SRM Technical Presentation

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1. SRM Introduction and Concepts
2. SRM 1.0 Prerequisites and SAN Integration
3. SRM Workflows
4. SRM Alarms and Site Status Monitoring
5. SRM Core benefits and Summary
6. SRM Demo
Advantages of Virtual Disaster Recovery

- Virtual machines are portable
- Virtual hardware can be automatically configured
- Test and failover can be automated (minimizes human error)
- The need for idle hardware is reduced
- Costs are lowered, and the quality of service is raised
Introducing Site Recovery Manager (SRM)

Site Recovery Manager leverages VMware Infrastructure to transform disaster recovery

What it is:
- Site Recovery Manager is a new VMware product for disaster recovery

What it does:
- Simplifies and automates disaster recovery processes
  - Setup
  - Testing
  - Failover
  - Failback

Site Recovery Manager works with VMware Infrastructure to enable faster, more reliable, affordable disaster recovery
Site Recovery Manager At A Glance

- VirtualCenter
- Site Recovery Manager
- Array Replication
- Datastore Groups
Site Recovery Manager At A Glance

VirtualCenter → Site Recovery Manager → Protected VMs become unavailable

Array Replication

VirtualCenter → Site Recovery Manager

Protected VMs

Datastore Groups
Site Recovery Manager At A Glance

Protected Site Recovery Site
VirtualCenter Site Recovery Manager

SRM Supports bi-directional Site protection

Datastore Groups

Protected VMs powered on

Protected VMs become unavailable

Array Replication

Datastore Groups

Recovery Site

VirtualCenter Site Recovery Manager

Site A Site B
SRM Server Side Components

* Note: Conceptual drawing only. SRM Server may run on another system than VCMS
<table>
<thead>
<tr>
<th>Site</th>
<th>Concept</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protected</td>
<td>LUN</td>
<td>Indivisible unit of storage that can be replicated</td>
</tr>
<tr>
<td>Protected</td>
<td>Datastore</td>
<td>Contains one or more LUNs (i.e. VMFS)</td>
</tr>
<tr>
<td>Protected</td>
<td>Datastore Groups</td>
<td>Auto-generated collection of one or more datastores. Indivisible unit or storage failover.</td>
</tr>
<tr>
<td>Protected</td>
<td>Protection Group</td>
<td>Collection of all VMs stored in a datastore group</td>
</tr>
<tr>
<td>Recovery</td>
<td>Recovery Plan</td>
<td>Contains one or more protection groups</td>
</tr>
</tbody>
</table>
SRM Concepts And Their Relationships

**Protection Group 1**
- LUN 1
- VMFS 1
- Datastore Group 1
- Recovery Plan 1 (Whole Site)
  - Protection Groups:
    - Protection Group 1
    - Protection Group 2
    - Protection Group 3

**Protection Group 2**
- LUN 2
- VMFS 2
- Datastore Group 2
- Recovery Plan 2 (Subset)
  - Protection Groups:
    - Protection Group 1

**Protection Group 3**
- LUN 3
- VMFS 3
- Datastore Group 3
- Recovery Site
  - Protected Site
  - LUN 4
  - VMFS 4
  - LUN 5
  - VMFS 5
SRM 1.0 Prerequisites

- ESX Server 3.0.2, ESX Server 3.5 or ESX Server 3i
- VirtualCenter (VC) server version 2.5 installed at the protected site and at the recovery site
- SRM server installed at the protected and at the recovery site
- SRM plug-in installed on the VI Clients that will access the protected and recovery site
- Network configuration that allows TCP connectivity between VC servers and SRM servers
- An Oracle or SQL Server database that uses ODBC for connectivity in the protected site and in the recovery site
- A SRM license installed on the VC license server at the protected site and at the recovery site
- Pre-configured array-based replication between the protected site and the recovery site
**Array Integration with SRM**

Vendor-specific scripts support:

- Array discovery
- Replicated LUN discovery
- SRM Test initiation (*simulated failover in an isolated environment*)
- SRM Failover initiation (*actual failover of services to the recovery site*)

