Virtualizing Mission Critical Applications for Business Production

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vSpecialist
The Journey to The Private Cloud

<table>
<thead>
<tr>
<th>IT Production</th>
<th>Business Production</th>
<th>IT-as-a-Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Costs</td>
<td>Improve Quality Of Service</td>
<td>Improve Agility</td>
</tr>
</tbody>
</table>

- Lower Costs: IT Production
- Improve Quality Of Service: Business Production
- Improve Agility: IT-as-a-Service

% Virtualized:
- 15%
- 30%
- 50%
- 85%
- 95%

Lower Costs
- IT

Improve Quality Of Service
- Business

Improve Agility
- IT-as-a-Service

Microsoft
Oracle
SAP

Platinum
Gold
The Trend Is Clear…

<table>
<thead>
<tr>
<th>Application</th>
<th>% of customers running apps in production on VMware</th>
</tr>
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<tbody>
<tr>
<td>MS Exchange</td>
<td>36%</td>
</tr>
<tr>
<td>MS SQL</td>
<td>56%</td>
</tr>
<tr>
<td>MS SharePoint</td>
<td>53%</td>
</tr>
<tr>
<td>Oracle Middleware</td>
<td>41%</td>
</tr>
<tr>
<td>Oracle DB</td>
<td>34%</td>
</tr>
<tr>
<td>IBM WebSphere</td>
<td>50%</td>
</tr>
<tr>
<td>IBM DB2</td>
<td>24%</td>
</tr>
<tr>
<td>SAP</td>
<td>27%</td>
</tr>
</tbody>
</table>

Source: VMware customer survey, September 2008, sample size 1038
Data: Within subset of VMware customers running a specific app, % that have at least one instance of that app in production in a VM

In a recent Gartner poll, 73% of customers claimed to use x86 virtualization for mission critical applications in production
Source: Gartner IOM Conference (June 2008)
“Linux and Windows Server Virtualization Is Picking Up Steam” (ID Number: G00161702)
EMC is the BEST Solution for VMware

EMC: The #1 choice for virtualized environments

“Almost 40% chose EMC as preferred storage vendor in virtualized server environments (more than two times any other supplier).”

Source: Goldman Sachs, Americas Technology Hardware 2010 Outlook, January 2010

“EMC remains the clear storage leader in virtualized storage environments.”

Source: Goldman Sachs IT Spending Survey, January 7, 2010
Why EMC for Virtualized Mission Critical Applications

Best Server, Storage Utilization

Virtual Provisioning

Support Service Level Agreements

DRS, vMotion

VLUN, PP/VE, QoS

Purpose Built Backup for VMware

Production

Dev/Test

Advanced Disaster Recovery

Replication Manager

Emc

Emc

Emc

Emc

Emc

Emc

RecoverPoint

SRM
Critical Attributes for Mission Critical Applications

• Performance
  – Ensure performance levels and support business requirements

• Management
  – End-to-end visibility and automation

• Business Continuity
  – Ensure availability
  – Simplify planning and failover with automation

• Security
  – Data cannot be compromised

Better support of Service Level Agreements
The Virtualization Journey—
Business Production
Better Performance and Flexibility

EMC Fully Automated Storage Tiering
1.5x more transactions
2.5x faster response time
30% lower TCO

EMC Symmetrix VMAX
Ultra-scalable storage built for
the most stringent SLAs in a virtual environment
Optimize Storage and Lower Costs
EMC Tiered Storage for Oracle Data Warehouse

Dynamically optimizes performance management and cost

- EMC FAST maintains an end-to-end view as data moves to the optimal tier, non-disruptively to meet business objectives
- Symmetrix VMAX with Performance Analyzer creates detailed performance trends and analysis
- Ionix ControlCenter StorageScope reports storage utilization to facilitate chargeback
Vblock™ Powered Solution for SAP

• Vblock is truly an optimized multi-application compute system
  – One UCS chassis was equivalent to a complete SAP production landscape
  – Average performance improvement of 50%

• Vblock use cases demonstrate great operation agility, responsiveness and predictability in support of TCO study conclusions.
  – Simplify provisioning and operation
  – Cost reduction across SAP layers
  – Monitoring SAP landscape
  – Securing all SAP layers
  – High Availability (HA), Business Continuity, and Disaster Recovery (BC / DR)
The Virtualization Journey—Business Production
Manage every layer of the virtual information infrastructure

EMC Ionix
Identifies root cause and business impact of infrastructure issues
Automates model-based network change, confirmation, and compliance management
Manages resources efficiently

EMC PowerPath/VE
Automates optimal server, storage, and path utilization in a dynamic virtual environment

