

Smarter Data Management Demands Workload Optimized Systems with Unparallel Virtualization

- Save and Succeed with IBM POWER7 -



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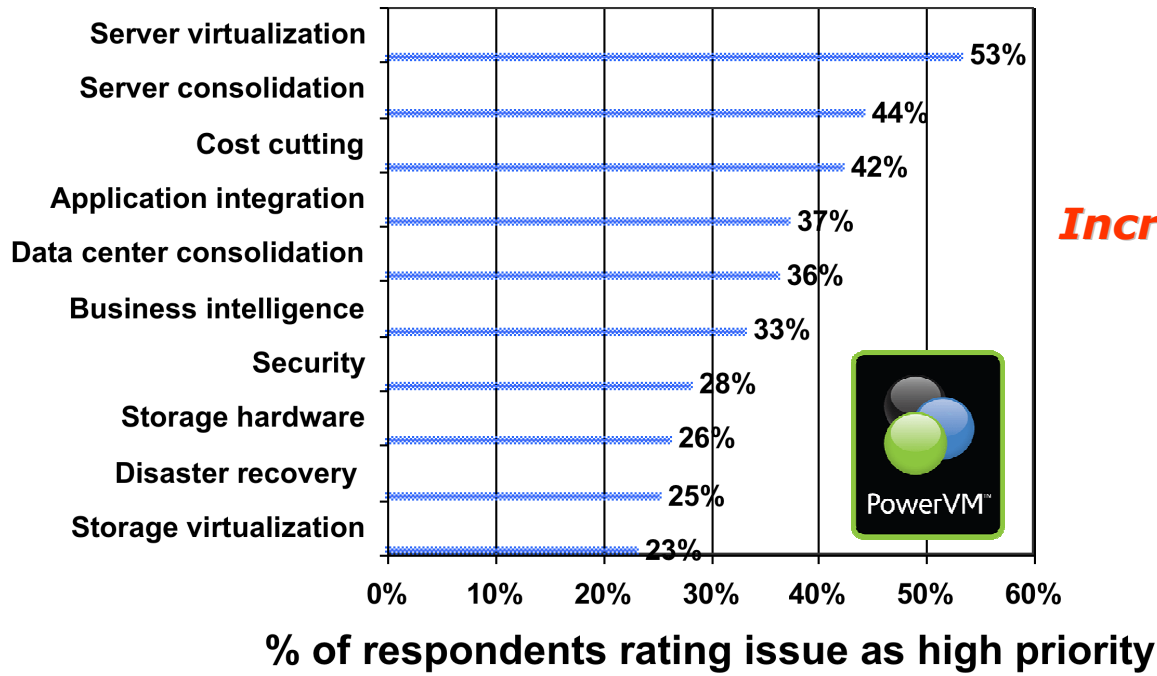
Agenda

- Understanding Dynamics of Virtualization.
- IBM's successful History of Virtualization.
- Customers benefiting from Power Virtualization
- PowerVM and VOIS
- Future enhancements for PowerVM
- Call to action



