

Virtualization Business outcomes

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Industry Standard Servers Sales

The Caribbean



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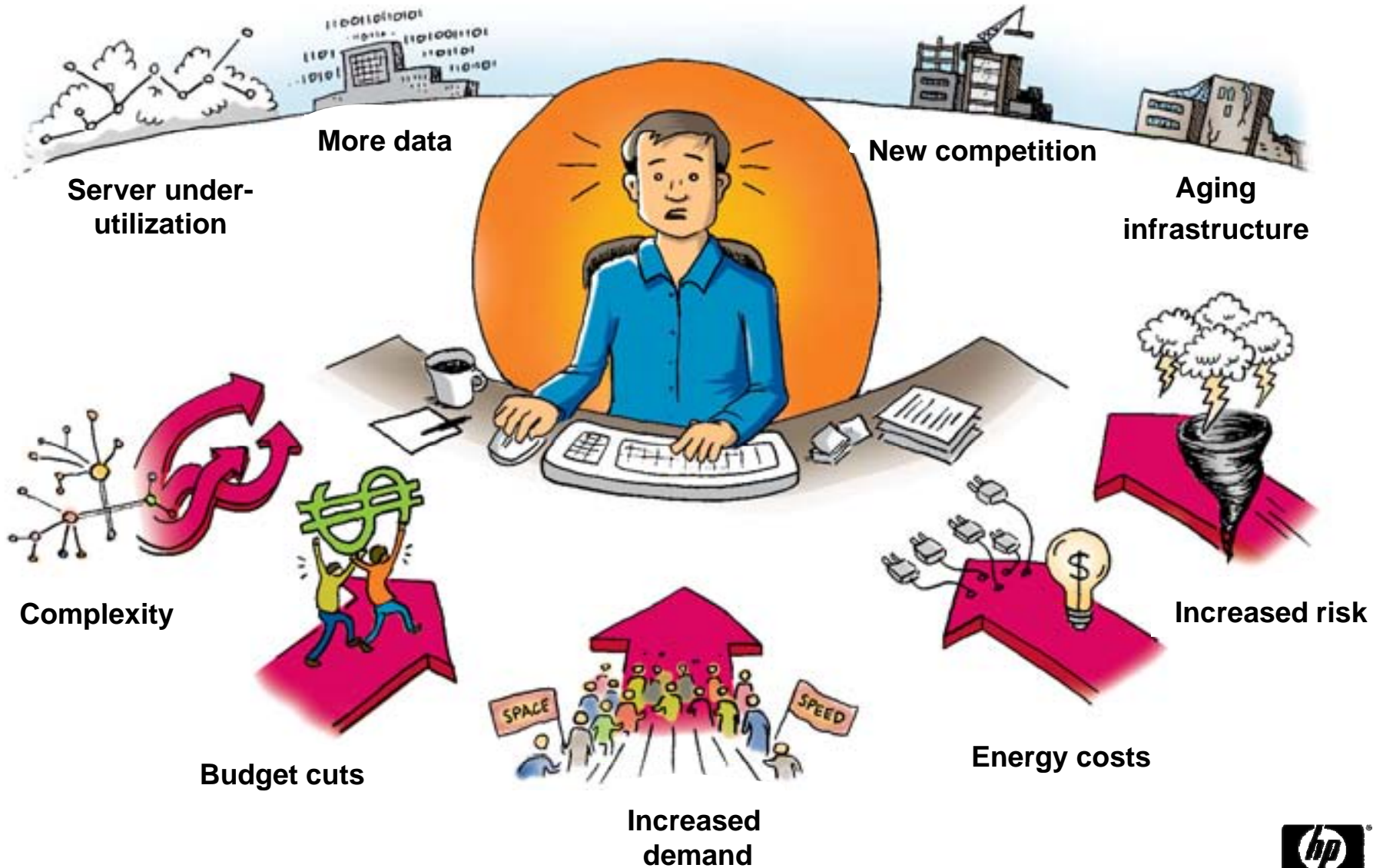
Basic Reliability - Traditional model

One Application per Server



...leads to underutilized servers

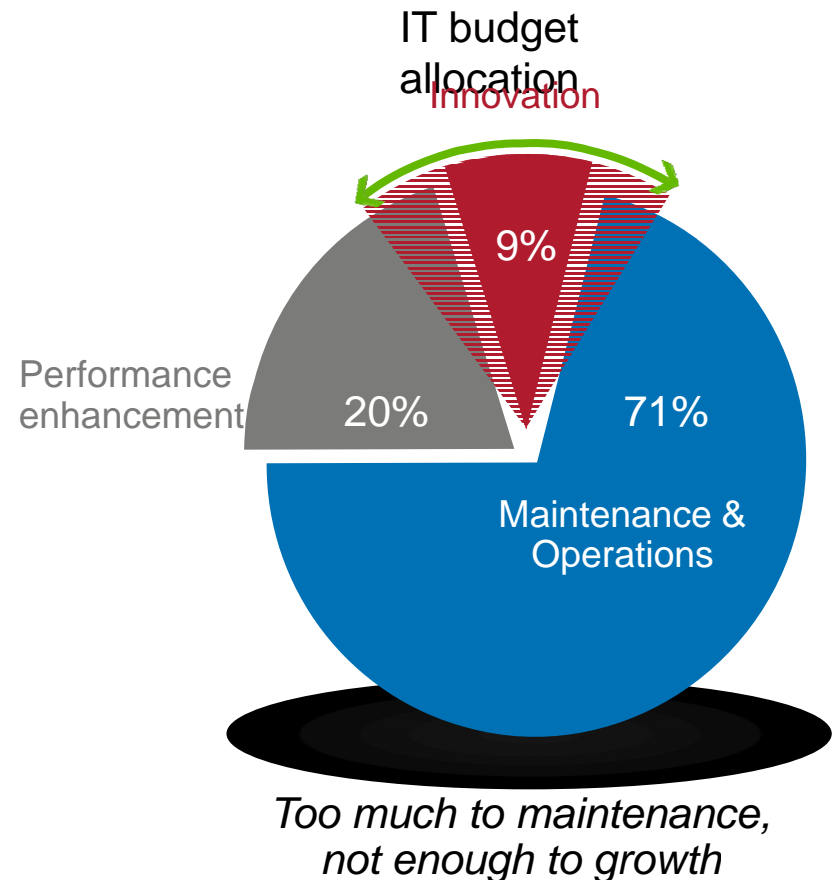
Your current situation



IT pain points

Finding ways to optimize business outcomes

- Too expensive to manage and maintain
- Too many applications, too much customization
- Underutilized servers
- Escalating energy costs
- Business impact of downtime and outages
- Struggle to meet service level agreements for critical workloads
- Can't implement new projects fast enough
- Infrastructure at risk from viruses and security breaches