▶ Array vendors will be responsible for creating the scripts for their Arrays to enable the integration with SRM
Safety Tip: DNS Validation – The Rule of ‘Four’

Validate DNS is working as expected and by performing the following DNS lookups for the VC, SRM and ESX servers:

- Short name
- Long name
- Reverse
- Forward
Safety Tip: DNS Validation – The Rule of ‘Four’

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<table>
<thead>
<tr>
<th>Short name</th>
<th>Long name</th>
<th>Reverse</th>
<th>Forward</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>vcm-ns1.eng.vmware.com</code></td>
<td><code>vcm-ns1.eng.vmware.com</code></td>
<td><code>10.17.193.1</code></td>
<td><code>10.17.195.196</code></td>
</tr>
</tbody>
</table>
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  - Forward

```
C:\\>nslookup dr-vc-vin22.eng.vmware.com
Name:    dr-vc-vin22.eng.vmware.com
Address: 10.17.195.184
```

```
C:\\>nslookup vms-nsl.eng.vmware.com
Name: vms-nsl.eng.vmware.com
Address: 10.17.195.234
```

```
C:\\>nslookup vin22.eng.vmware.com
Name: vin22.eng.vmware.com
Address: 10.17.195.106
```

```
C:\\>nslookup dr-vc-vin22.eng.vmware.com
Name:    dr-vc-vin22.eng.vmware.com
Address: 10.17.195.184
```

```
C:\\>nslookup vms-nsl.eng.vmware.com
Name: vms-nsl.eng.vmware.com
Address: 10.17.195.234
```

```
C:\\>nslookup vin22.eng.vmware.com
Name: vin22.eng.vmware.com
Address: 10.17.195.106
```
Safety Tip: DNS Validation – The Rule of ‘Four’

- Validate DNS is working as expected and by performing the following DNS lookups for the VC, SRM and ESX servers:
  - Short name
  - Long name
  - Reverse
  - Forward

```
Command Prompt
C:\\nslookup dr-vc-vin22.eng.vmware.com
Name: dr-vc-vin22.eng.vmware.com
Address: 10.17.195.184
Server: vmc-ns1.eng.vmware.com
Address: 10.17.193.1

Command Prompt
C:\\nslookup 10.17.195.234
Name: dr-vc-vin22.eng.vmware.com
Address: 10.17.195.184
Server: vmc-ns1.eng.vmware.com
Address: 10.17.193.1

Command Prompt
C:\\nslookup vin22.eng.vmware.com
Name: vin22.eng.vmware.com
Address: 10.17.195.16
Server: vmc-ns1.eng.vmware.com
Address: 10.17.193.1

Command Prompt
C:\\nslookup eng.vmware.com
Name: eng.vmware.com
Address: 10.17.0.20
Server: vmc-ns1.eng.vmware.com
Address: 10.17.193.1
```
SRM Installation Workflow

⇒ At the **protected site** the following activities are completed:
  - Installation of the SRM server
  - Installation of the SRM Plugin into the VI Client
  - Installation of the Storage Replication Adapter (SRA)

⇒ At the **recovery site** the following activities are completed:
  - Installation of the SRM server
  - Installation of the SRM Plugin into the VI Client *
  - Installation of the Storage Replication Adapter (SRA)

⇒ **It is important to complete the SRM workflows in the order detailed in this presentation**

* Note: Optional step, only required if a different instance of the VI Client is used to access the recovery site
SRM Setup Workflow – Protection Site

At the **protection site** the following setup activities are completed:

- The user pairs the SRM servers at the protected and recovery sites
- Security certificates are established between the SRM servers and the VC.

Certificates that are not properly signed will result in the Yellow Warnings Signs. Reciprocity will still be established allowing you to continue to the next step in the workflow.
Array Managers Configuration

- Select the correct Manager Type from the Manager type drop down box

- Note: The SRM 1.0 Beta will only support Manager Types from EqualLogic and Symmetrix only
SRM identifies available arrays and replicated datastores and determines the datastore groups.