EMC Unified Infrastructure Manager
Single point of management for Vblock Infrastructure Packages
Ionix ControlCenter Console Relationship View

- Shows virtual to physical mapping in SAN
  - Shows end-to-end relationship from a VM to spindles
  - Maps application to resources
  - Enables root-cause analysis
- Views include:
  - ESX server to VM guest
  - ESX server to data store
  - Display properties of a virtual machine
  - Properties View displays the most common attributes (including configuration) for the selected objects
Load Balancing in Virtual Environments

• Managing complex storage architectures
  – Hundreds or thousands of independent virtual machines
  – I/O-intensive applications
  – Added complexity of VMware VMotion, Distributed Resource Scheduler, High Availability

• PowerPath manages all this complexity
  – Constantly adjusts I/O path usage and changes in I/O loads from VMs
  – Simplifies provisioning
  – Optimizes overall I/O performance
VMware-Based Storage Management with EMC Storage Viewer Plug-in for vCenter Server

- Provides integrated views of storage use, configurations, and checks for best practice settings

Free download for EMC customers
Making Storage VMware-Aware
Managing Virtual Machine Environments via Navisphere (Flare 29)
Improve Efficiencies, Reduce Costs with Virtual Storage

Simplify management and deliver better performance

- 40% more performance
  - Requires less power and delivering more IOPS
- 40% higher I/O throughput
  - PowerPath/VE enables consistent, predictable performance
- 90% faster provisioning
  - Auto Provisioning Groups supports VMs and storage
- 75% reduction in initial storage allocation
  - Virtual Provisioning improves utilization and capacity on demand

Microsoft SQL Server  Exchange SharePoint
VMware vSphere 4
The Virtualization Journey—Business Production

EMC Information Infrastructure: your virtualized data center

**Protection**

**EMC Avamar and Data Domain**
95% faster backups and restores using 90% less capacity
vStorage API and vCenter integrated

**EMC VPLEX**
No downtime data migrations, VMotion over distance

**EMC RecoverPoint**
Enable any-point-in-time recovery to protect data against loss or corruption

**EMC Replication Manager**
Application-centric product manages the entire data replication process
Virtual Machine (VM) Failover

Before VMware Site Recovery Manager

1. VM mapped to LUNs and consistency groups
2. Replicate LUNs
3. Shut down the virtual machine
4. Pause replicated image (journal captures)
5. Select most recent snapshot
6. Allow image access to remote VMware ESX
7. Scan for new disk
8. Register VM
9. Power-up VM
10. Failback
11. Recover local VM
Virtual Machine Failover
With VMware Site Recovery Manager

Shut down the virtual machine
Pause replicated image (journal captures)
Select most recent snapshot
Allow image access to remote VMware
ESX Server
Scan for new disk
Register VM
Power-up VM
* User initiates failback
Reverse replication direction, sync data
Recover local VM

1. VM mapped to LUNs and consistency groups
2. Replicate LUNs

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Integrated Disaster Recovery for SAP with RecoverPoint and VMware SRM

- Non-disruptive full rehearsals for full SAP environments
- Integration of RecoverPoint and VMware SRM
- Supports audit requirements
- Simplifies and automates disaster recovery workflows
- Setup, testing, and failover
- Centrally manages and automates recovery plans
Simplified migration of virtual application servers between datacenters across distances of up to 100 KM – with VPLEX

Non-disruptive workload migration with VMware VMotion
Reduce Costs and Improve Backup Performance for Microsoft SharePoint

- Reduce power, cooling and data center space with VMware
- Increase availability using VMware VMotion, VMware HA and VMware Distributed Resource Scheduler
- Allocate storage just-in-time with Celerra Thin Provisioning
- Instantly backup Microsoft SharePoint without performance impact using Replication Manager
Increase Oracle Availability with Virtualization

**High availability**
100% uptime migration of virtual machines in three minutes with VMotion and multiple virtual machine failover in five minutes with VMware High Availability

**Seamless scalability**
Migrate Virtual LUN to a new storage tier or protection type with 100% uptime

**Minimize licensing costs**
Use all of the CPU that you pay for and save millions in licensing

**Reduce total cost of ownership**
Consolidate infrastructure and increase hardware utilization
The Virtualization Journey—
Business Production

Leverage advanced protection in a virtual environment

- RSA enVision correlates events across the virtualized environment to identify suspicious behaviors
  - SecureID ensures administration authentication for access to the ESX service console

- VMware vShield Zones used to restrict access to internal security appliances
  - RSA enVision, Authentication Manager, and the Data Loss Prevention Suite VMs ensure only necessary communications with connected sources and targets