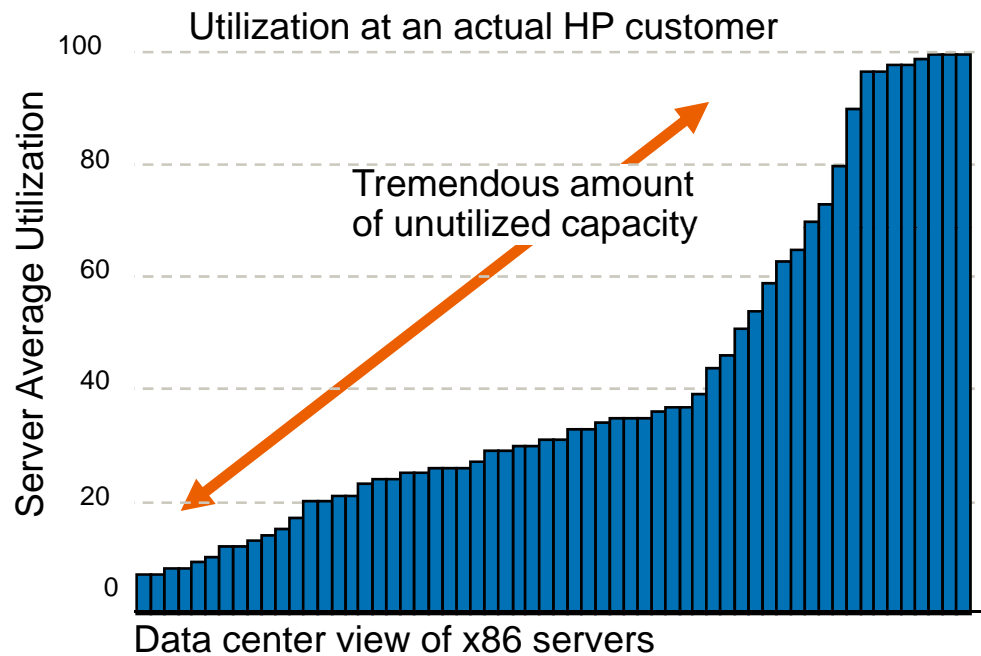


*HP IT estimates



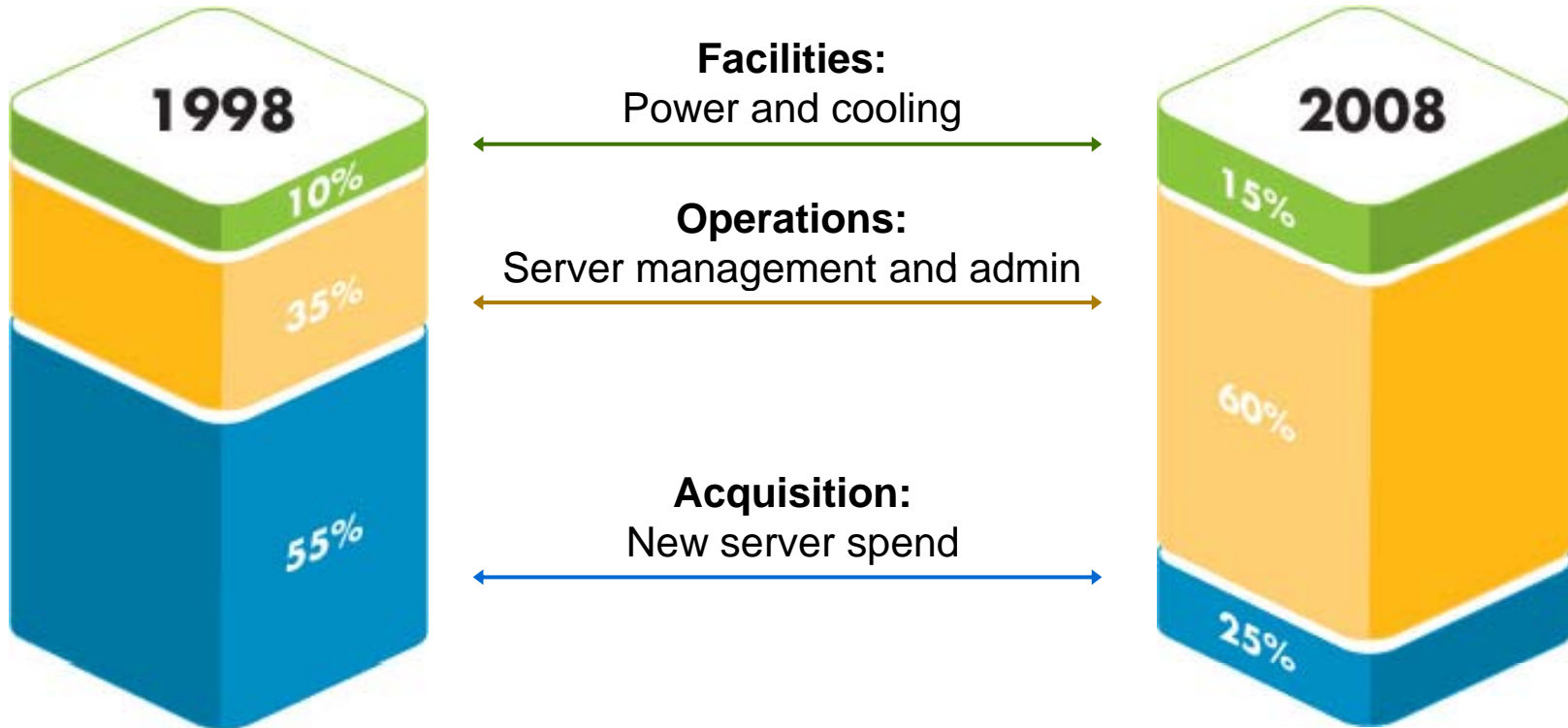
Server Trends: Consolidation

Reducing “idle waste” in under-utilized servers



Current technology put average utilization at approximately 30%
Multi-core will accelerate this trend

Shifting data center costs



Customers demand vendors who can lower costs for all areas

*Source: Industry Sources



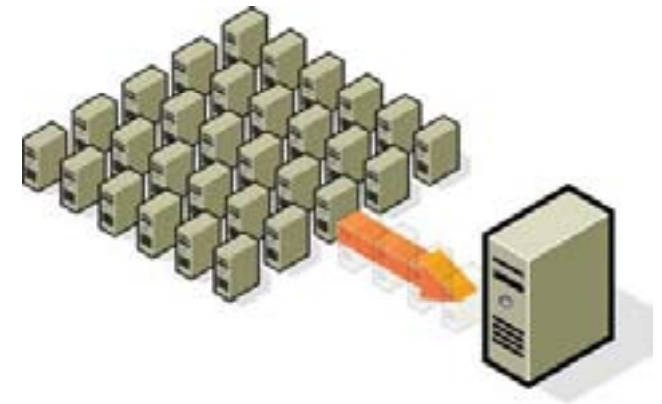
Server consolidation

Virtualization Usage Model:

Server consolidation with virtualization allows more applications to be combined on a single server than physical consolidation alone, while increasing service levels to the business and reducing hardware, power, cooling, and floor space costs by up to 50%-70%.

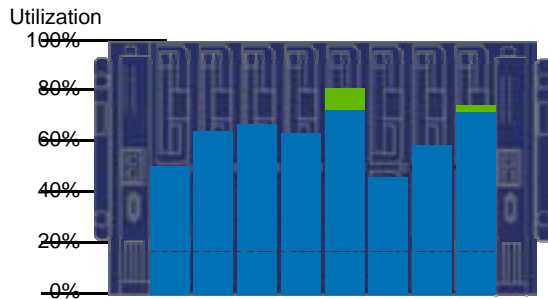
Key benefits:

- Run 10 or more applications on a single server
- Increase CPU utilization of existing servers 500%
- Reduce power and cooling costs
- Provision new systems in minutes instead of days
- Add new virtual servers dynamically in response to business requirements
- Extend the life of legacy applications running on older operating systems



Why virtualize?

Consolidation



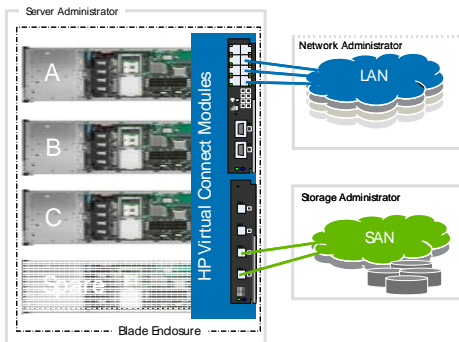
More workloads on fewer servers for higher utilization

Efficiency



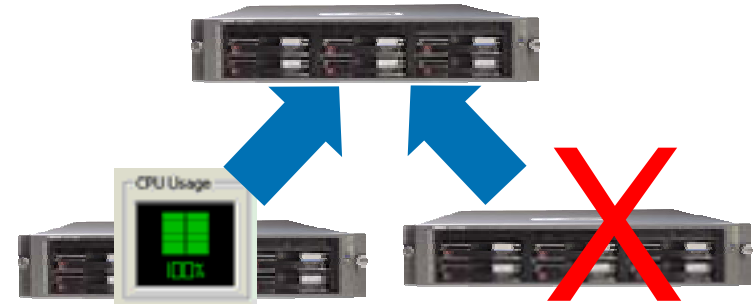
Fewer physical servers save power and reduce management time

Isolation



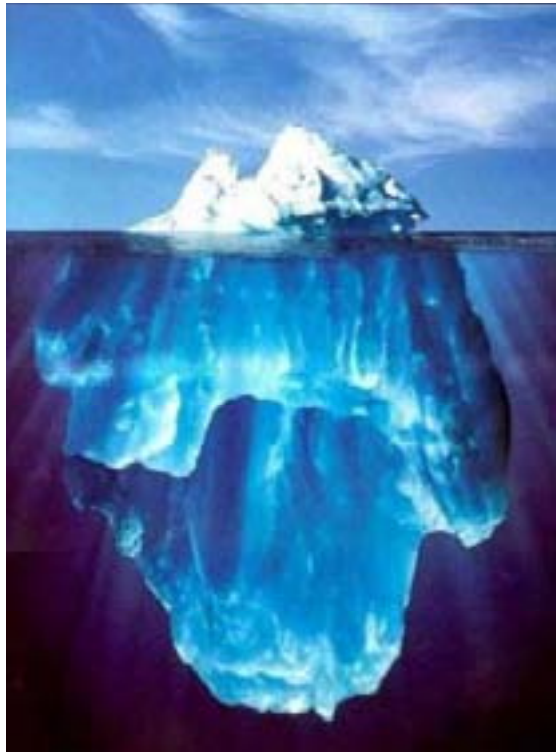
Reduce hard dependencies between infrastructure domains

Flexibility



Workloads can be moved between servers to optimize performance and reduce downtime

