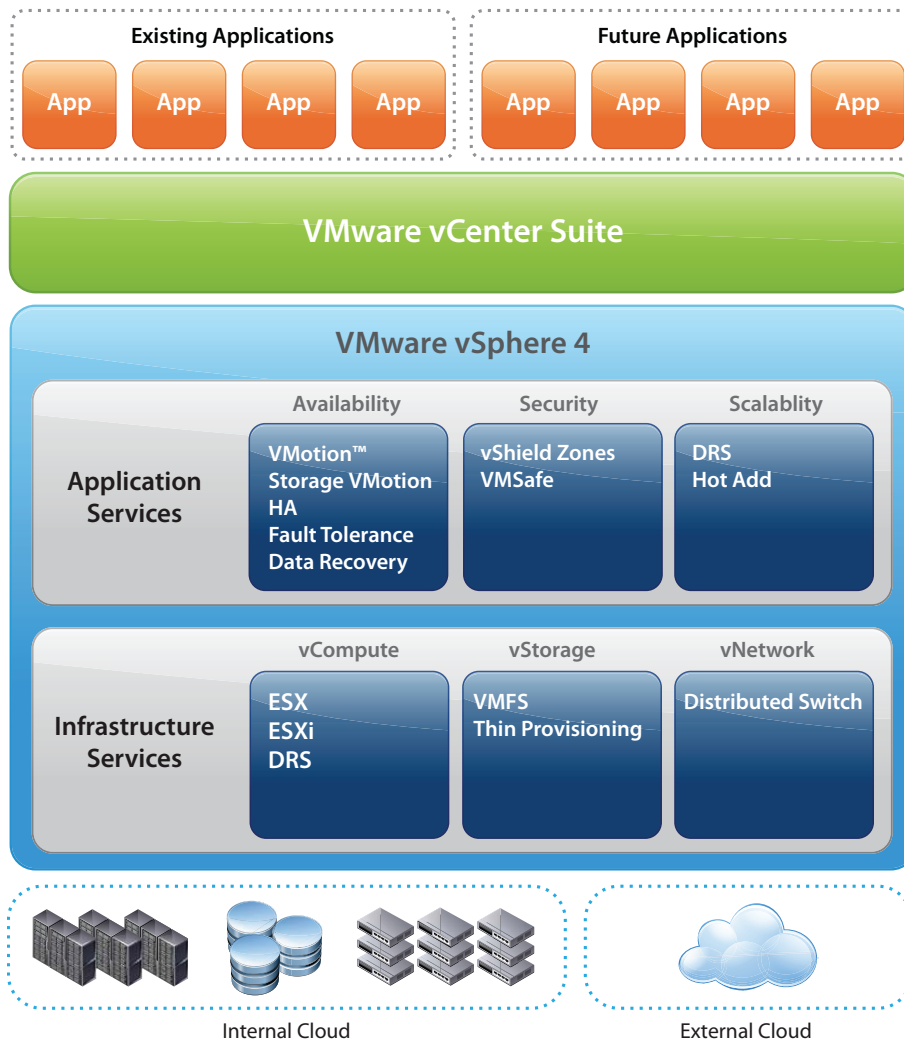# vmware® | CS CHEAT SHEET

VMware vSphere™ 4

What is VMware vSphere™ 4?

VMware vSphere™ 4 is the industry's first cloud operating system, which uses the power of virtualization to transform datacenters into dramatically simplified cloud computing infrastructures and enables IT organizations to deliver the next generation of flexible and reliable IT services, using internal and external resources, securely and with low risk.

VMware vSphere, the next generation of the powerful and proven VMware® Infrastructure 3 platform used by more than 130,000 customers, dramatically reduces capital and operating costs, increases control over delivery of IT services while preserving the flexibility to choose between any type of OS, application and hardware, hosted in-house or using external resources.

VMware vSphere 4, the industry's first cloud OS

Existing Applications

App | App | App | App

Future Applications

App | App | App | App

VMware vCenter Suite

VMware vSphere 4

Application Services	**Availability**	**Security**	**Scalablity**
	VMotion™ Storage VMotion HA Fault Tolerance Data Recovery	vShield Zones VMSafe	DRS Hot Add

Infrastructure Services	**vCompute**	**vStorage**	**vNetwork**
	ESX ESXi DRS	VMFS Thin Provisioning	Distributed Switch

Internal Cloud

External Cloud

What are the benefits of VMware vSphere 4?