SRM Setup Workflow – Protection Site - continued

- Protection Side Array Managers
  - Display Name: vin22dc SAN
  - Manager Type: Symmetric Native
  - Address: vin22

- Protection Arrays:
  - Array ID: 000190102189
  - Model: DMK3-24
  - Peer Array: 000187461516
  - LUN Count: 38

- Recovery Side Array Managers
  - Display Name: vin23dc SAN
  - Manager Type: Symmetric Native
  - Address: vin23

- Recovery Side Array Managers
  - Display Name: vin21dc SAN
  - Manager Type: Symmetric Native
  - Address: vin21

- Protection Arrays:
  - Array ID: 000190102189
  - Model: DMK3-24
  - Peer Array: 000187461516
  - LUN Count: 0
Using the Inventory Preferences Mapper, the user maps resources in the protected site to their counterparts in the recovery site.

<table>
<thead>
<tr>
<th>Protection Groups</th>
<th>Inventory Preferences</th>
<th>Permissions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Summary</strong></td>
<td><strong>Primary Site Resources</strong></td>
<td><strong>Secondary Site Resources</strong></td>
</tr>
<tr>
<td><strong>Networks</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>vim22dc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VM Network</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td><strong>Compute Resources</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>vim22dc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>vim22.eng.vmware.com</td>
<td>None Selected</td>
<td></td>
</tr>
<tr>
<td>shared</td>
<td>None Selected</td>
<td></td>
</tr>
<tr>
<td>local services</td>
<td>None Selected</td>
<td></td>
</tr>
<tr>
<td>protected services</td>
<td>recovery</td>
<td></td>
</tr>
<tr>
<td><strong>Virtual Machine Folders</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>vim22dc</td>
<td>None Selected</td>
<td></td>
</tr>
<tr>
<td>shared</td>
<td>recovery</td>
<td></td>
</tr>
</tbody>
</table>
A protection group is a group of VMs that will be failed over together to the recovery site.

Working through the Protection Group wizard you will need to select a location for temporary VirtualCenter Inventory files for the protected VMs at the recovery site.
Working through the Protection Group wizard a user selects which VMs need to be protected and assigns them to a protection group.

The creation of a protection group results in VC inventory updates in the recovery site.

The list of VMs that will make up the Protection Group are listed above along with the Folder, Host and Pool (resource pool) that the protected VMs will be associated with in the recovery site.

The datastore that was selected for the temporary storage that needs to be assigned to each VM in the Protection Group is also referenced above.
SRM Setup Workflow – Recovery Site

At the **recovery site** the following setup activity is completed:

- The user creates a recovery plan which is associated to a single or multiple protection groups.

---

Recovery Plans are added via the VI Client connected to the VC server in the recovery site.

Click on the Add button on the toolbar above or click on the Add Recovery Plan under the Commands section to launch the Recovery Plan wizard.
SRM Recovery Plan

During an actual failover using SRM, the Protected Site VMs are shutdown starting with Low Priority VMs, followed by Normal Priority VMs (app_vm17 to app_vm11) and ending off with the High Priority VMs (app_vm12).

It is worth noting that during a simulated failover test using SRM, the Protected VMs (app_vm7 to app_vm12) are not shutdown in the Protected Site.

The datastore group (shared-san-2) which is associated with Protection Group 2 is prepared at the recovery site for the failover of the protected VMs (app_vm7 to app_vm12).

If required designated non-critical VMs at the recovery site can be shutdown to provide more resources for the VMs that will need to be powered on to complete the execution of the Recovery Plan at the recovery site.