Client IT Challenges Need Leadership Virtualization Solutions

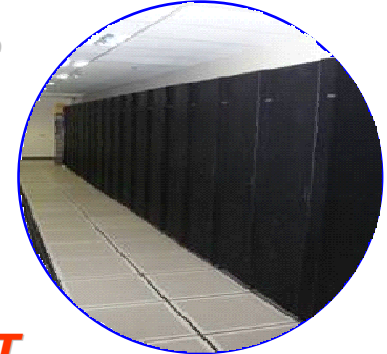
CIO key spending initiatives



Overburdened IT staff



Increased service levels



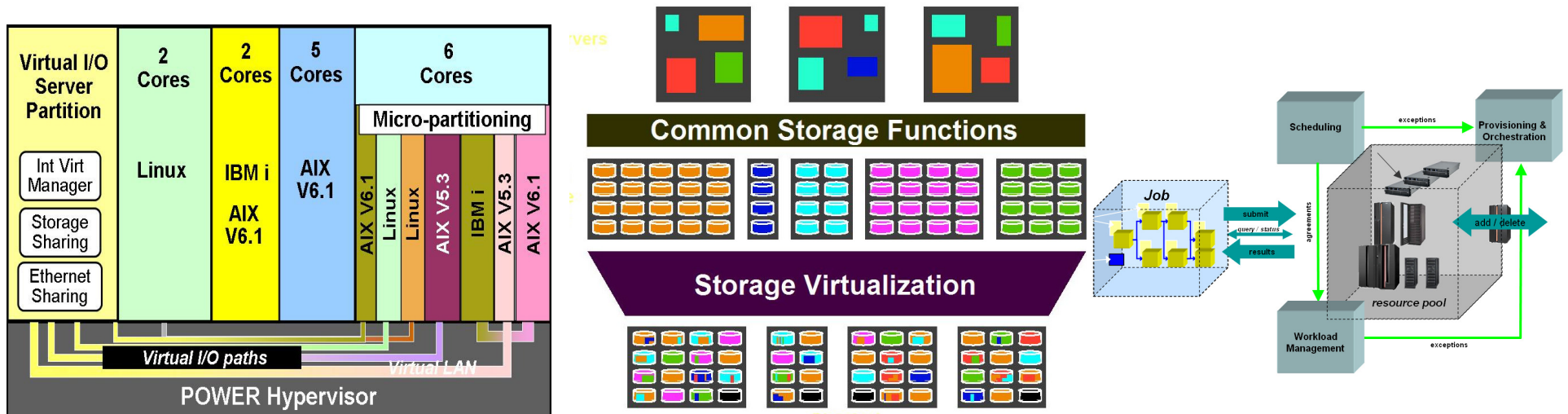
Strained IT budgets



Source: Goldman Sachs Group IT Spending Survey, July 2008