VMware vSphere:

• Dramatically reduces capital expenses per application by 50% and operating expenses per application by over 60%

• Increases control over delivery of IT services with built-in, automated availability, security and scalability

• Preserves the flexibility to choose between any type of OS, application and hardware, hosted in-house or using external resources

What's new with VMware vSphere 4?

• VMware vSphere 4 builds on VMware Infrastructure 3 and adds in a number of powerful new capabilities

• VMware vSphere 4 can be purchased starting May 21 in new editions at different prices

Key New Features

Product/Feature	What is it?	What are the benefits?
VMware® Fault Tolerance	• Provides zero-downtime and zero-data-loss continuous availability in the case of hardware failures	• Eliminates even the smallest of disruptions in the event of hardware failures • Simple to set up • Can be used with any application[1]
VMware vNetwork Distributed Switch	• Provides a central datacenter level aggregated control point for virtual machine networking • Enables the use of third party virtual switches such as Cisco Nexus 1000v in vSphere environments	• Simplified provisioning and administration of virtual machine networking • Enhanced security and monitoring for virtual machines migrated via VMware VMotion through maintenance and migration of port runtime state
VMware Host Profiles	• Allows creation of "golden" profiles of ESX hosts and their application to existing or new hosts	• Simplifies the provisioning and configuration management of ESX hosts
VMware vStorage Thin Provisioning	• Defers the allocation of storage to virtual machines until it is needed • Uses monitoring and alerting capabilities to trigger proactive procurement of storage	• Reduces storage costs by over 50% in virtual environments
VMware Hot Add	• Allows CPU and memory to be added to running virtual machines without disruption or downtime • Allows virtual HBAs and NICs to be added to or removed from virtual machines without disruption or downtime	• Allows applications to be given additional resources without disruption or downtime
VMware Data Recovery	• Provides backup to disk and simple recovery at a file or image level for small environments	• Provides a simple, cost-effective data protection solution for small environments
VMware® vShield Zones	• Enforces corporate firewall security policies at the application level in a shared environment, while still maintaining trust and network segmentation of users and sensitive data	• Simplifies application security • Allows more efficient use of firewalls in cluster environments comprising different types of applications
VMware vSMP (8-way)	• Allows a single virtual machine to use up to 8 virtual CPUs at a time (this was previously 4 vCPUs in VI3)	• Allows for the most compute intensive applications to be run as virtual machines
Performance and Scalability	• 255GB of RAM in virtual machines (previously 64GB) • 64 cores and 512GB of physical RAM supported by ESX hosts • Over 8,900 database transacion transactions per second per virtual machine – sufficient to run annually the entire transaction traffic of VISA • 3x increases in network transmit throughput increase over VI 3.5 • Increased MS SQL Server throughput efficiency by 20% • Increased Citrix XenApp throughput by 30% • Increased iSCSI throughput by up to 10x[2]	• Allows the most intense and critical applications to benefit from all the advantages of virtualization without a noticeable impact to users

[1] In vSphere 4.0, VMware Fault Tolerance works with 1-vCPU virtual machines only

[2] vSphere supports 10GigE with iSCSI (VI3 does not support 10 GigE with iSCSI)