Servers Virtualization Challenges



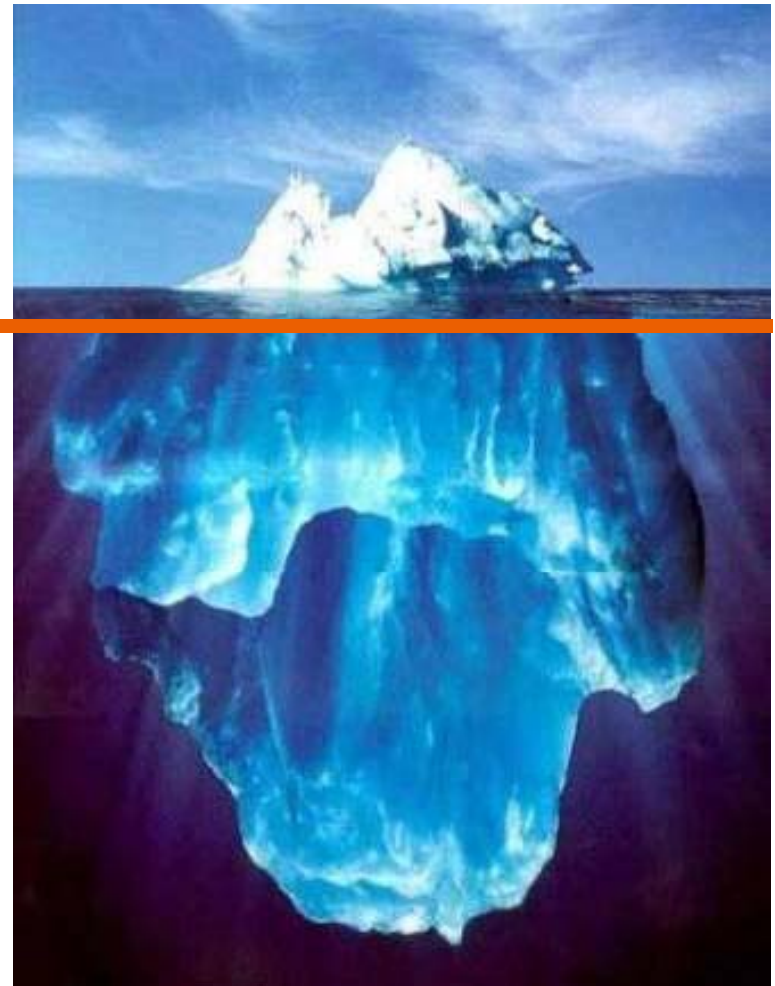
- Potential to have more impact from a single server failure
- Need to manage both virtual and physical servers
- Different skills sets for IT versus for physical servers
- Experience needed to most effectively consolidate workloads
- Resistance to changes in processes

People and process: Key to virtualization success

- Technology — Tools and infrastructure
- Process — Definition/design, governance, continuous improvement
- People — Roles and responsibilities, management, skills development and discipline, culture
- Financial — Business case
- External — Regulatory, legal compliance

15%

85%

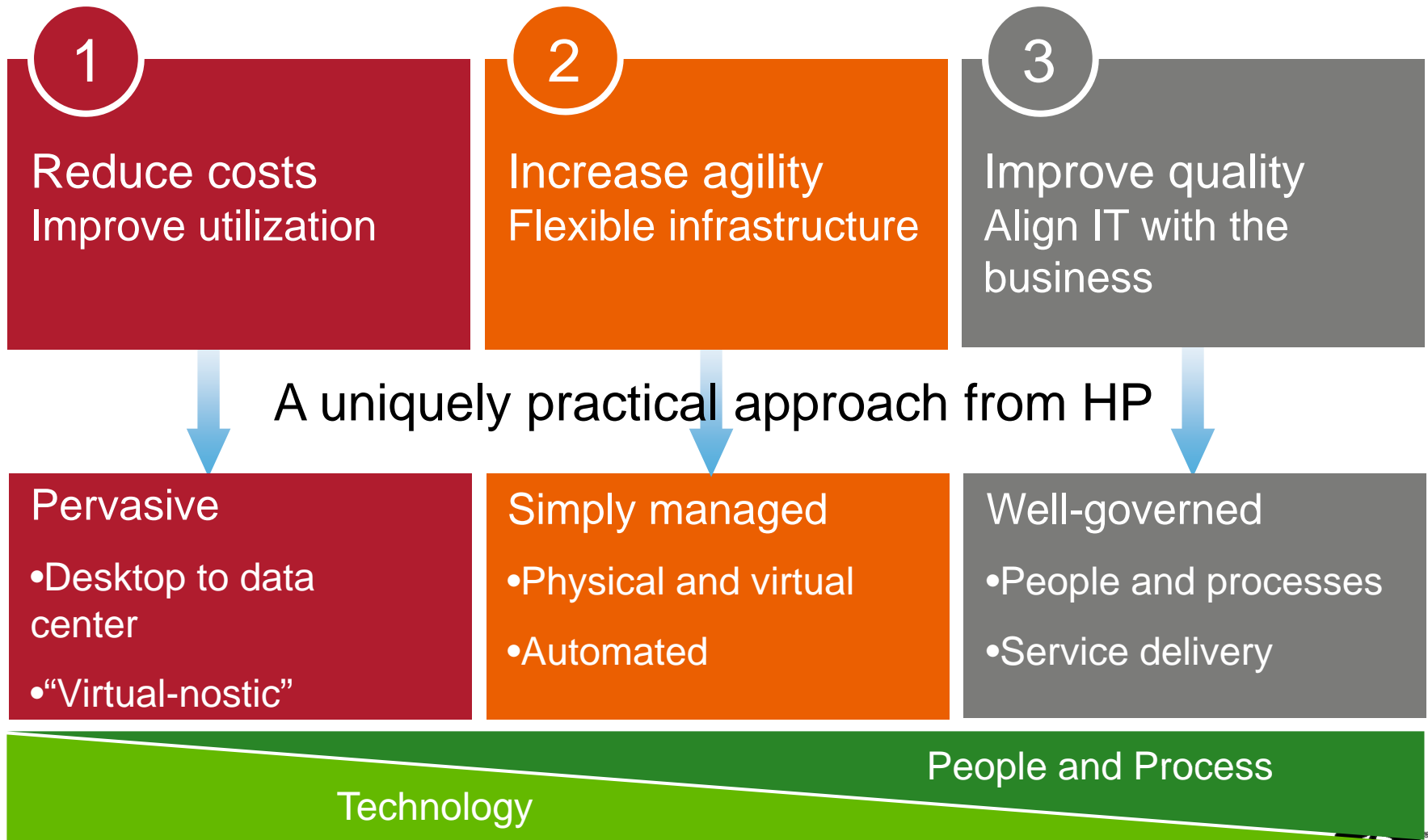


Tough issues will not be
technical!



HP Virtualization solutions:

Making the virtual real



What is Virtualization?

