Delivering Business Continuity Solutions with VMware Virtualization

VMware Virtualization Forum 2009
Agenda

- Business Continuity Requirements
- Minimizing Downtime in the Datacenter
- Providing Effective Disaster Recovery
- Summary and Next Steps
Business Continuity: The Big Picture

Business Continuity = Minimizing Downtime

Availability expectations continue to increase

- RTO’s decreasing from >24 hours to <12 hours

Cost of downtime continues to rise

- Increasing dependence on x86 infrastructure

Almost 60% of surveyed companies incurred significant financial damage as a result of systems failure in the past year

-- Economist Intelligence Unit

Source: META Group

Cost of Downtime Per Hour

<table>
<thead>
<tr>
<th>Industry</th>
<th>Cost ( Millions per Hour )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>2.5</td>
</tr>
<tr>
<td>Telecom</td>
<td>2.0</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>1.5</td>
</tr>
<tr>
<td>Average</td>
<td>1.0</td>
</tr>
<tr>
<td>Financial Svcs</td>
<td>0.5</td>
</tr>
<tr>
<td>IT</td>
<td>0.0</td>
</tr>
<tr>
<td>Insurance</td>
<td>0.5</td>
</tr>
<tr>
<td>Retail</td>
<td>0.0</td>
</tr>
<tr>
<td>Pharma</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Source: META Group
### Requirements for Building Business Continuity Solutions

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Benefits</th>
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</thead>
<tbody>
<tr>
<td><strong>Built on a reliable platform</strong></td>
<td>• Over 85% of customers using for production workloads</td>
</tr>
<tr>
<td></td>
<td>• No reliance on OS or arbitrary drivers</td>
</tr>
<tr>
<td><strong>Independent of physical infrastructure</strong></td>
<td>• Hardware-independent protection</td>
</tr>
<tr>
<td><strong>Protection across operating systems and applications</strong></td>
<td>• Application and OS independent protection</td>
</tr>
<tr>
<td><strong>Protection against a broad spectrum of downtime causes</strong></td>
<td>• Protection against planned and unplanned downtime</td>
</tr>
<tr>
<td></td>
<td>• Protection against component, server, data, and site failures</td>
</tr>
</tbody>
</table>
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Business Continuity Requirements

Minimizing Downtime in the Datacenter
- Protection against failures
- Eliminating planned downtime

Providing Effective Disaster Recovery

Summary and Next Steps
Transforming the Cost and Complexity of Business Continuity

Traditional solutions are costly and complex
- Point solutions tied to HW, OS, or applications

VMware reduces cost and complexity at each business continuity level
- Integrated with the VI platform
- HW, OS, app independent

- Mirrored Sites
- Fault-Tolerant Configurations
- Site Recovery Manager
- VMware FT
- VMware HA
- DRS
- VMotion
- Shared Redundancy
- Encapsulation
- Isolation

Entry-Level Server
High-End Server
Failover Cluster

VMware Offers Protection At Every Level

- Protection against hardware failures
- Planned maintenance with zero downtime
- Protection against unplanned downtime and disasters

NIC Teaming, Multipathing
VMware Fault Tolerance, High Availability, DRS Maintenance Mode, VMotion

Component
VMware Infrastructure
Storage
VCB + 3rd-Party Backup Solutions, VMware Data Recovery

Server
Storage Data
Data Site
Site Recovery Manager

Site
Protection Against Planned Downtime

Server Maintenance
- VMotion & DRS Maintenance Mode
- Migrate running VMs to other servers in the pool
- Automatically distribute workloads for optimal performance

Storage Maintenance
- Storage VMotion
- Migrate datastores for running VMs to other storage targets

Key Benefits
- Eliminate downtime for common maintenance
- No application or end user impact
- Freedom to perform maintenance whenever desired
Protection Against Unplanned Downtime

**Component Failure**
- Leverage redundant network and storage connections
- Share redundancy across workloads

**Server Failure**
- Automatic restart of virtual machines
  VMware High Availability automatically restarts VMs on other servers in the pool
- Continuous protection with VMware Fault Tolerance

**Site Failure**
- Automated failover with Site Recovery Manager
Transforming Availability

Hardware Failure Tolerance

- CONTINUOUS
- AUTOMATED RESTART
- MANUAL RESTART
- UNPROTECTED

Application Coverage

0% 10% 100%

with VMware HA

VMware FT
VMware Fault Tolerance – *New in vSphere 4.0!*

- Single identical VMs running in lockstep on separate hosts
- **Zero downtime, zero data loss** failover for all virtual machines in case of hardware failures
- Integrated with VMware HA/DRS
- No complex clustering or specialized hardware required
- Single common mechanism for all applications and operating systems
### Target VMware FT Applications