Updates to Existing Products/Features

Product/Feature	What is it?	What are the benefits?
VMware® Distributed Resource Scheduler (DRS)/VMware® Distributed Power Management (DPM)	• DRS continuously monitors virtual machines and physical servers to optimally align compute capacity to application requirements based on business priorities • DPM optimizes DRS clusters for the lowest possible power consumption	• Automated matching of application demand to computing resources • Simplified operational management and higher levels of utilization in virtual environments • Up to an additional 20% reduction in power costs with DPM
VMware® Storage VMotion	• Live migration of virtual disks from one storage location to another without disruption to users • New, simple administrator interface	• Minimizes the need to schedule application downtime due to storage maintenance
VMware® VMotion™	• Live migration of virtual machines from one server to another without disruption to users	• Minimizes the need to schedule application downtime due to server maintenance
VMware® High Availability (HA)	• Continuous monitoring of servers in a pool and automated restart of virtual machines on alternate servers in the event of hardware failures • Automated restart of virtual machines in the event of OS failures	• Simple, cost-effective protection against hardware and OS failures • Pervasive protection for all applications, allowing protection of applications with no other failover options
VMware Update Manager	• Automates patching for ESX hosts and select Microsoft and Linux virtual machines	• Eliminates manual tracking of patch levels of ESX Server hosts and virtual machines • Automates enforcement of patch standards • Reduces risk through snapshots and offline virtual machine patching
VMware® ESX™/ESXi	• Proven, high performance bare metal hypervisor • Unique CPU and memory optimization features that enable the highest consolidation rations • Optimized for the highest network and storage throughput	• Delivers high consolidation ratios leading to the highest capital expenditure savings • Easily runs the most intense applications at very high throughput rates

New vSphere Editions

Features Included	VMware vSphere Standard Edition	VMware vSphere Advanced Edition	VMware vSphere Enterprise Edition (Available until 12/15/09 only)	VMware vSphere Enterprise Plus Edition
VMware Host Profiles				✓
VMware vNetwork Distributed Switch/Third-Party Switch Enablement				✓
VMware DRS/DPM			✓	✓
VMware Storage VMotion			✓	✓
VMware Fault Tolerance		✓	✓	✓
VMware Data Recovery		✓	✓	✓
VMware vShield Zones		✓	✓	✓
VMware Hot Add		✓	✓	✓
VMware VMotion		✓	✓	✓
VMware Thin Provisioning	✓	✓	✓	✓
VMware vSMP	4-way SMP	4-way vSMP	4-way vSMP	8-way vSMP
VMware HA	✓	✓	✓	✓
VMware® vCenter™ Update Manager	✓	✓	✓	✓

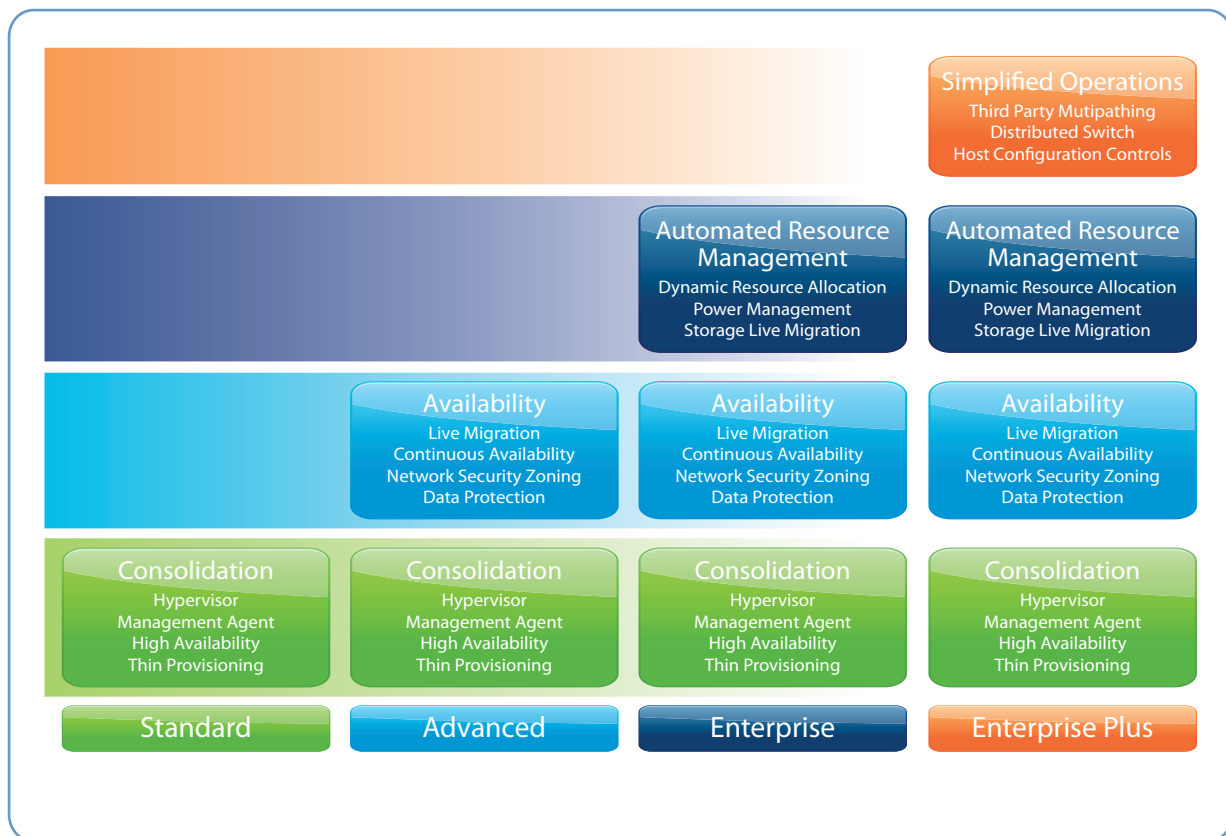| VMware vStorage APIs (Formerly VMware Consolidated Backup)	✓	✓	✓	✓
VMware vCenter Server Agent	✓	✓	✓	✓
VMware ESX/ESXi	✓	✓	✓	✓
Limits on number of cores per CPU	*Up to 6 processor cores per physical CPU*	*Up to 12 processor cores per physical CPU*	*Up to 6 processor cores per physical CPU*	*Up to 12 processor cores per physical CPU*
Limits on memory per host	256GB physical memory per host	256GB physical memory per host	256GB physical memory per host	No license memory limit
License	$795	$2,245	$2,875	$3,495
SnS (gold)	$275	$471	$604	$734
SnS (plat)	$325	$561	$719	$874