VMs are restarted at the recovery site starting with the High Priority VMs first (app_vm12) followed by the Normal Priority VMs (app_vm7 to app_vm11).
SRM Recovery Plan - continued

SRM Recovery Plans:

- turn manual **BC/DR run books** into an automated process
- specify the steps of the recovery process in VirtualCenter
- Provide a way to test your BC/DR plan in an isolated environment at the recovery site without impacting the protected VMs in the protected site
Testing a SRM Recovery Plan

SRM enables you to ‘Test’ a recovery plan by simulating a failover of protected VMs with zero downtime to the protected VMs in the protected site.

From the VI Client in the recovery site, expand Recovery Plans in the left hand pane and select the recovery plan to be tested. The simulated failover test can be started by either clicking on the 'Test' button that is highlighted above or by clicking on the 'Test Recovery Plan' link under the Commands section.
Testing a SRM Recovery Plan - continued

Each step that is executed in the recovery plan can be monitored via the Recovery Steps window while the simulated failover test is running.

Recovery Plan steps identified by ‘Test Only’ are only executed during a simulated failover.

Recovery Plan steps identified by ‘Recovery only’ are only executed during an actual failover.
Testing a SRM Recovery Plan - continued
Executing an actual failover in SRM

WARNING - Executing an actual failover with SRM will permanently alter virtual machines and infrastructure of both the protected and recovery sites

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.
Executing an actual failover in SRM - continued

WARNING - Executing an actual failover with SRM will permanently alter virtual machines and infrastructure of both the protected and recovery sites

![Run Recovery Plan - Recovery Plan 2 - Protection Group 2](image)

Carefully review this information and confirmation before running this recovery plan.

**Recovery Plan Information**

- Recovery Plan: Recovery Plan 2 - Protection
- Protected Site: vim22
- Protected Site Status: Connected
- Recovery Site: vim23
- Number of Virtual Machines: 6

**Confirmation**

- Do not run this recovery plan.
- I understand that this process cannot be undone, and that running this recovery plan will permanently alter the virtual machines and infrastructure of both the protected and recovery datacenters.

**Buttons:**

- Run Recovery Plan
- Cancel

WARNING – Failback to the protected site is a not an automated process in SRM 1.0
SRM Alarms and Site Status Monitoring

SRM will support the following alarm notification actions:
- Send e-mail to specified address
- Send SNMP trap to VC trap receivers
- Execute specified command on VC host

We recommend you complete setup of alarm notifications for:
- Remote Site Down
- Remote Site Ping Failed
- Replication Group Removed
- Recovery Plan Destroyed
- License Server Unreachable
SRM Alarms and Site Status Monitoring - continued

SRM will raise VC events for the following conditions:

- Disk Space Low
- CPU use exceeded limit
- Memory low
- Remote Site not responding
- Remote Site heartbeat failed
- Recovery Plan Test started, ended, succeeded, failed, or cancelled
- Virtual Machine Recovery started, ended, succeeded, failed, or reports a warning
Site Recovery Manager Core Benefits

- **Expand disaster recovery protection**
  - Now any workload in a VM can be protected with minimal incremental effort and cost

- **Reduce time to recovery**
  - As soon as disaster is declared, a single button kicks off recovery sequence for hundreds of VMs

- **Increase reliability of recovery**
  - Replication of system state ensures a VM has all it needs to startup
  - Hardware independence eliminates failures due to different hardware
  - Easier testing based off of actual failover sequence allows more frequent and more realistic tests
Summary

Site Recovery Manager Leverages VMware Infrastructure to Make Disaster Recovery

- **Rapid**
  - Automate disaster recovery process
  - Eliminate complexities of traditional recovery

- **Reliable**
  - Ensure proper execution of recovery plan
  - Enable easier, more frequent tests

- **Manageable**
  - Centrally manage recovery plans
  - Make plans dynamic to match environment

- **Affordable**
  - Utilize recovery site infrastructure
  - Reduce management costs
Some Helpful Resources

- SRA Documentation Links
  - LeftHand Networks SRA for VMware Site Recovery Manager [http://resources.lefthandnetworks.com/forms/VMware-LeftHand-SRA-Download](http://resources.lefthandnetworks.com/forms/VMware-LeftHand-SRA-Download)
DEMO

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