<table>
<thead>
<tr>
<th>Workload Type</th>
<th>Application</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database</td>
<td>Small to medium instances that are strategic to IT infrastructure</td>
<td>Costs to deploy traditional cluster solutions not justified but availability is a must</td>
</tr>
<tr>
<td>Exchange and messaging</td>
<td>&lt; 1000 users</td>
<td>Reduced licensing and management costs</td>
</tr>
<tr>
<td>Remote Branch Office</td>
<td>Many workloads</td>
<td>SLA requirements require a traditional cluster ($$$). Deliver high availability at lower cost and easier to administer.</td>
</tr>
<tr>
<td>Custom applications</td>
<td>Business-specific solutions</td>
<td>Cluster solutions not available today</td>
</tr>
</tbody>
</table>
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Business Continuity Requirements

Minimizing Downtime in the Datacenter

Providing Effective Disaster Recovery
- Disaster Recovery Challenges and Requirements
- Using VMware Products to Build Disaster Recovery Solutions

Summary and Next Steps
Challenges of Traditional Disaster Recovery

- Complex recovery processes and infrastructure
- Dependent on perfect training, documentation, and execution
- Failure to meet recovery requirements
  - Recovery takes days to weeks
  - Recovery tests often fail
  - Significant IT time and resources consumed
Disaster Recovery Risks

Drivers of risk

- New applications or changing app/infrastructure configuration
- Gap between current configuration and last revision of the DR plan
- Human error and manual steps during DR testing & failover
- Availability of key DR staff
- Lengthy recovery time
- Increasing complexity of managing the DR solution

Associated costs

- Lost business & productivity for each hour of downtime
- (Unpredictable) staff overtime
- Application end-users disrupted by testing & outages; inability to meet SLAs
Reducing and Managing Recovery Risk

Best Practices for Minimizing Risk

- **Frequent testing** to ensure DR plan correct & successful
- **Automation** to minimize mistakes and speed up recovery time
- **Tight integration** between infrastructure management and DR solution
- **Multiple layers of downtime protection** at all levels of the datacenter
Key Features of Virtualization for Disaster Recovery

**Hardware-Independence**
- Reliably recover a virtual machine to any hardware
- Enable waterfaling of equipment to recovery site

**Encapsulation**
- All information about a system is stored as data on disk
- Entire systems can be protected with data protection tools

**Partitioning and Consolidation**
- Reduced hardware requirements at production and DR site
- Can use higher consolidation ratios at DR site

**Resource Pooling**
- Transparently share and allocate hardware resources
- Automatic resource optimization
Using VMware Infrastructure in our disaster recovery plans, we’ve been able to reduce the time it takes to recover our critical systems by 50 percent.

-- Ted Duncan, Education Datacenter, Florida Department of Education
Building Better Disaster Recovery Solutions

Management
- Simplify and automate implementation, testing, and execution of recovery process

Data
- Provide full protection of configuration, OS, and application data

Infrastructure
- Reduce cost and complexity of providing infrastructure necessary to ensure successful recovery
Reduce Cost and Complexity of Recovery Infrastructure

Eliminate hardware dependencies
- Reduce risk of failures during recovery
- Reduce ongoing management burden

Reduce infrastructure requirements
- Consolidate production and recovery
- Reuse servers from production for recovery

Turn recovery site into productive resource
- Leverage recovery site for other workloads
- Resource guarantees ensure predictable resource allocation
Improving Data Protection

**VMware enables scalable, non-disruptive backup and simple, reliable restore to any hardware**

**Traditional backup**
- Disruptive to applications and users
- Slow, complex process for full restore

**Backup with VMware vSphere**
- Non-disruptive to applications & users
- Enables off-host backup with standard backup software
- Enables image and file-level backup of virtual machines
VMware Data Recovery – New in vSphere 4.0!

1. Backup
   - vCenter Server
   - 1. Schedule backups via VC
   - 2. Snapshots taken
   - 3. Data de-duped and stored

2. Restore
   - vCenter Server
   - 1. VM goes down
   - 2. Select VM images/files to recover
   - 3. Restore... VM running in seconds

- Agent-less, disk-based backup and recovery of your VMs
- VM or file level restore
- Incremental backups and data de-dupe to save disk space
- Quick, simple and complete data protection for your VMs
- Centralized Management through VMware Infrastructure client
- Cost-effective use of storage for backup data
Improved Recovery with Data Recovery

- Backups and restores can run simultaneously
- Highly customizible image level restore
  - Replace a lost VM
  - Restore to a different location/datastore
  - Select disks to restore
- Fast “roll back”:
  - Use change tracking to roll back a virtual disk/Virtual Machine to an earlier state
  - Only transfers modified blocks for fast restore
- Restore Rehearsal:
  - Run a restore of a VM to a different datastore and disable networking
**Data Protection Options**

- **Virtual machine backup**
  - File and image backup
  - Useful for non-production and some stateless virtual machines
  - Slowest recovery time

- **Server-based replication**
  - Granular replication
  - Generally OS-dependent
  - Processing overhead on server

- **Array-based replication**
  - Least impact on server
  - LUN-level granularity
Simplifying the Disaster Recovery Process

**Eliminate recovery steps**
- No operating system re-install or bare-metal recovery
- No time spent reconfiguring hardware