- SNMP configuration can ensure that events in the storage array are visible to RSA enVision and the security infrastructure
  - Data must be visible not only to hosts that currently house the data, but to all hosts that could potentially house that data
RSA enVision in the VMware Environment

• A VI-Client running on RSA enVision Collector Appliance will invoke an API call to the vCenter Server.
• Only SIEM that collects 2 distinct logs from VMware environment thru 1 seamless, agentless connection
  – vCenter logs
  – ESX/ESXi server logs
  – Covers 380 distinct messages
• Ease of analysis, implementation and change control in VMware environment
Securing Critical Apps: Secure Virtual Desktops

Ionix SCM for security configuration and patch management

RSA SecurID for remote authentication

RSA DLP for protection of data-in-use

Microsoft Active Directory

VMware vCenter

Clients

VMware Infrastructure

VMware View Manager

RSA SecurID for ESX Service Console and vMA

RSA enVision log management for:
- VMware vCenter
- VMware View
- Ionix SCM
- RSA SecurID
- RSA Data Loss Prevention
- Microsoft Active Directory
- Cisco UCS
- EMC Storage
Securing the Virtual Information Infrastructure

Protect information at every layer of the virtual information infrastructure

- Control information behavior even as virtual machines are moved throughout the environment
- Comprehensive reports enable seamless tracking of sensitive information activity
- Minimize risk with a validated approach from EMC

Virtual Information Infrastructure

- VMware
- Data Loss Prevention Suite
- SecureID
- enVision

Virtualization

Server

- Cisco UCS
- Dell rack-mount servers

Network

- Cisco switches

Storage

- EMC CLARiiON
- EMC Symmetrix VMAX

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# EMC Virtualization Services Capabilities

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Design</th>
<th>Implement</th>
<th>Operations</th>
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<tbody>
<tr>
<td>Discovery</td>
<td>Detailed Design</td>
<td>Implement</td>
<td>Continuous Improvement</td>
</tr>
<tr>
<td>Analysis</td>
<td>Pilot and Test</td>
<td>Transition</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Report metrics continuously</td>
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<table>
<thead>
<tr>
<th>Manage the virtual program, processes, and environment</th>
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<tbody>
<tr>
<td>Create business case; determine requirements</td>
</tr>
<tr>
<td>Create operational best practices, processes</td>
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<tr>
<td>Transition operations to new virtual model</td>
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<tr>
<td>Report metrics continuously</td>
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<tr>
<th>Optimize virtual infrastructure and service levels</th>
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<tbody>
<tr>
<td>Develop strategic end-state architecture and roadmap</td>
</tr>
<tr>
<td>Develop detailed design</td>
</tr>
<tr>
<td>Deploy virtual infrastructure</td>
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<tr>
<td>Develop skills</td>
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<tr>
<th>Virtualize Tier 1 applications</th>
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<tbody>
<tr>
<td>Rationalize application portfolio; determine platform strategy</td>
</tr>
<tr>
<td>Profile application characteristics</td>
</tr>
<tr>
<td>Migrate applications to virtual environment</td>
</tr>
<tr>
<td>Manage the Virtualization program</td>
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Enhancing Skills and Expertise
Featured Courses from EMC Education Services

**Hands-on workshops to integrate and optimize capabilities of EMC storage platforms in VMware virtualized application environments**

- VMware vSphere integration with CLARiiON, Celerra, and Symmetrix
- Performance and capacity optimization involving CLARiiON, Celerra, Symmetrix, ControlCenter StorageScope and multiple server operating systems
- Symmetrix FAST Configuration and Management

**VMware courses, available from EMC**

- VMware vSphere Install, Configure, Manage
- VMware vSphere Manage Availability
- VMware vSphere Design Workshop
- And more

**Cloud Computing Foundations e-Learning**

- Expand your public, private, and hybrid cloud perspective

Learn more ➔ http://education.EMC.com
Only EMC…

provides the most & comprehensive support for vSphere and VMware’s companion product portfolio

can deliver the scale and integration diversity required to reach your virtualization SLAs and goals

is the industry leader with a turnkey, full integrated platform of products, services and solutions that fuel the transformation from physical to virtual – Joint offering with Cisco & VMware -- Vblock

brings the broadest set of capabilities, know-how and technology offerings to extend the value of your VMware investment -- accelerating, extending and enhancing your Journey to the Private Cloud
EMC: The #1 Choice for Virtualized Environments

Why do twice as many CIOs pick EMC for their VMware environments?

Best technology + Best people + Best solutions

EMC² + VMware® = Zero Risk

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Next Steps

- Review Reference Architectures on www.emc.com
- Meet with an EMC vSpecialist to learn more
- Meet with EMC Consulting to develop a strategy
- Accelerate your Journey to the Private Cloud
THANK YOU