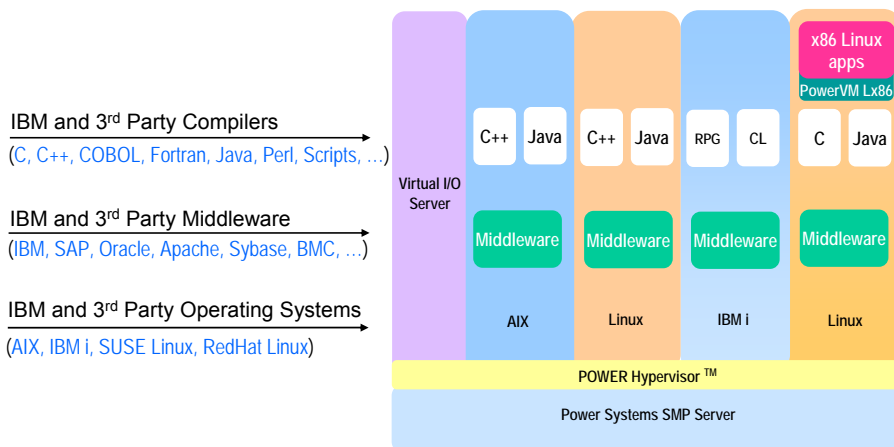
## Power Systems Deliver The Virtualized Platform To Enable A Dynamic Infrastructure

Capability	<b>IBM Software</b> <i>POWER SYSTEMS</i>	<b>ORACLE</b> <i>hp</i>	<b>Microsoft</b> <i>intel</i>
<b>Solution</b>	PowerVM	Integrity Virtual Machines	VMware vSphere 4.0
<b>Supported Server Configurations</b>	Supports Entire Power Systems Product Line	Limited to High-end and Mid-range Servers	Low-end, some Mid-range, Limited High-end
<b>Integrated Hardware Hypervisor</b>	Integrated for Better Efficiency, Security, RAS	Software-based on HP-UX UNIX, Third Party Processor	Hardware, Processor is Third Party
<b>Virtual Server Scalability to Service All Workloads</b>	0.1 up to 64 CPUs max and 2 TB RAM	0.05 up to 8 CPUs max and 64 GB RAM	Up to 8 CPUs max and 1 TB RAM
<b>Add/Remove System Resources Without Reboot</b>	Yes (CPU, RAM, I/O)	Limited Function	Limited Function
<b>Integrated Live Virtual Server Relocation</b>	Live Partition Mobility	Online VM Migration has Limited Function	VMotion
<b>Workload Partitions</b>	Advanced Function with Mobility	Secure Resource Partitions have Limited Function	Third Party
<b>Linux x86 Emulation</b>	PowerVM Lx86	Function not Available	Not Required

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## Power Systems Support An Ecosystem Based On Open Standards



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## Power Systems Servers Lead The Way With High Performance, Technology

Capability	<b>IBM Software</b> <i>POWER SYSTEMS</i>	<b>ORACLE</b> 	<b>Microsoft</b> 
Price/Performance	Industry Leading	Higher Price, Lower Performance	Higher TCO, Lower Performance
Clock Rate	Industry Leading	Industry Trailing	Lower
Benchmarks	Do More with Less Cores	Uses Twice as Many Cores	Inferior Performance
Long-term Viability	Primary Investment	Many Delays, Technology Lagging	Primary Investment
Unix Market Share	Leadership	From #1 to #3	N/A

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