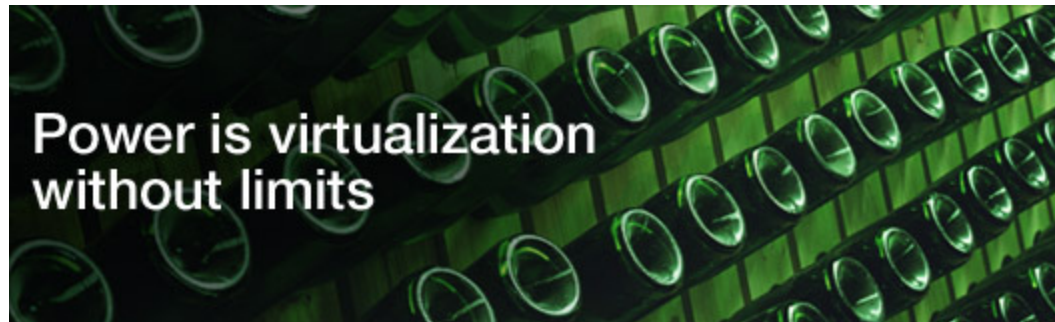
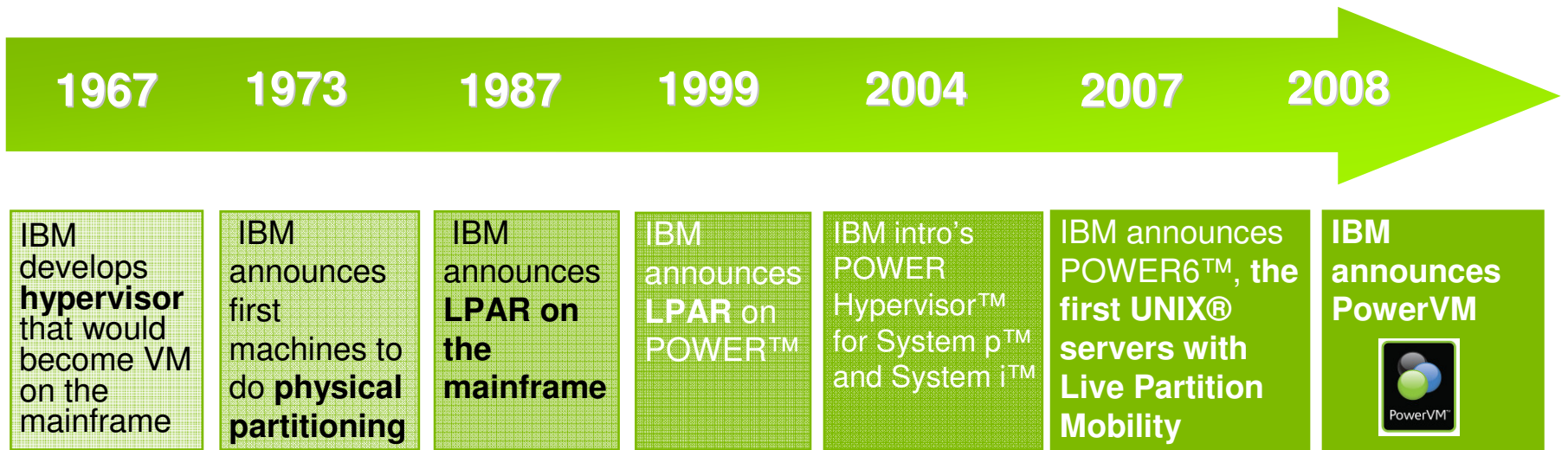
Virtualization enables benefits beyond consolidation

Virtualize at all layers of the architecture for maximum benefits



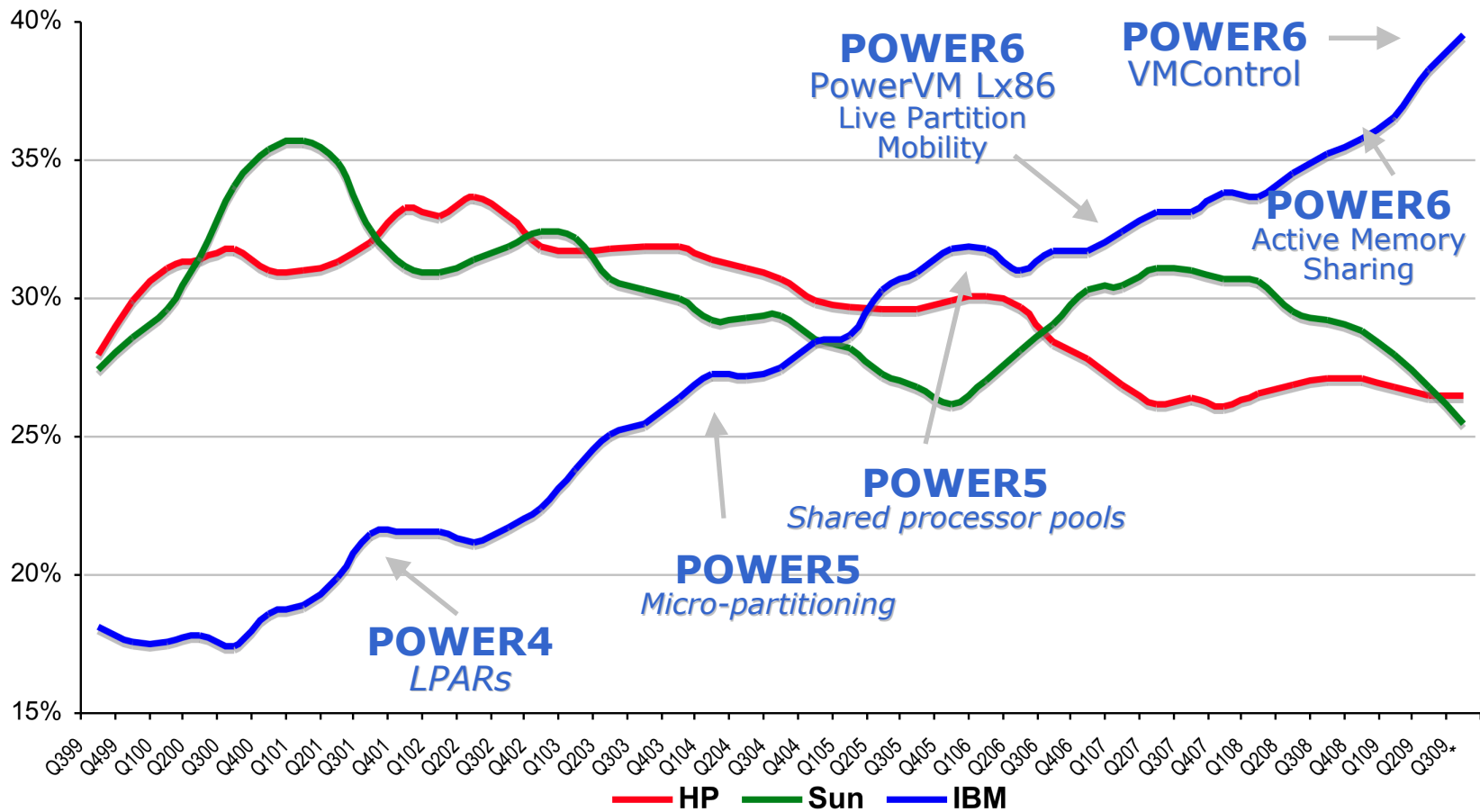
PowerVM Builds on IBM's History of Virtualization Leadership