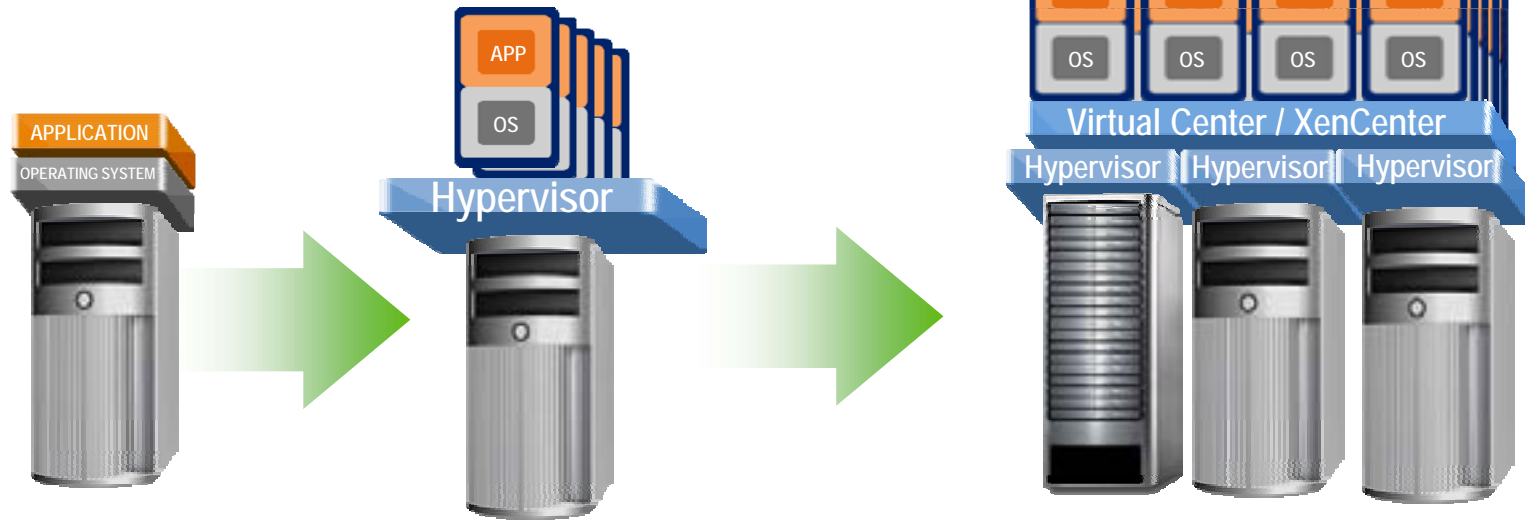
Multiple OSes on
a single server

Xen, Microsoft Hyper-V

Server Farms

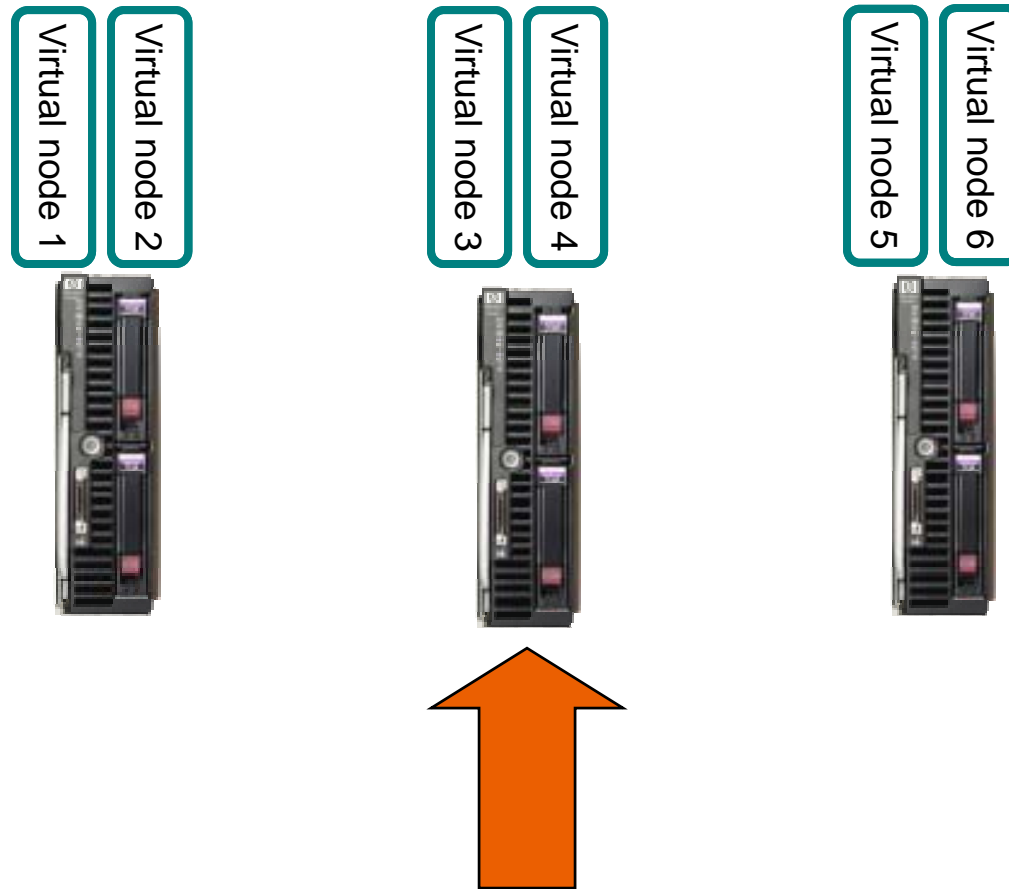
VMware & Citrix Xenserver

One Application
per server



What Can I Do With Virtualization?

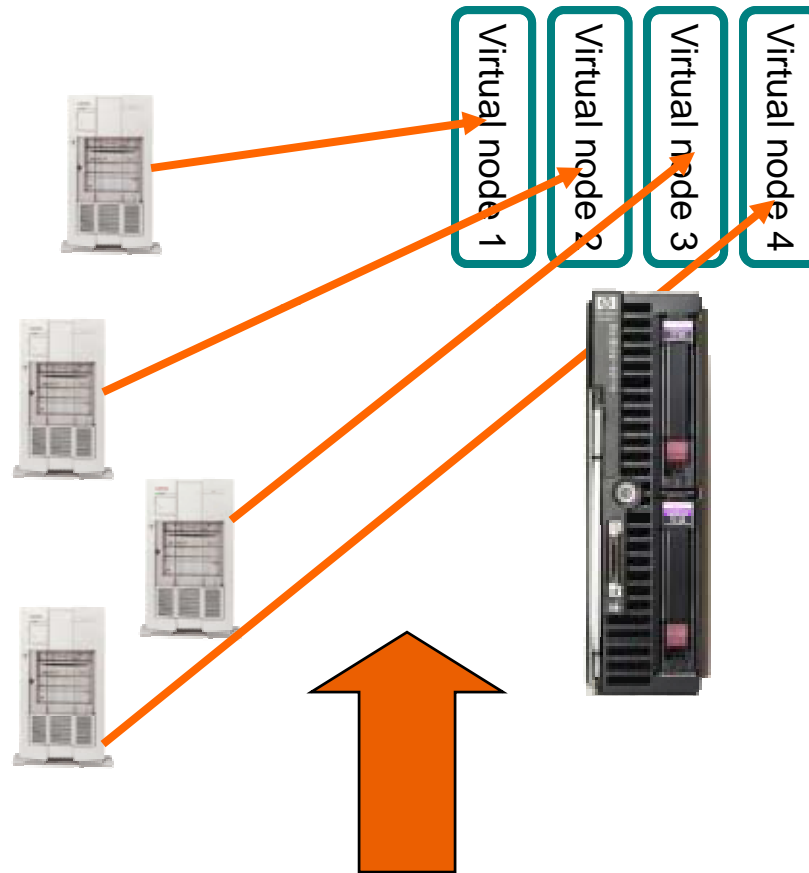
Zero-Downtime Maintenance



Upgrade any server without
downtime!

What Can I Do With Virtualization?

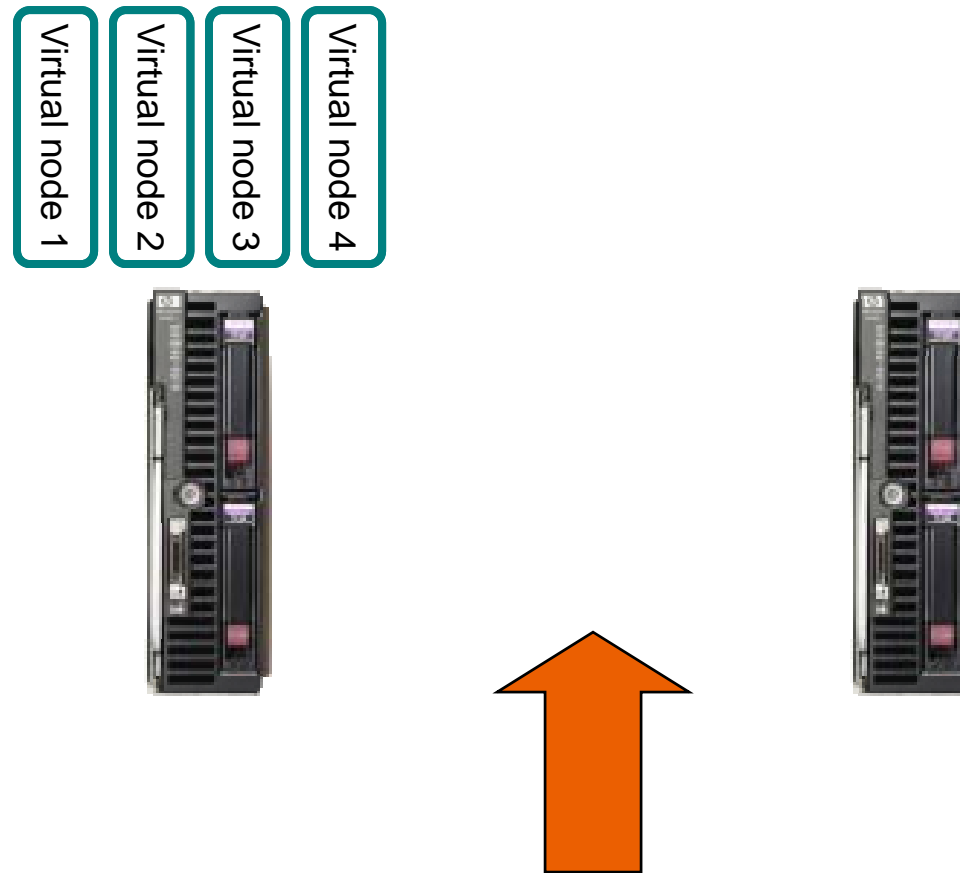
Simplified Migration



hp Server Migration Pack

What Can I Do With Virtualization?

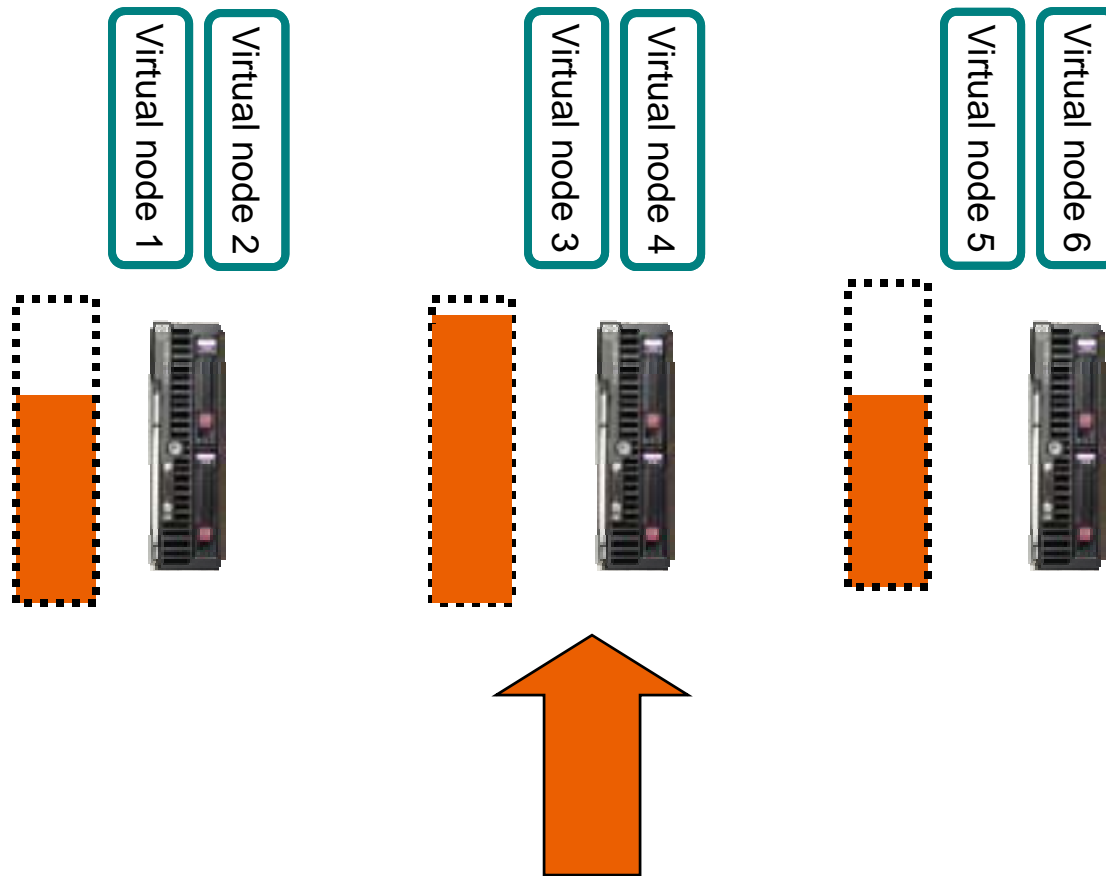
Need More Horsepower? No Problem!