Note: License prices are in 1-CPU increments. VI3 licenses were sold in 2-CPU increments; vSphere 4 licenses are sold in 1-CPU increments.

Note: US list pricing is USD – International pricing may vary

Note: Most features require one (1) instance of vCenter Server

Note: At least 1 year of SnS is mandatory

Comparison of VMware vSphere Editions (Note: Enterprise edition will be discontinued after 12/15/2009)

Simplified Operations
Third Party Mutipathing
Distributed Switch
Host Configuration Controls

Automated Resource Management
Dynamic Resource Allocation
Power Management
Storage Live Migration

Automated Resource Management
Dynamic Resource Allocation
Power Management
Storage Live Migration

Availability
Live Migration
Continuous Availability
Network Security Zoning
Data Protection

Availability
Live Migration
Continuous Availability
Network Security Zoning
Data Protection

Availability
Live Migration
Continuous Availability
Network Security Zoning
Data Protection

Consolidation
Hypervisor
Management Agent
High Availability
Thin Provisioning

Consolidation
Hypervisor
Management Agent
High Availability
Thin Provisioning

Consolidation
Hypervisor
Management Agent
High Availability
Thin Provisioning

Consolidation
Hypervisor
Management Agent
High Availability
Thin Provisioning

Standard   **Advanced**   **Enterprise**   **Enterprise Plus**

New vSphere Editions Designed for SMBs
All inclusive packages with licenses for 3 servers (up to 2 CPUs each) and the license for the central license server.

Features Included and No. of Instances	VMware vSphere Essentials	VMware vSphere Essentials Plus
VMware Data Recovery (for 6 CPUs)		✓
VMware High Availability (for 6 CPUs)		✓
VMware Update Manager (for 6 CPUs)	✓	✓
VMware vSMP (for 6 CPUs)	4-way SMP	4-way SMP
VMware vCenter Server Agent (for 6 CPUs)	✓	✓
VMware ESX/ESXi (for 6 CPUs)	✓	✓
VMware® vCenter Server (for 3 servers with up to 2 CPUs each) (1 instance)	✓	✓
All-in-one pricing	$995	
License	License ($879)	License ($2,995)
Support and Subscription	Mandatory 1 year subscription ($116)	Mandatory 1 year Support and Subscription ($629 Gold/ $749 Plat)
Optional	Support per incident is $299	