A 40-year track record in virtualization innovation continues with PowerVM™



PowerVM Helps Drive Power Systems Market Momentum

UNIX Server Rolling Four Quarter Average Revenue Share



Source: IDC Quarterly Server Tracker Q309 release, December 2009

Leadership Power Systems Portfolio

Completing the broadest performance range of any platform on the market – POWER7

Entire POWER6 line continues to be available

Power 795
Power 595

Power 780

Power 770
Power 570

Power 750
Power 550

Power 720/740
Power 520

Power 560

Power 710/730

High Performance Computing

PS Blades
JS Blades

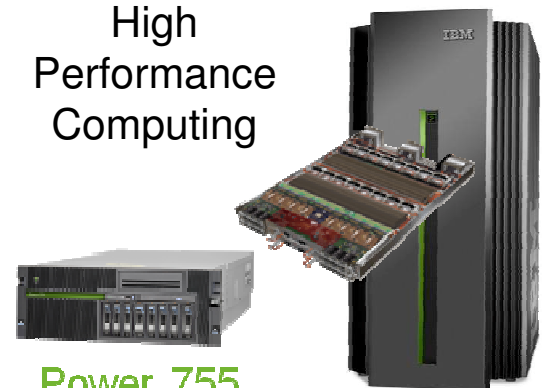
i Editions Express for BladeCenter S



Power Systems Software

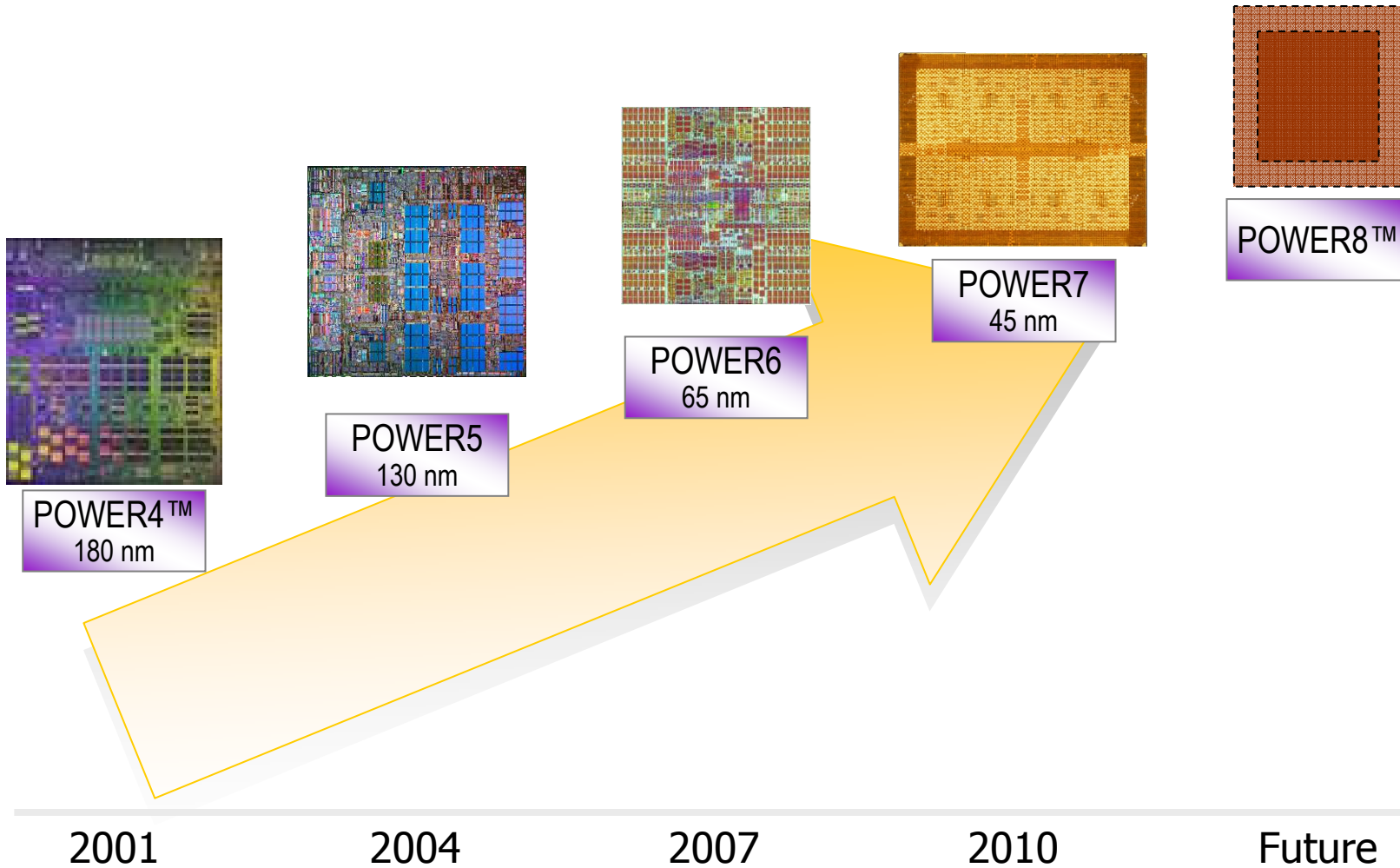
Power 755

Power 575



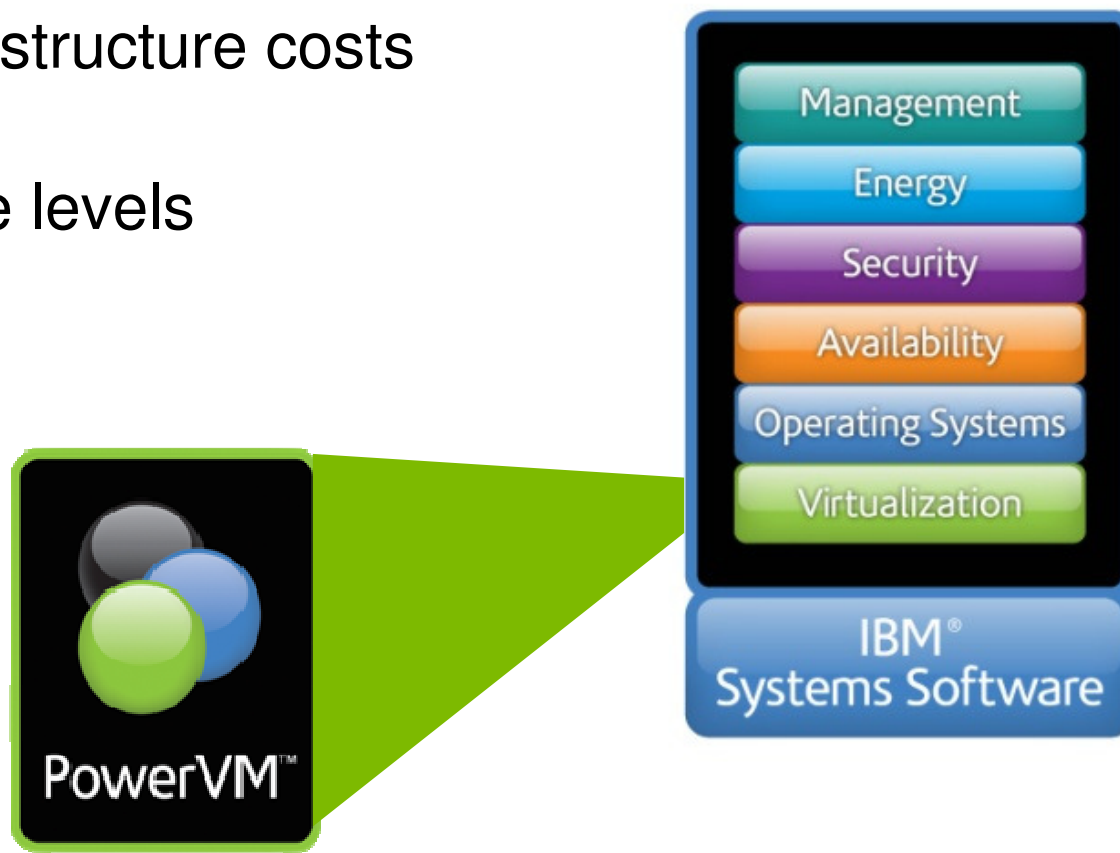
Processor Technology

IBM Investment in the Power Franchise

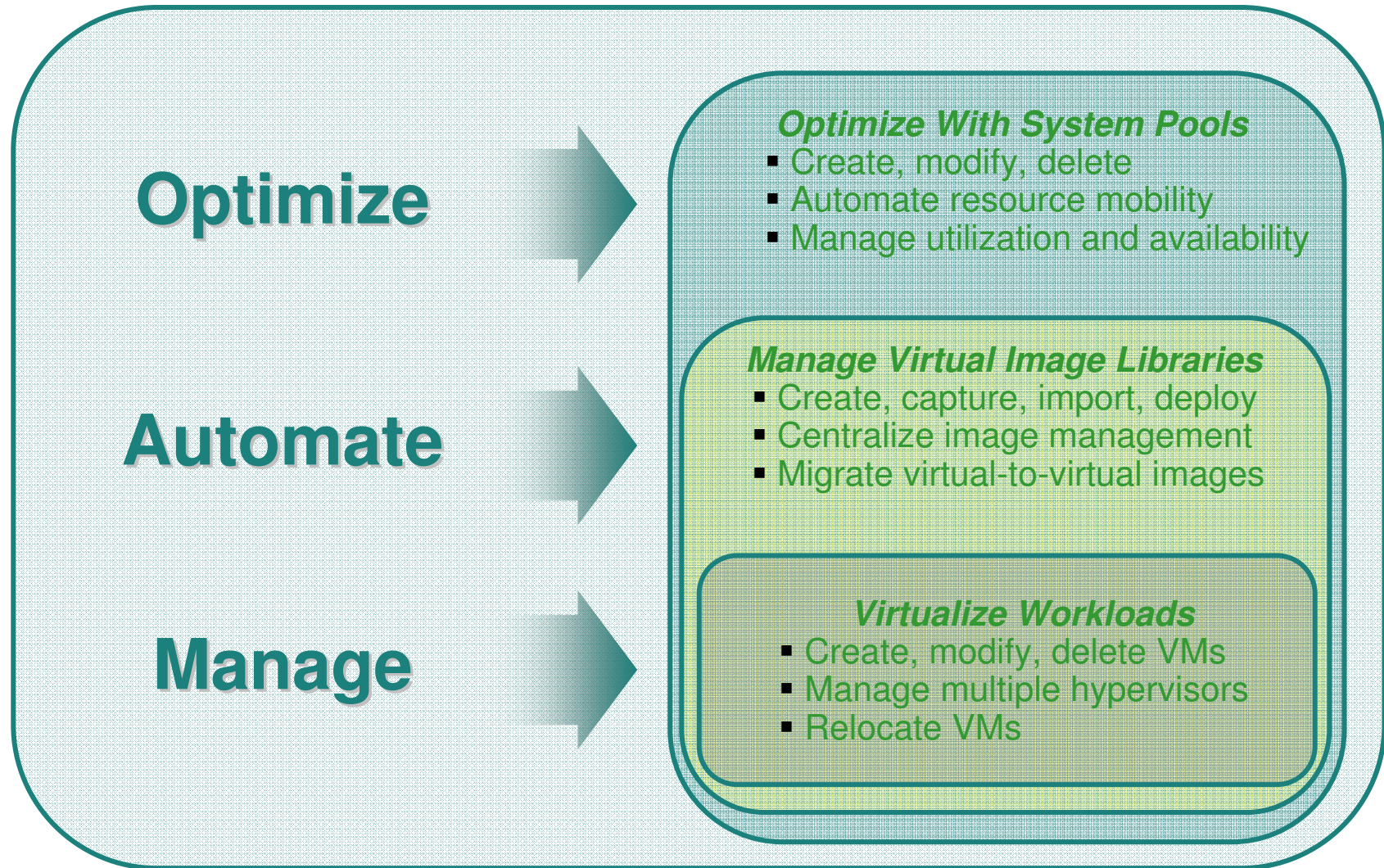


PowerVM: Virtualization Without Limits

- Reduces IT infrastructure costs
- Improves service levels
- Manages risk



How Client Virtualization Management Needs Evolve



What is PowerVM?

Hardware and software that delivers industry-leading virtualization on IBM POWER processor-based servers for UNIX, Linux and i customers



PowerVM Editions feature:

- Virtual I/O Server
- Integrated Virtualization Manager
- Micro-Partitioning technology and shared processor LPARs
- PowerVM Lx86
- Shared Dedicated Capacity
- Multiple Shared Processor Pools
- Live Partition Mobility
- Active Memory Sharing



PowerVM Editions: Built to Meet Client Virtualization Needs

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

<i>PowerVM Editions</i>	Express	Standard	Enterprise
Maximum LPARs	1+2 / Server	10 / Core	10 / Core
Management	VMControl IVM	VMControl IVM, HMC	VMControl IVM, HMC
Virtual I/O Server	✓	✓	✓
PowerVM Lx86	✓	✓	✓
Multiple Shared Processor Pools		✓	✓
Live Partition Mobility			✓
Active Memory Sharing			✓

PowerVM Editions offer a unified virtualization solution for any Power workloads



Power your planet.

Virtual I/O Server (VIOS) Basics

Power LPAR based I/O virtualization appliance

- Facilitates sharing physical I/O resources amongst LPARs
- Power5, Power6, Blade
- VIOS serves AIX, Linux, and i operating systems
- Multiple VIOS's per CEC, typically deployed in pairs
- Packaged with PowerVM editions (optional feature)

Virtual I/O

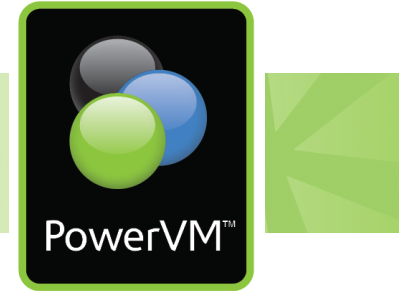
- Storage
 - vSCSI (Storage Virtualizer)
 - NPIV (Pass-through)
- Virtual Networking
 - Ethernet Bridging