HP Server Migration Pack

What Can I Do With Virtualization?

Dynamically Use Your Infrastructure

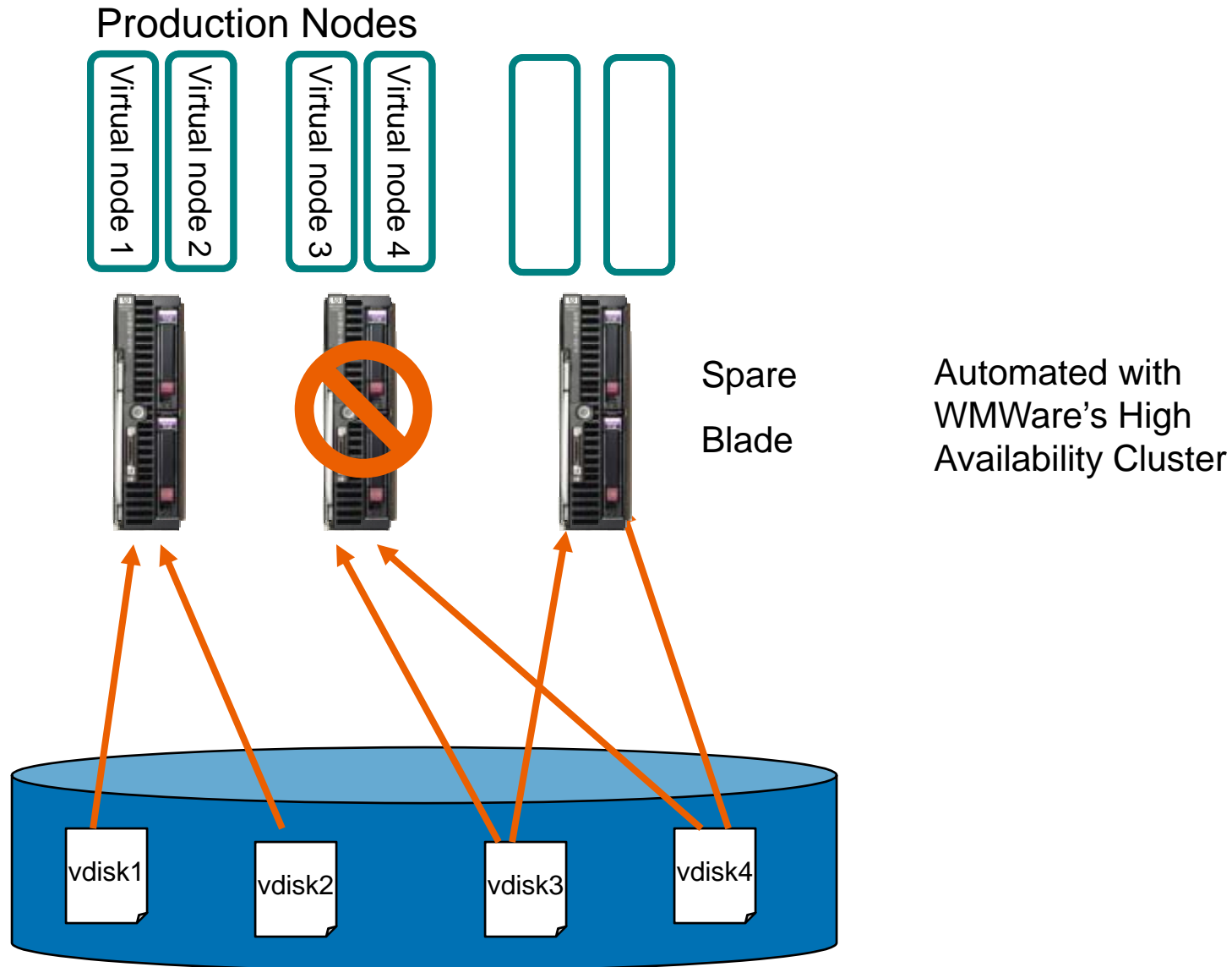


Node Approaching High Utilization Levels

Automated resource management with VMWare's Distributed Resource Scheduler

What Can I Do With Virtualization?

Localized Disaster Recovery



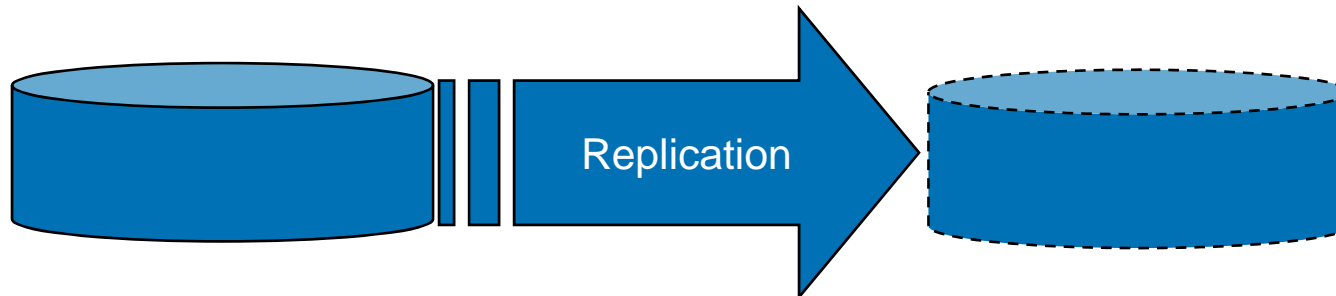
What Can I Do With Virtualization?

Simplify Disaster Recovery Plans

Production Servers



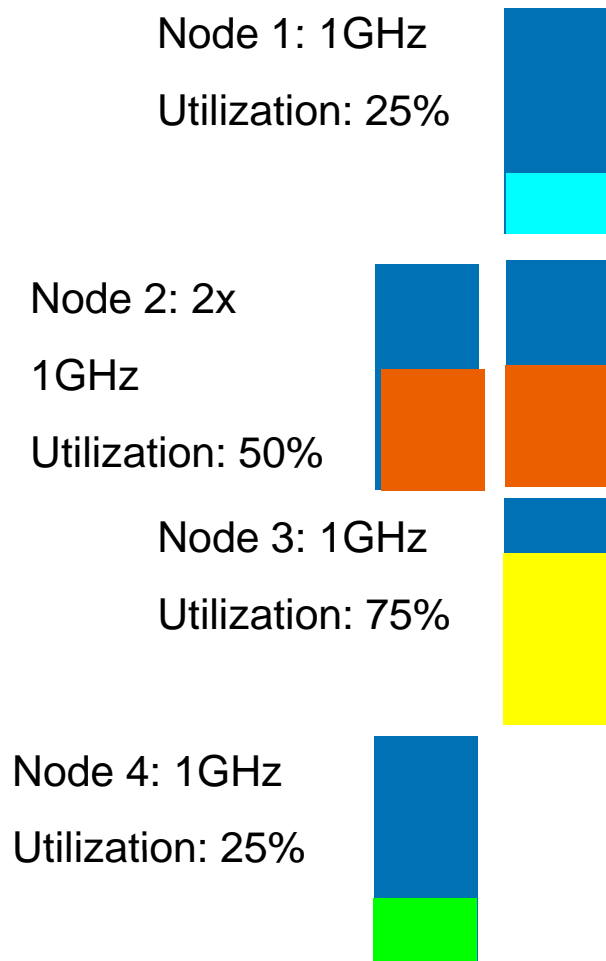
Backup Servers



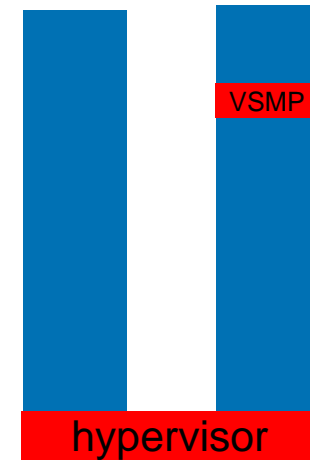
Server virtualization simplifies how you manage your disaster recovery plans and lowers operational costs

How Does It Work?