Entitlements Overview
(Individual feature license purchases not included)

Original License with Valid SnS	VMware vSphere License	New Features Added	Upgrade Promotion until 12/15/09
VMware® Infrastructure 3 Enterprise (One 2-CPU license)	**VMware vSphere 4 Enterprise** (Two 1-CPU licenses, limited to 6 cores per CPU and 256GB RAM)	**VMware Fault Tolerance** **VMware Data Recovery** **VMware vShield Zones**	**$295/CPU to VMware vSphere Enterprise Plus Edition**
VMware® Infrastructure 3 Standard Edition (One 2-CPU license)	**VMware vSphere 4 Standard** (Two 1-CPU licenses, limited to 6 cores per CPU and 256GB RAM)	**VMware vStorage Thin Provisioning**	**$745/CPU to VMware vSphere Advanced Edition**
VMware® Infrastructure 3 Foundation Edition (One 2-CPU license)	**VMware vSphere Standard** (Two 1-CPU licenses, limited to 6 cores per CPU and 256GB RAM)	**VMware HA** **VMware vStorage Thin Provisioning**	
VMware vCenter Server	**VMware vCenter Server Standard**	**VMware vCenter Orchestrator** **VMware vCenter Server Linked Mode**	
VMware vCenter Server Foundation	**VMware vCenter Server Foundation**		

New Sales Opportunities Enabled by VMware vSphere 4

1. **Drive deeper and broader adoption of virtualization in the datacenter**

- Virtualize Tier 1 applications with:
  - Maximized application throughput
    - Up to 8,900 database transactions[1] per second per virtual machine; annually 5x the entire payment traffic of VISA
    - Over 200,000 IOPS per ESX host; capable of supporting over 3x the average daily traffic of eBay[2]
    - Increased MS SQL Server throughput efficiency by 20%
    - Increased Citrix XenApp throughput by 30%
    - Up to 3x network transmit throughput increases
    - Up to 10x more iSCSI throughput to storage[3]
    - Record number of MS Exchange mailboxes per host[4]
  - Increased control over service levels
    - VMware Fault Tolerance provides continuous levels of availability against hardware failures, tackling the needs of critical applications which may not have had any prior solutions for protection or used expensive redundant hardware/complex clustering software
    - VMware vShield Zones provides an efficient way of enforcing application firewall policies in shared cluster environments
    - Non-disruptive scale up of virtual machine CPUs (from 4 to 8 vCPUs), memory (64GB to 255GB), devices and disks
- Enforce enterprise levels of control over change and configuration through unique large scale management features (Why customers should buy or upgrade to Enterprise Plus)
  - VMware Host Profiles and VMware vNetwork Distributed Switch allow easy standardization of server security, storage and network settings, increasing operational efficiency by automating configuration management and reducing errors due to misconfiguration
  - VMware DRS automates dynamic allocation of resources to virtual machines reducing the need to manually monitor and move virtual machines to address workload peaks and lows
  - VMware DPM (now supported fully) automates power optimization, reducing power costs by up to 20%
  - VMware Storage VMotion (new UI now available) makes it easy to live migrate virtual machine disks from one storage location to another without disruption or downtime
  - Additional core entitlements future proof datacenters for increasing the numbers of cores in CPUs
- Deepen integration with storage, networking and security teams reducing barriers to adoption
  - Advanced network management with third-party distributed virtual switch (e.g. Cisco Nexus 1000v)
  - Advanced storage management with third-party multipathing plug-ins (e.g. EMC PowerPath)
  - Advanced security with third-party security products leveraging VMsafe interfaces (e.g. Symantec, McAfee, Checkpoint, IBM, etc.)