Advanced Virtualization

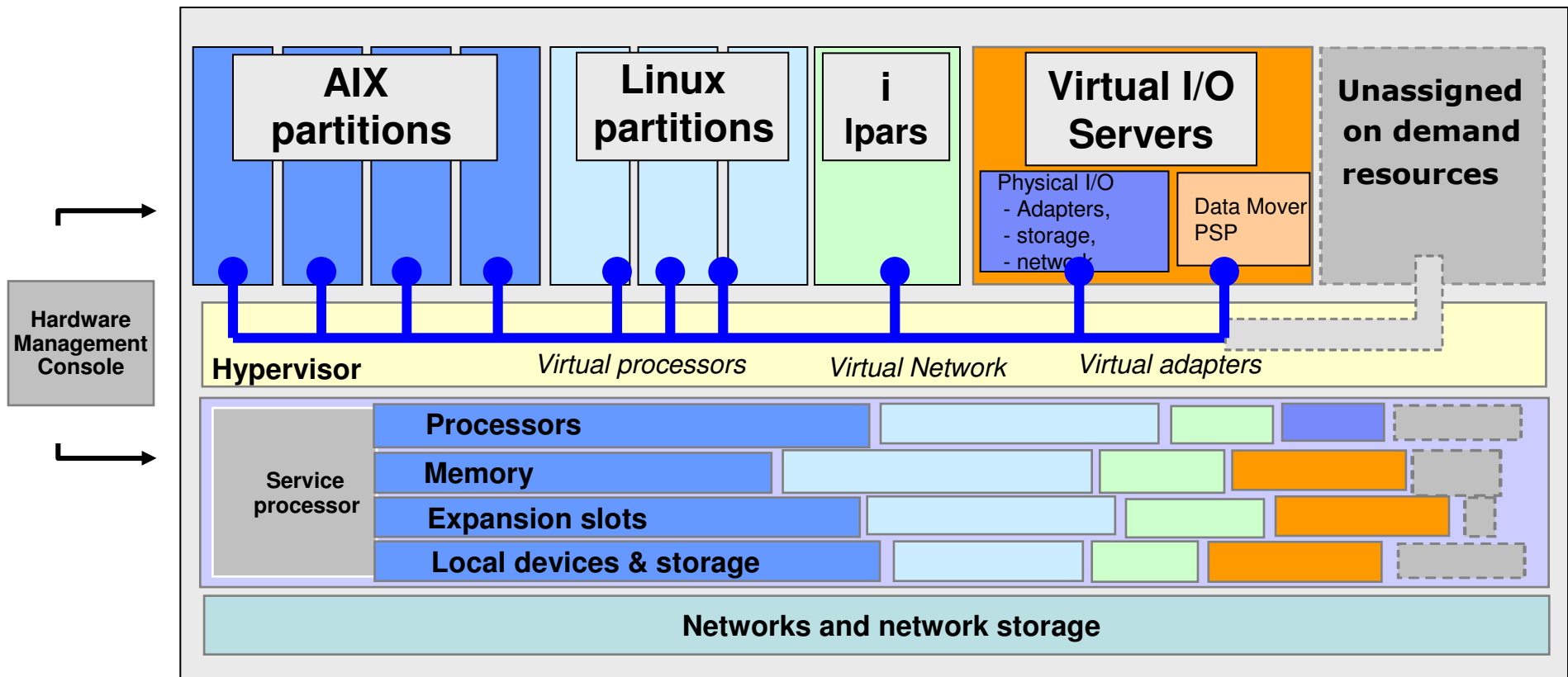
- LPAR Mobility
- AMS (Active Memory Sharing)



PowerVM Virtual I/O Server (VIOS)