Processor Virtualization



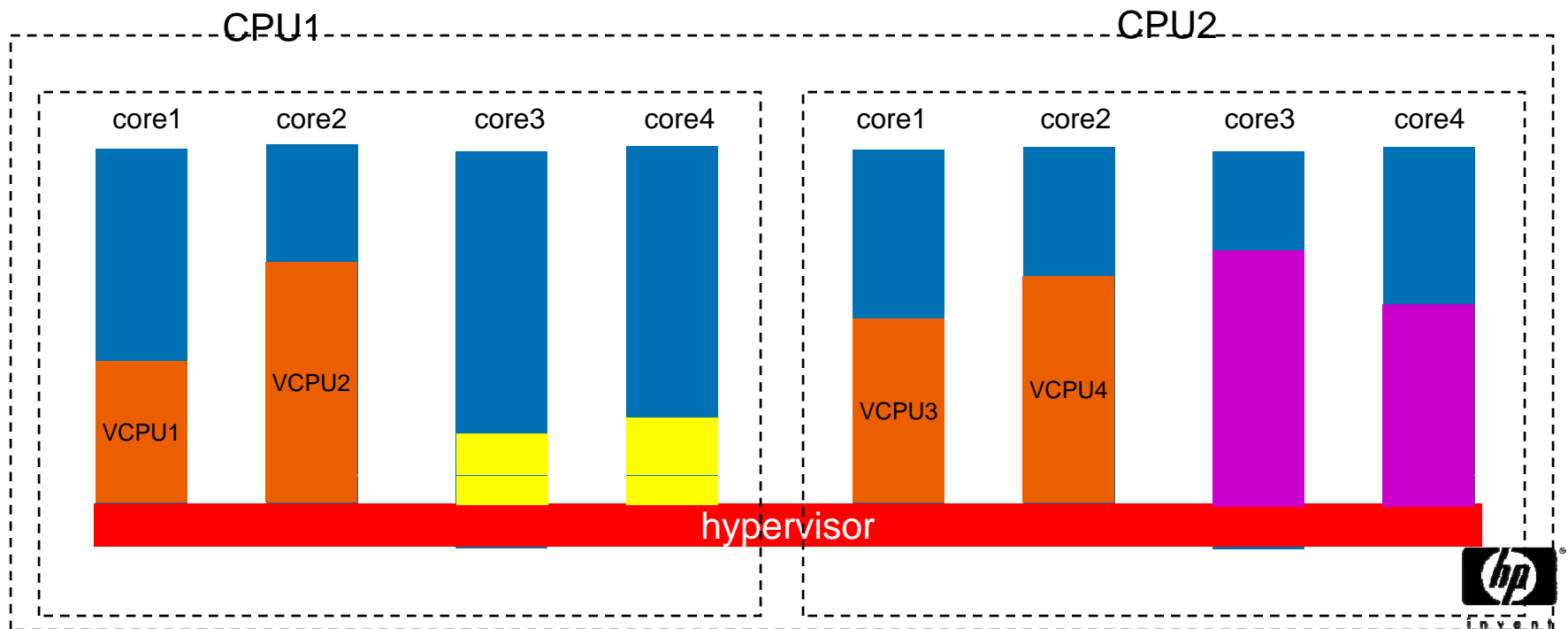
Consolidated Node:
2x 2GHz Dual-Core
Utilization: 80%



How Does it Work?

Scalability

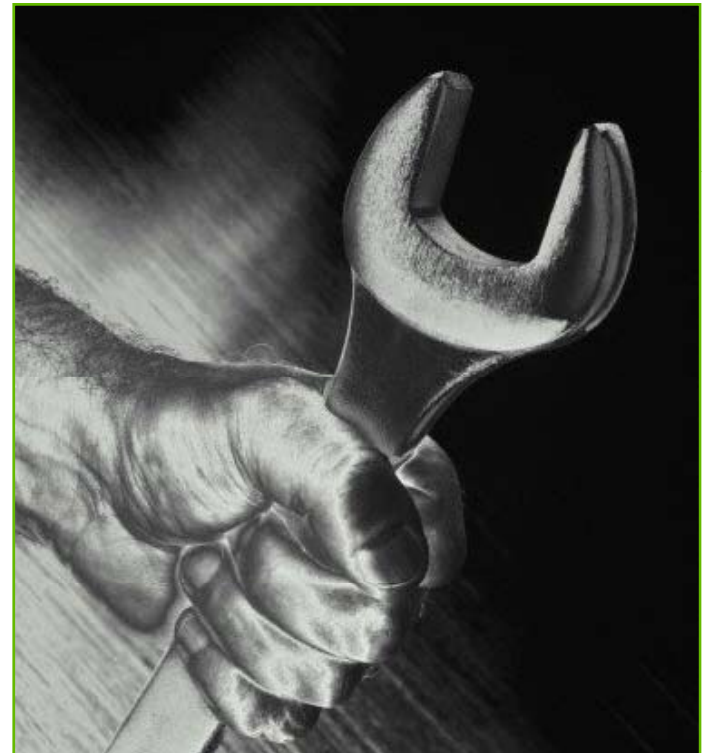
- The OS or the Hypervisor can move Virtual CPUs (vCPUs) across your infrastructure to increase overall physical server utilization, allowing for almost limitless scalability.



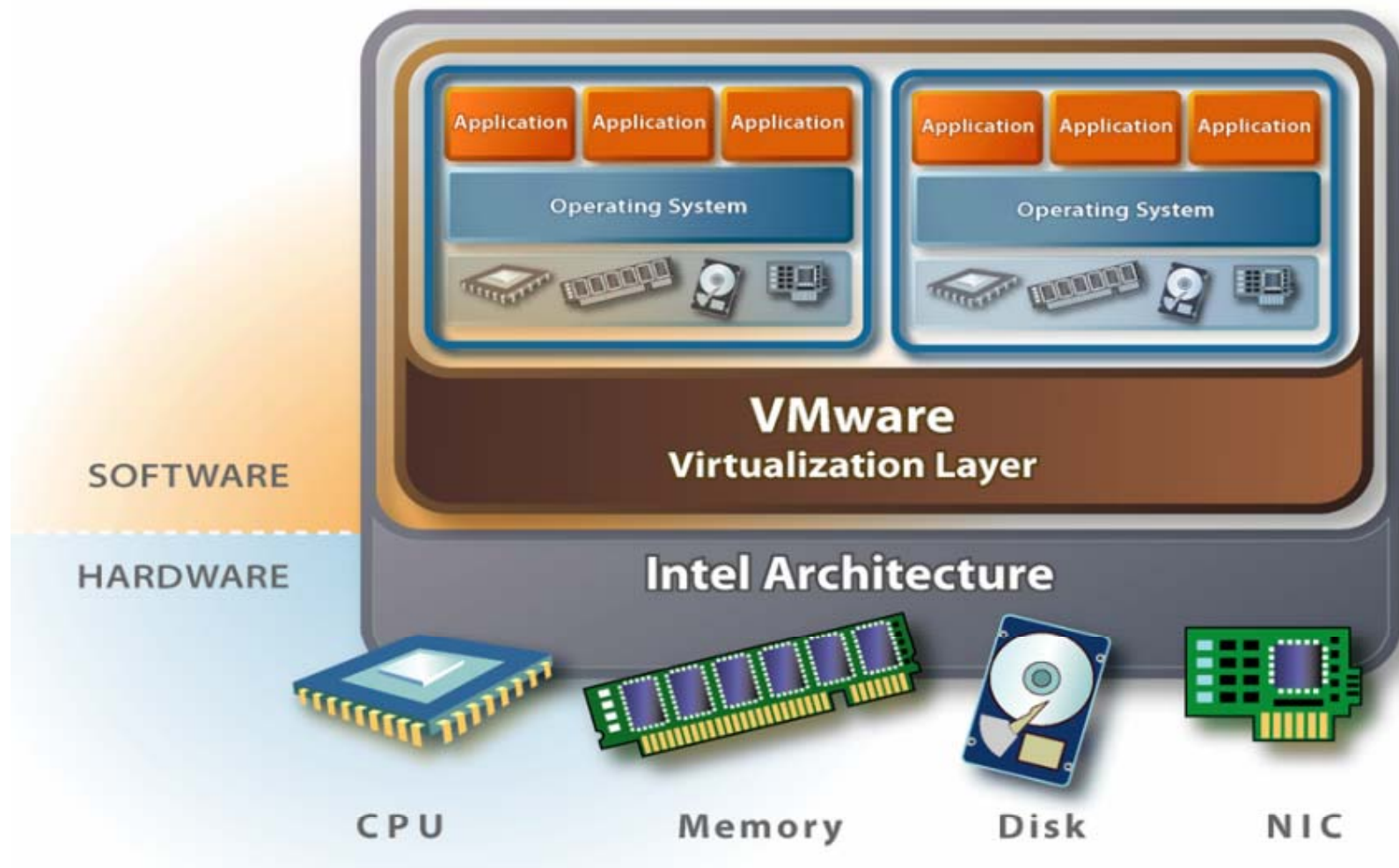
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How Virtualization Helps

- Reduce infrastructure costs
 - Improve asset utilization through **consolidation**
- Minimize people costs
 - Improve **control** via management simplification, standardization, automation
- Generate incremental revenue
 - Improve **continuity** with heterogeneous replication and other services