**Standardize recovery process**
- Consistent process independent of operating system and hardware
VMware vCenter Site Recovery Manager

Site Recovery Manager leverages VMware Infrastructure to deliver advanced disaster recovery management and automation

- Simplifies and automates disaster recovery workflows:
  - Setup, testing, failover

- Turns manual recovery runbooks into automated recovery plans

- Provides central management of recovery plans from the VMware Infrastructure Client

Works with VMware Infrastructure to make disaster recovery rapid, reliable, manageable, affordable
Site Recovery Manager Key Components

- **Site Recovery Manager**
  - Manages and monitors recovery plans
  - Tightly integrated with vCenter Server

- **VMware Infrastructure**
  - Builds on top of VMware ESX and vCenter Server platform

- **Storage**
  - iSCSI or FibreChannel storage

- **Storage Partner Replication**
  - Integrated via replication adapters created, certified and supported by replication vendor

**Partner Replication**
Disaster Recovery Setup

Integrate with replication
- Identify which virtual machines are protected by replication configuration

Map recovery resources
- Server resources, network resources, management objects

Create recovery plans
- For virtual machines, applications, business units
- Convert manual runbook to pre-programmed response
- Customizable with scripting and callouts

Simplify configuration of recovery infrastructure and process
Simplify coordination of replication with virtual environment
Site Recovery Manager: User Interface

Managed through vCenter plug-in

Key configuration steps
Site Recovery Manager:
Creating and Editing Recovery Plans

Recovery plans for failure scenarios
Recovery plan editor
Testing

Replication Management
- Snapshot replicated LUNs before test
- Delete snapshots of replicated LUNs after test

Network Management
- Change all virtual machines to a test port group before powering them on

Customization/extensibility
- Same breakpoints and callouts as failover sequence
- Extra breakpoints and callouts around the test bubble

- Non-disruptive testing of recovery plans
- Testing can incorporate existing/non-virtual DR tools and processes
Testing and Executing Recovery Plans

Steps in recovery plan

Status and time stamps

When to execute

User confirmation message

[Diagram of recovery plan steps and statuses]
Failover Automation

- Detect site failures
  - Raise alert when heartbeat lost

- Initiate failover
  - User confirmation of outage
  - Granular failover initiation

- Manage replication failover
  - Break replication
  - Make replica visible to recovery hosts

- Execute recovery process
  - Use pre-programmed plan
  - Provide visibility into progress

- Automation for failover (and failback) process
- Real-time, step-by-step visibility into execution progress
Failover Initiation

From the VI Client in the recovery site, expand Recovery Plans in the left-hand pane and select the recovery plan to execute the failover against. The failover can be started by either clicking on the ‘Run’ button that is highlighted above or by clicking on the ‘Execute Recovery Plan’ link under the Commands section.
Simplified Compliance

Self-documenting recovery plans

- Centrally managed
- Always current

Easier testing

- Ensure recoverability with realistic testing

Auditable testing and failover

- View and export recovery plans, tests, execution
Agenda

Business Continuity Requirements

Minimizing Downtime in the Datacenter

Providing Effective Disaster Recovery

Summary and Next Steps
Why VMware Software for Business Continuity

Expand protection
- Any workload in a virtual machine can be protected with minimal incremental effort and cost

Slash planned downtime
- Zero-downtime hardware maintenance
- Non-disruptive virtual machine disk migration

Minimize unplanned downtime
- Platform reliability built-in
- Automatic restart after server or OS failure
- Manageable, automated disaster recovery
“If your organization is already taking advantage of virtualization, then adding Site Recovery Manager to handle disaster recovery is a no-brainer.”

Jerry Wilkin
Senior Systems Administrator, Dayton Superior Corporation

Learn more at www.vmware.com/customers/stories
Site Recovery Manager Promotion

Site Recovery Manager Acceleration Kit

A 15% discount on what you need for your first purchase of SRM

An easy way to get started with Site Recovery Manager
BC/DR Service Offerings

VMware vCenter Site Recovery Manager Jumpstart

- The VMware vCenter Site Recovery Manager Jumpstart provides you with a proof-of-concept, on-site installation and configuration of SRM.
- 3 days on-site, 5 participants max

Plan and Design for VMware vCenter Site Recovery Manager

- The Plan and Design for VMware vCenter Site Recovery Manager service provides a comprehensive architectural design for SRM that addresses your requirements, accommodates VMware vSphere dependencies
- Offered in 3-tiers as a soft-bundle
Next Steps

Learn more

➢ Read more about VMware Business Continuity Solutions at http://www.vmware.com/solutions/continuity/

➢ Find more business continuity customer case studies at http://www.vmware.com/customers/stories/index_continuity.html

Start your evaluation

➢ VMware and partners can help you evaluate VMware software

Get expert help in getting started

➢ Contact VMware at: sales@vmware.com or call 1-877-4VMWARE (486-9273) in the U.S. and Canada, 1-650-475-5000 elsewhere
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