Power Server



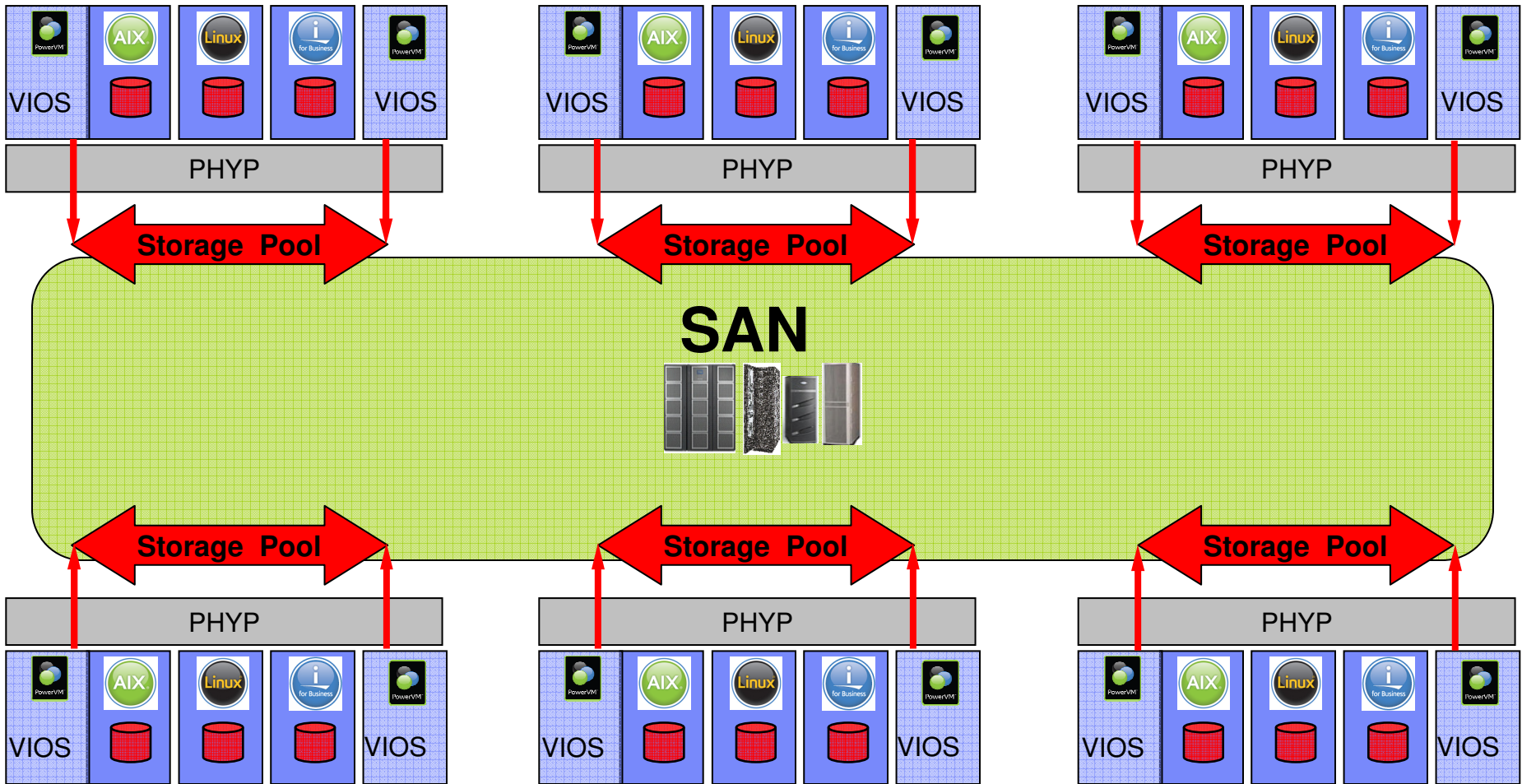
Virtual I/O Server

IBM Systems Director

Core Mgmt	Storage Mgmt
• Inventory	
• Config	
• Health	
• -----	

Centralized Platform Mgmt

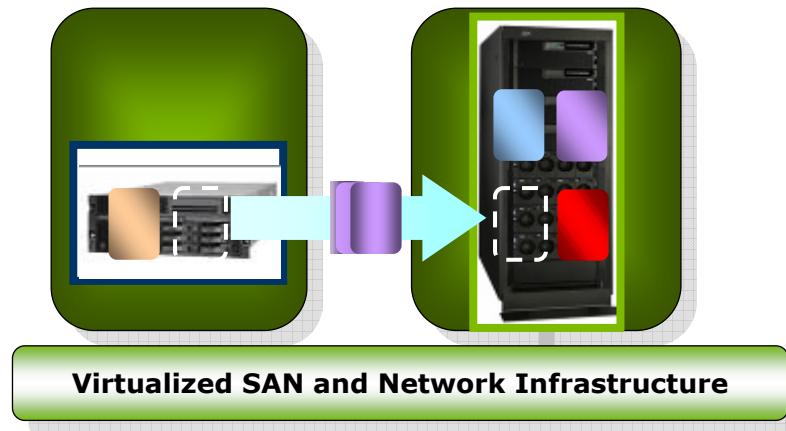
LPARs



PowerVM Live Partition Mobility Improves Service Levels



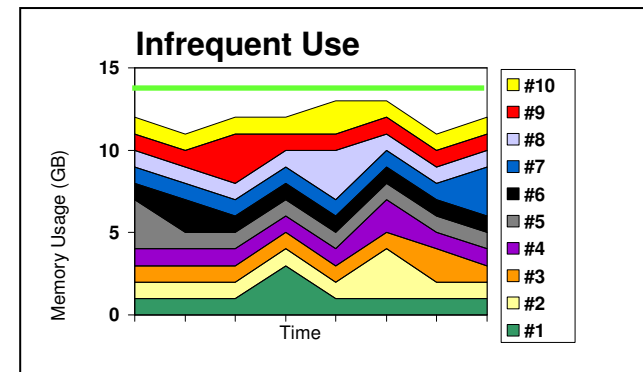
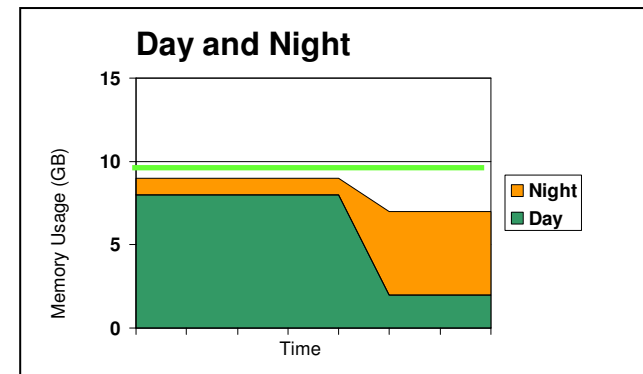
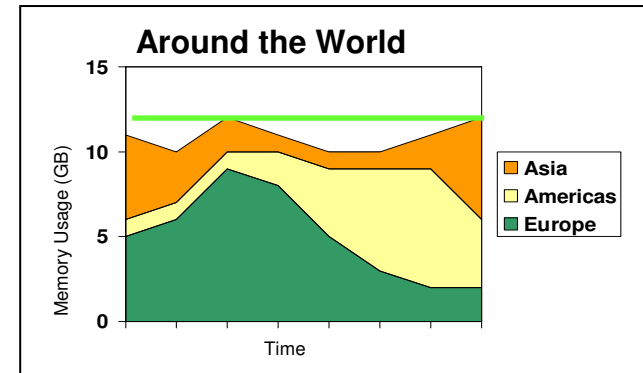
- ***Business and IT security and resiliency are as critical as ever, and must be dynamic and intelligent in order to match the speed of business change***
- PowerVM Live Partition Mobility
 - Move running AIX and Linux partitions between systems