Virtualization: The VMWare ESX Way



Solution building blocks

VMware software – VMware Infrastructure 3

VirtualCenter

Provides a central point of control for virtual computing resources

Consolidated Backup

Centralized file-level backups with no agents

DRS (Distributed Resource Scheduler)

Dynamically allocates computing capacity across hardware resources

HA (High Availability)

Provides improved availability of Virtual Machines within a cluster

VMotion

Migrates live virtual machines between physical hosts

VSMP (Virtual SMP)

Allows a single virtual machine to span multiple physical processors simultaneously

VMFS (Virtual Machine File System)

High performance cluster file system for ESX Server virtual machines

ESX Server and VirtualCenter Agents

Provides virtual infrastructure for partitioning, consolidating and managing servers
Connects VMware ESX Server with the VirtualCenter management server

Enterprise

Self-optimizing Datacenter

Standard

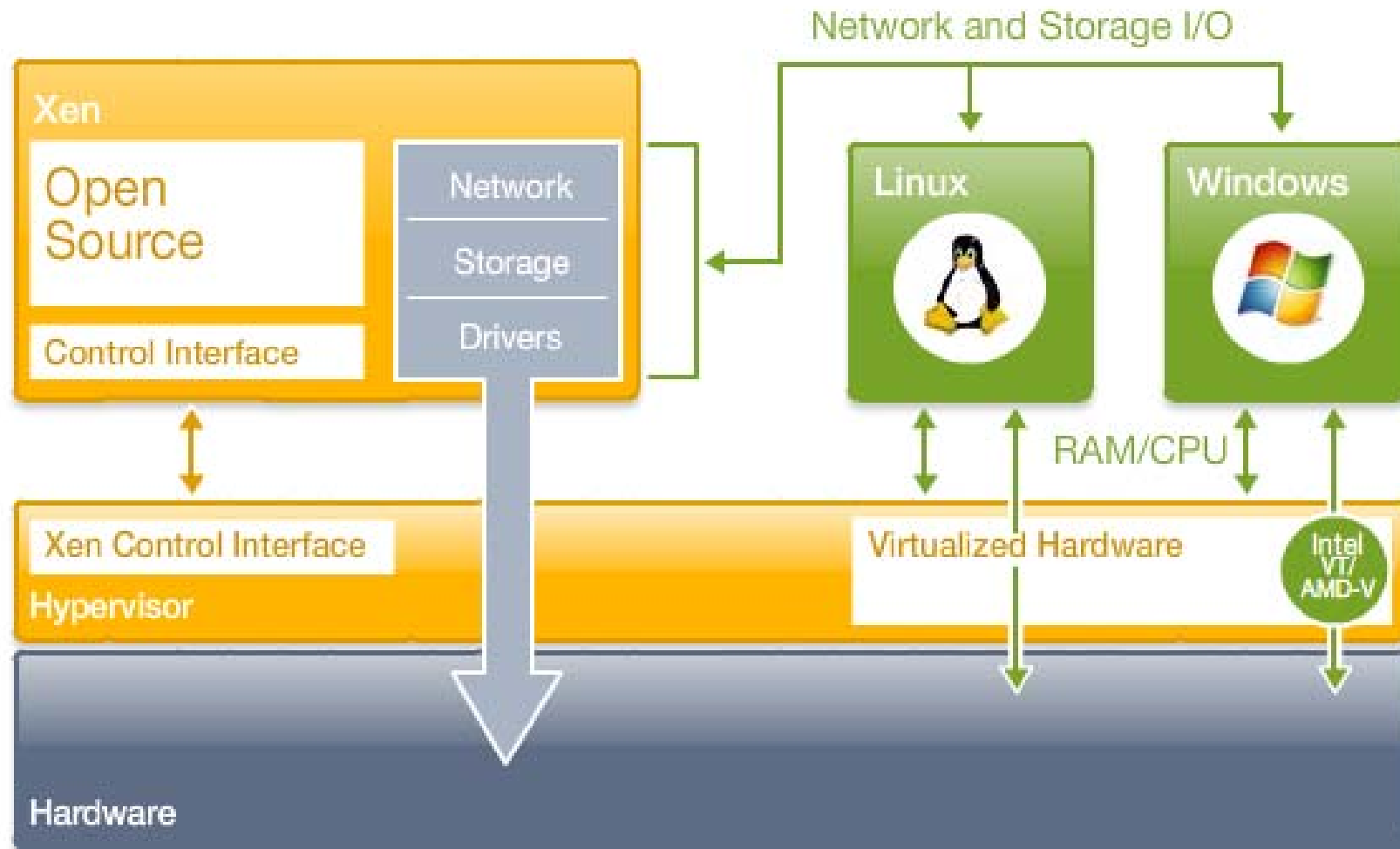
Department/Datacenter

Starter

Branch/Retail Office



Para-virtualization: The Citrix XenServer & Windows Hyper-V Way



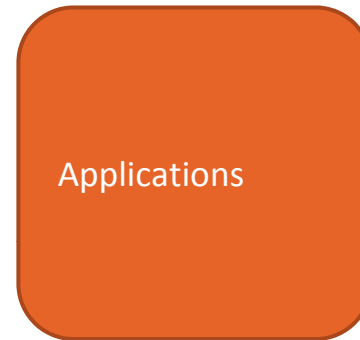
Microsoft Hyper-V Architecture

Provided by:

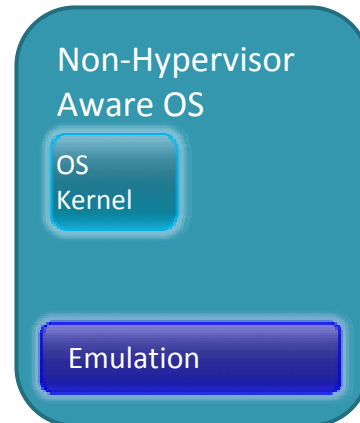
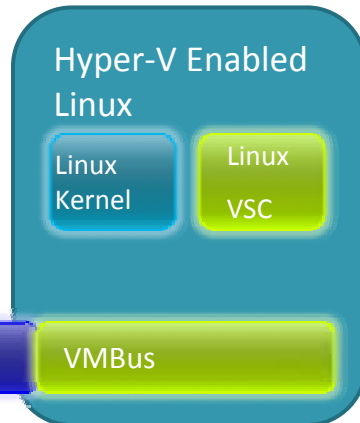
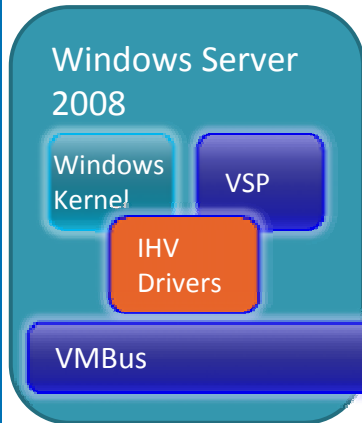


Parent Partition

Child Partitions



User Mode (Ring 3)



Kernel Mode (Ring 0)



Virtualization Technology Matrix

High Level Core Product Comparison

Feature	VMWare ESX / VI3	Citrix XenServer	Microsoft Hyper-V
x64 CPUs	32 logical	Unlimited	16 logical
x64 Host Memory	256 GB	128 GB	1 TB
Guest Memory	64 GB	32 GB	64 GB
Memory over-commit, page sharing, ballooning	Yes	Over-Commit	No
SMP VMs	4-way	8-way	4-way
Hot add CPU/memory/NIC/disk	Storage	Yes (all)	No

Virtualization Technology Matrix

High Level Enterprise Feature Comparison

Feature	VMware ESX / VI3	Citrix XenServer	Microsoft Hyper-V
Live migration	Yes – VMotion	Yes – XenMotion	No – 2H09?
High Availability	Yes – VMware High Availability (HA)	Yes	Yes – Host Clustering with ENT + DC edition
Load Balancing	Yes – VMware Distributed Resource Scheduling (DRS)	Yes – Resource Pools NIC Bonding (in v4.1)	No –
Non-Disruptive Patch Mgmt of host	Yes – VMware Update Manager (works with DRS to ensure uptime of VMs while hosts need to reboot)	Yes – needs scripting today to move running VMs (but beta of “Pool-Wide Patch Mgmt” like VMware Update Mgr is available)	No –
Pricing (Enterprise)	\$5,000 per 2P server \$5,000 for Management Server	\$2,500 per server	Included in WS2008

Windows Server 2008 with Hyper V



Windows Server 2008
Standard

- x86 and x64 editions
- 4 GB (32-bit) and 32GB (x64) RAM
- Support for up to 4 processors
- Includes 1 virtual guest instance

\$689



Windows Server 2008
Enterprise

- x86 and x64 editions
- 64 GB (32-bit) and 2 TB (x64) RAM
- Support for up to 8 processors
- Includes 4 virtual guest instances