2. **Drive virtualization adoption with SMB customers and ROBO customers**

- **Integrated data protection**: Efficient integrated backup and recovery and integrated firewall protection
- **Increased availability**: Continuous protection against hardware failures with VMware Fault Tolerance
- **Affordable IT**: New packaging options to provide the industry's lowest cost solution per workload

---

[1] http://www.vmware.com/company/news/releases/performance-vmworld.html

[2] http://www.vmware.com/company/news/releases/specweb2005.html

[3] 10GigE now supported with iSCSI

[4] http://www.vmware.com/company/news/releases/ibm_exchange_vmworld.html

Competitive Overview for VMware vSphere 4

Most Efficient:

• vSphere's higher consolidation ratios and higher scalability result in better CapEx savings
• vSphere's Infrastructure, Application and vCenter Management services result in better OpEx savings

Uncompromised Control:

• VMware technologies like DRS, DPM, FT, VMsafe, Host Profiles, Storage VMotion, and others allow IT to deliver on SLAs while maintaining control

Maximum Choice

• VMware strives to support whatever hardware, application stack, management stack, OS, or service provider the customer has selected
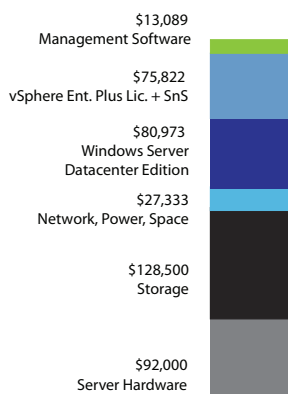• VMware strategy: Broad support to enable maximum customer choice

Sample Soundbites

Customer question: "So why should I choose VMware vSphere instead of _____?"

• "Other competitors don't get it. It's not about a hypervisor or live migration. It's about a complete datacenter-wide OS that aggregates disparate resources into a seamless internal cloud."

• "VMware is the 'software mainframe' offering better uptime than anything based on Hyper-V. Our solutions can make application downtime a thing of the past."

• "VMware is the lowest cost-per-application – 20% lower than other vendors' so-called 'free' offerings."

• "VMware supports 4x more guest operating systems than Microsoft. In fact, VMware supports more versions of Windows than Microsoft."
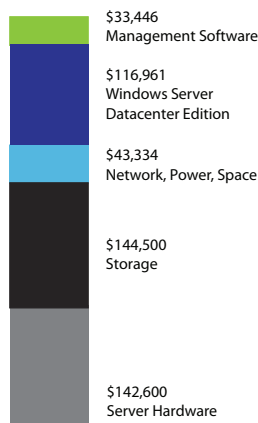
Cost per Application Comparison

$434,881
(with 2 yrs support) vmware

Microsoft **$480,848**
(with 2 yrs SA)

$13,089
Management Software

$75,822
vSphere Ent. Plus Lic. + SnS

$80,973
Windows Server
Datacenter Edition

$27,333
Network, Power, Space

$128,500
Storage

$92,000
Server Hardware

$33,446
Management Software

$116,961
Windows Server
Datacenter Edition

$43,334
Network, Power, Space

$144,500
Storage

$142,600
Server Hardware

VMware vSphere 4
Enterprise Plus

Microsoft Windows
Server 2008 with Hyper-V

Cost to Deploy
100 Virtual Machines

VMware vSphere 4
Enterprise Plus
$4349 per Application

─────────────

Microsoft Windows
Server 2008 with Hyper-V
$4808 per Application

VMware costs 10% less AND has more functionality!

Use the Cost per Application Calculator to figure out your cost per application:
http://www.vmware.com/technology/calculator/costperapp.html

Comparison Tables

Most Efficient	vmware	Microsoft	CITRIX
Hardware Scale Out	✓ 64 logical cores 512GB RAM	~ 24 logical cores 1TB TAM	X 32 logical cores 128GB RAM
CPU Efficiency	✓ CPU HW-assist or BT Virt-specific scheduler	X Requires HW-assist Reuse gen-OS scheduler	X Requires HW-assist for Win Reuse gen-OS scheduler
Memory Efficiency	✓ Memory HW-assist Overcommit/sharing	X Memory HW-assist No overcommitment	X Memory HW-assist No overcommitment
Virtual Hardware (VM) Scale Out	✓ 8-way vCPU 255GM vRAM	X 4-way on Win08 only 64GB vRAM	~ 8-way vCPU 32GB vRAM
Hot-add/remove Virtual Resources	✓ Add: vCPU, vMem Add: virtual disk	X None	X No hot-add CPU, mem Add: virtual disk
Power Efficiency	✓ DPM: Cluster-level power management	X No Cluster-level management	X No Cluster-level management
Storage Usage Efficiency	✓ Thin provisioning monitoring tools	X Thin disks, but no monitoring tools	X Only by way of third-party storage vendor
Network Management Efficiency	✓ Distributed switch Third-party virtual switch	X None	X None
Automated Patching Efficiency	✓ Transparent host patch Auto guest patching	X Host patching causes VM downtime	X Host patching, but no auto guest patching