- ✓ Eliminate planned outages and balance workloads across systems

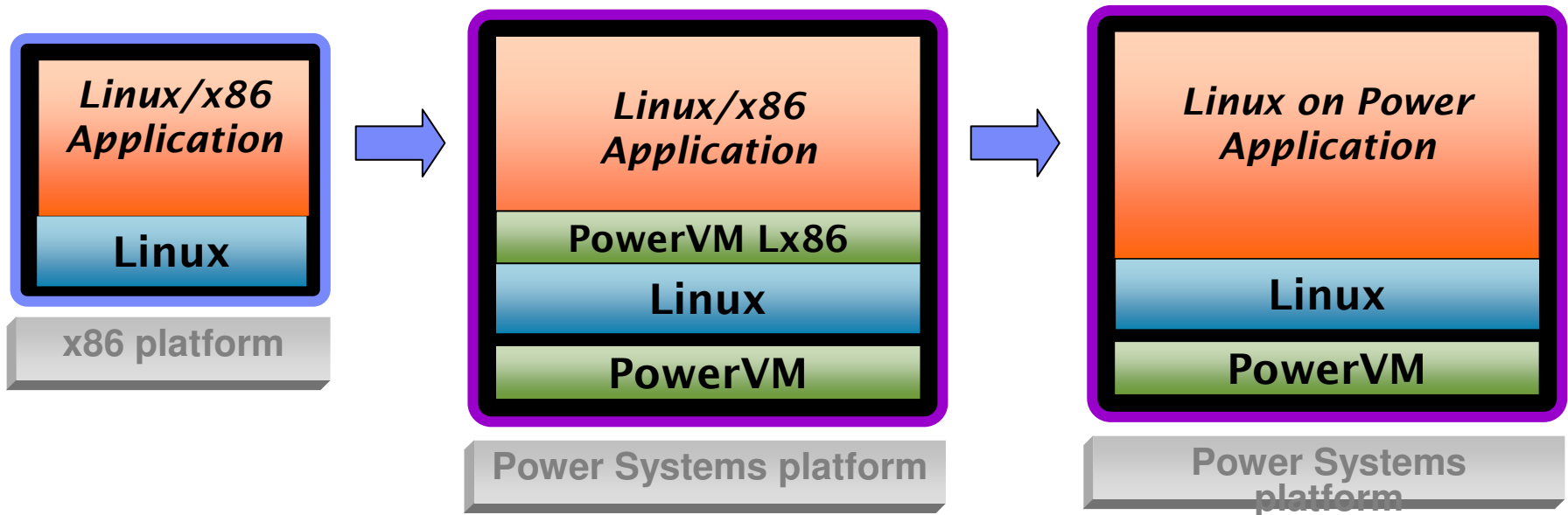
PowerVM Active Memory Sharing

- Memory virtualization enhancement for Power Systems
 - Partitions share a pool of memory
 - Memory dynamically allocated based on partition's workload demands
- Extends Power Systems Virtualization Leadership
 - Capabilities not provided by Sun and HP virtualization offerings
- Designed for partitions with variable memory requirements
 - Workloads that peak at different times across the partitions
 - Active/inactive environments
 - Low average memory requirements
- Available with PowerVM Enterprise Edition
 - Supports AIX 6.1, i 6.1, and SUSE Linux Enterprise Server 11
 - Partitions must use VIOS and shared processors
 - POWER6/POWER7 processor-based systems











PowerVM Lx86 Accelerates Linux Workload Migration

- PowerVM Lx86 cross-platform virtualization runs unmodified Linux/x86 applications within VMs using Linux on Power
 - Copy x86 application binaries and run them – no rewriting necessary
 - Run Linux/x86 workloads with AIX, IBM i and Linux on Power workloads
- Simplifies migration and virtualization of workloads from x86-based platforms to higher-performance Power Systems servers running Linux
- Provides a convenient ‘bridge’ to native compilation of Linux workloads
- Included with all PowerVM Editions



VMControl Editions: Added Value for PowerVM Clients

 VMControl	VMControl Express Edition	VMControl Standard Edition	VMControl Enterprise Edition
Virtualization Capabilities	Manage resources	Automate virtual images	Optimize system pools
PowerVM 	  	 	
Create/manage virtual machines (x86, PowerVM and z/VM)	✓	✓	✓
Virtual machine relocation	✓	✓	✓
Capture/import, create/remove standardized virtual images		✓	✓
Deploy standard virtual images		✓	✓
Maintain virtual images in a centralized library		✓	✓
Create/remove system pools and manage resources in system pools			✓
Add/remove physical servers within system pools			✓

Benefits of Using PowerVM on POWER7

- **Support for 1000 LPARs (VMs) per server**
 - Run up to 160 LPARs on a Model 750 (Feb 2010)
 - Run up to 320 LPARs on a Model 750 (Oct 2010 SoD)
- **Increased CPU cores and memory capacity** support more powerful virtualized workloads and higher consolidation ratios
- **Superior TCO and ROI** compared to competing UNIX and x86-based platforms (including virtualization)
- **Use live partition mobility to migrate workloads** from POWER6 to POWER7 platforms with zero downtime



Future PowerVM Capabilities: Suspend/Resume

■ How it works:

- Suspend/resume is the process of ‘freezing’ an LPAR and saving the complete system state, and then restarting the workload exactly where it left off, without data loss
- After suspension, the server resources are freed up for use by other workloads
- The LPAR system state is stored in a set of files and can be resumed on the same server or on a different system after migration

■ Client benefits:

- Resource balancing – suspend low-priority or long-running workloads to allow more urgent processes access to server resources temporarily
- Simplified maintenance – administrators can perform system updates or CEC upgrades without having to spend time on workload shutdown/startup processes
- Debug/forensics – a workload can be temporarily suspended and a copy made for offline analysis for security or performance purposes



Future PowerVM Capability: Remote Restart

■ How it works:

- Remote restart allows an LPAR to be configured to automatically restart on a different Power Systems server after an outage
- All LPAR configuration information is captured on persistent storage external to the original server and dynamically refreshed

■ Client benefits:

- Enhanced workload portability
 - LPAR definitions are no longer tied to a specific server so they can be more easily cloned, archived and distributed
- Increased availability
 - Service levels for high-priority workloads maintained with minimal user disruption
- Minimized risk
 - Virtualized workloads rapidly restored after a power outage or unplanned event



Future PowerVM Capability: Enhanced Virtual Networking

■ How it works:

- The virtualized network switch functionality within the VIOS will include support for SNMP, QoS, dynamic VLAN and MAC access control lists

■ Client benefits:

- Tighter integration
 - More sophisticated controls for monitoring and tuning network traffic between virtualized workloads
- Optimized performance
 - Control over networking QoS (quality of service) rules for specific LPARs can fine-tune the performance of network-sensitive workloads
- Improved security
 - Support for MAC-based access control lists (ACLs) allows admins to impose higher levels of protection for specific workloads



Conclusion:

- Understanding Dynamics of Virtualization.
- IBM's successful History of Virtualization.
- Customers benefiting from Power Virtualization
- PowerVM and VOIS
- Future enhancements for PowerVM
- Optimize with PowerVM and POWER7



Thank you

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