\$2,600



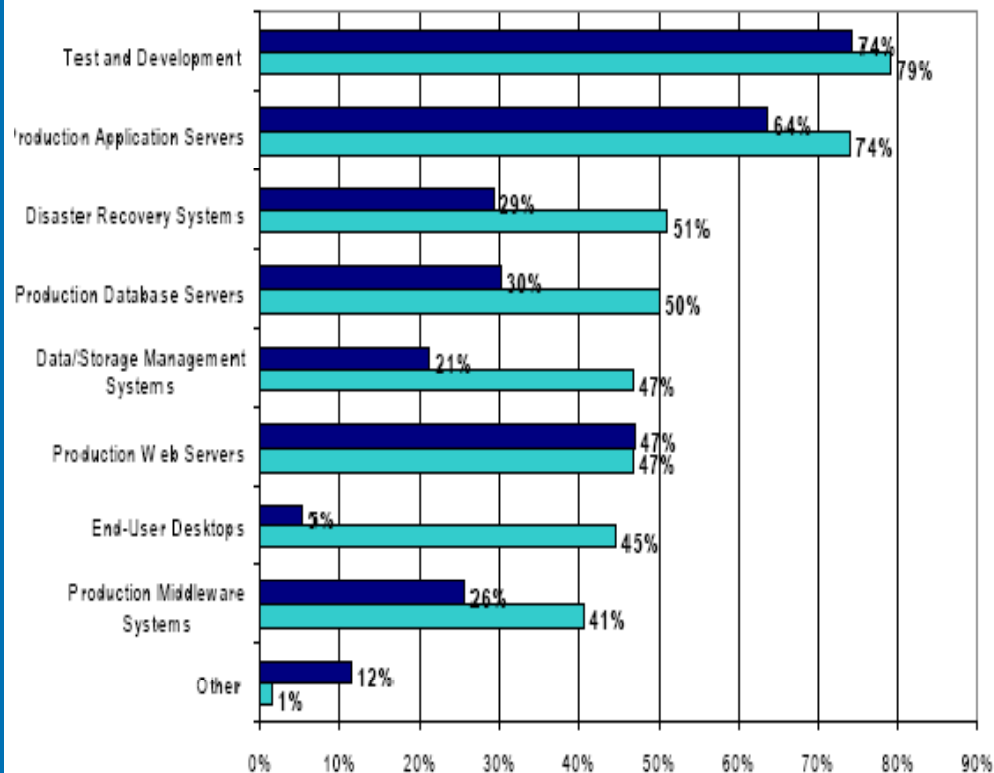
Windows Server 2008
Datacenter

- x86 and x64 editions
- 64 GB (32-bit) and 2 TB (x64) RAM
- Support for up to 64 processors
- Includes unlimited virtual guest instances

\$3,500

Virtualization delivers on its promise...

What types of workloads have you deployed virtualization technology for 2006 vs 2008?



What Workloads have you Virtualized?

- ✓ Production App Servers
- ✓ Production DB servers
- ✓ Replicated Sites

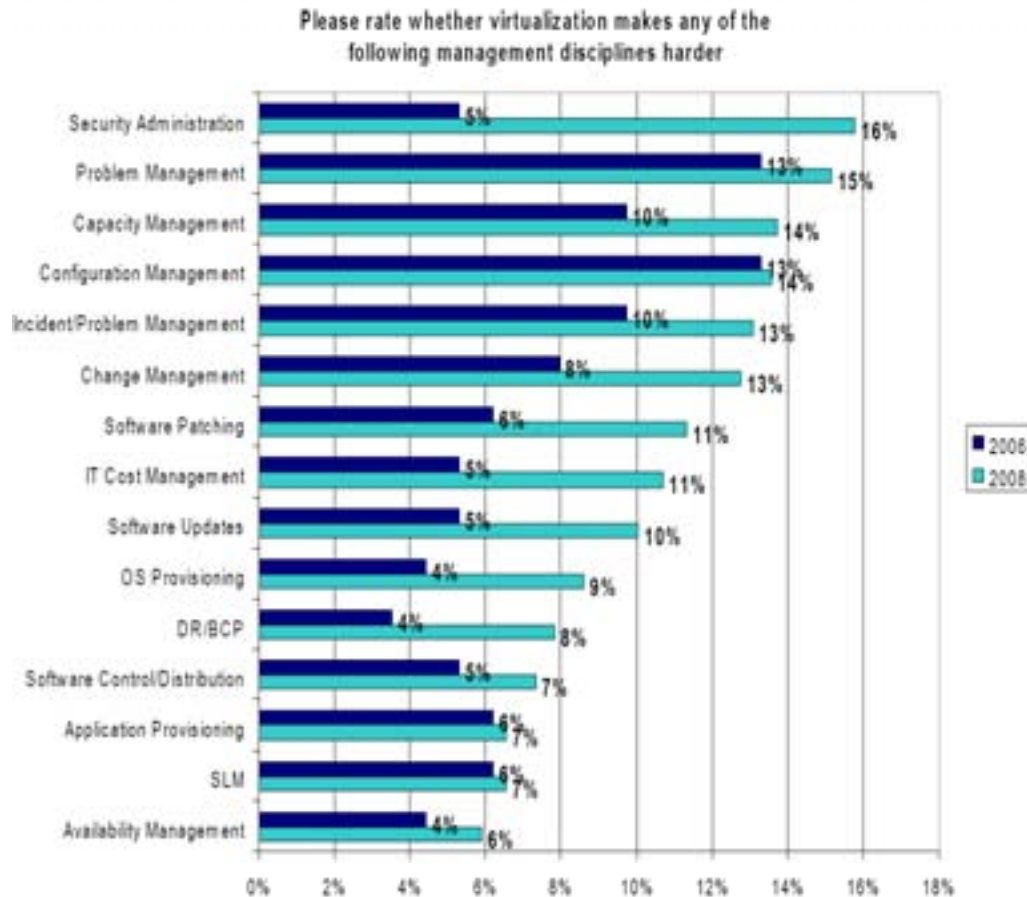
Source: EMA Virtualization Trends Analysis 2008



...but we still have hundreds of OS instances

What gets more complicated with Virtualization?

- ✓ Problem resolution
- ✓ Capacity Planning
- ✓ Networking



Server Virtualization Rules of Thumb

3 VMs/Processor core → 2P Quad Core = 24 VMs / 2P Server

2 GB RAM/VM → 2P Quad Core = 48GB / 2P Server

6 1Gbit NICs/ 2P Server

- 1 NICs for backup to tape network
- 4 NICs for Application data
- 1 NIC for VMotion & Console

HP and VMware Leadership Facts

- **HP has the most VMware certified servers:** nearly as many as Dell and IBM combined, and twice as many servers certified for VMware ESXi.
- *The DL785 G5 and DL585 G5 have the **leading VMmark performance** results in their class. The DL785 8-socket ran the largest # of VMs ever on an x86 platform – 96, nearly 600 VMs per 42U rack. The DL585 G5 ran 60 VMs to achieve a new record.*
- HP has **more VMware Certified Professionals (VCPs)** than anyone – except VMware. The exact number is 655 (486 from HP and 169 from EDS). EDS plans to add 330 VCPs in the next 15 months. *Source:VMware*
- *IDC names HP the **Global Leader of Thin Clients Worldwide**. IDC, Q1 2008 WW Ent. Thin Client Q-View, MAY 08*
- **HP is the first** VMware Authorized Training Center to **train more than 10,000 students** on VMware certification courses.

HP ProLiant is the # 1 platform for VMWare

	Share (Rack-Optimized)	Share (Non-Rack-Optimized)	Share (Blade)	Share (All Form Factors)
Dell	32%	30%	9%	27%
HP	43%	46%	55%	46%
IBM	11%	13%	28%	15%
Other	8%	11%	6%	8%
Sun	5%	0%	2%	3%

Source: 2Q08 IDC Quarterly Server Virtualization Tracker (6-Oct-08) – New Servers Virtualized, Virtualization Platform: VMware ESX, CPU Type: x86



HP and VMware Leadership Facts (cont'd)

- **HP Management Tools integrate with VMware**
 - *HP and VMware have **dedicated engineering teams** that work on integration*
 - ***Insight Control is the only out-of-the-box management** solution that integrates with VMware VirtualCenter to automate responses to pre-failure alerts*
 - ***Insight Dynamics-VSE is the world's first software that integrates with the VMware** environment to let IT professionals **analyze and optimize their virtual & physical environments** in the same way.*

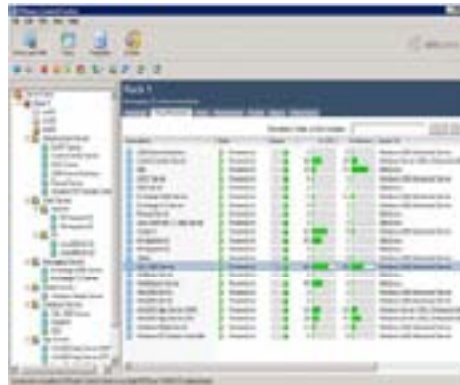
EDS leadership with VMware:

- ***EDS has over 100 clients** that have adopted services based on VMware virtualization technologies, and **will have virtualized***
- ***30-40,000 EDS and client servers by the end of 2008.***

Virtualization Simplified

Integrated Hypervisors

- **Integrated hardware virtualization**
 - No lengthy installations or complex configurations
 - Ready to virtualize out-of-the-box
 - License already loaded and registered to the serial number of the server
- **Major Virtualization Players**
 - VMWare ESX 3i
 - Citrix XenServer
 - Microsoft Hyper-V coming soon!
- **Focused for Centralized Management Tools**
 - VMware VirtualCenter
 - Citrix XenCenter
 - hp Virtual Machine Management Pack



Internal USB Port