★ New capability in VMware vSphere
Note: Many improvements were also made to existing VI3 capabilities

Uncompromised Control	vmware	Microsoft	CITRIX
Control for Server Maintenance	✓ VMware vMotion (w/ Enhanced Compatibility)	X Quick Migration causes downtime	✓ XenMotion
Control for Storage Maintenance	✓ VMware Enhanced Storage VMotion	X Nothing comparable	X Nothing comparable
Control for Resource Allocation	✓ VMware DRS Logical Resource Pool	X Pro Tips has downtime No logical pools	X Third-party for DRS No logical pools
Fault Tolerance for VMs	✓ VMware Fault Tolerance	X No VM-level protection	X Promised feature hasn't shipped yet
Control during NIC Failure	✓ Integrated NIC teaming	X Relies on network vendor to provide	~ Supported, but may require CLI to configure
Control during Host or VM Failure	✓ VMware HA Up to 32 nodes	X Only for host failure 1-VM-per-LUN issue	~ Only for host failure Up to 18 nodes
Control during Entire Site Failure	✓ VMware Site Recovery Manager	X Geo-clustering has no workflow, testing, audit	X Nothing comparable
Thin Hypervisor to Reduce Attack Surface	✓ VMware ESXi 70-100MB disk footprint	X Hyper-V w/ Server Core >2 GB disk footprint	X XenServer 1.8GB disk footprint
Better Security than Physical	✓ VMware VMSafe API Third-party support	X Nothing comparable	X Nothing comparable

★ New capability in VMware vSphere
Note: Many improvements were also made to existing VI3 capabilities

Comparison Tables

Maximum Choice	vmware	Microsoft	CITRIX
Choice through Guest OS Support	✓ >30 OSs supported More Windows than MS	✗ 11 OSs supported Windows biased	✗ 20 OSs supported
Choice through Hardware Support	✓ Large HCL: >450 HBAs, >160 NICs, >450 Servers	~ Using Windows drivers Potential driver issues	✗ Very limited HCL ~100 Servers
Choice through Application Support	✓ Leader category (according to a lead analyst firm)	✓ Leader category (according to a lead analyst firm)	~ Next-tier category (according to a lead analyst firm)
Integrating with Existing Management Tools	✓ Dozens of integrations vCenter API by SDK	~ Can integrate, but SC competes w/ existing	✗ Citrix Essentials API not readily available
Choice in 'Cloud' Service Provider	⭐✓ VM Ready program for cloud providers	✗ Building a MS-hosted offering	✗ No clear cloud strategy
Interoperability between Internal & External Cloud	⭐✓ VM Ready ensures interoperability	✗ Apps in MS cloud don't come back out	✗ No clear cloud strategy
Choice in Using Existing Applications in the Cloud	✓ Run existing apps w/o rewriting code	✗ Apps need to be rewritten for MS cloud	✗ No clear cloud strategy

⭐ New capability in VMware vSphere
Note: Many improvements were also made to existing VI3 capabilities

Important Links:

VMware vSphere Upgrade Center: Repository for all information on why upgrade to vSphere, how to upgrade with guides and demos, compatibility matrix, etc.
www.vmware.com/go/vsphere-upgrade-center

Licensing Support Page: Repository of all information on how licensing has changed, how to get new licenses, and how to deploy them.
www.vmware.com/support/licensing.html

VMware, Inc. 3401 Hillview Ave, Palo Alto, CA 94304 Tel: 1-877-486-9273 or 650-475-5000 Fax: 650-475-5001 vmware.com

9 / 9