

# EMC Disaster Recovery with VMware SRM

## Complete Data Protection for VMware Infrastructure

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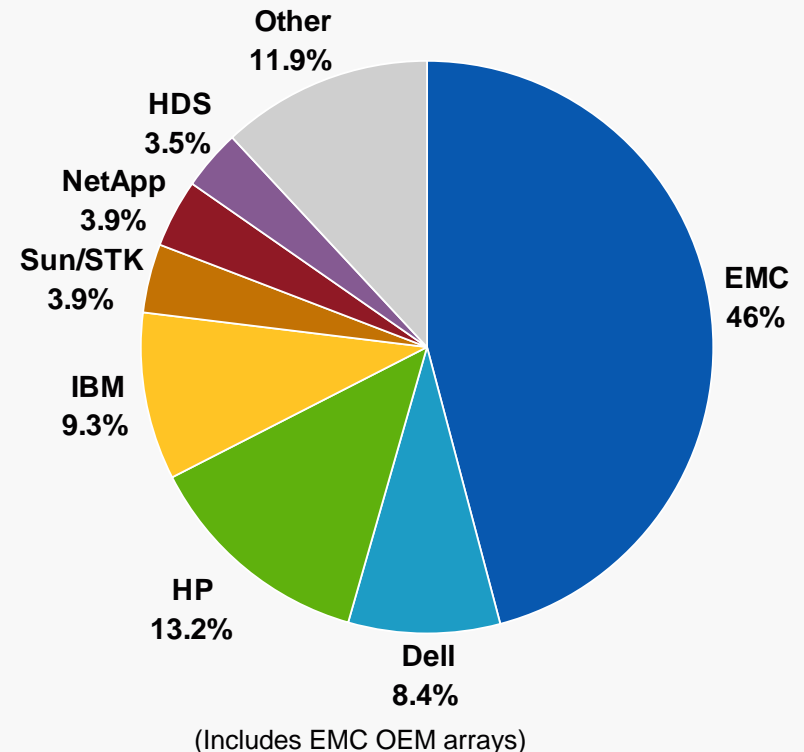
# Why EMC is the Leader for VMware Environments

- Shared storage
  - All EMC Platforms (Fibre Channel, iSCSI, NAS)
  - Virtual Provisioning, Quality of Service, Virtual LUNs, security, and ease of use
- Backup and recovery
  - NetWorker integration with VCB
  - Avamar with VMware Consolidated Backup, and Avamar Virtual Edition for VMware
- **Replication**
  - VMware Site Recovery Manager integrated across EMC replication products
- Resource management
  - EMC ControlCenter V6.0 support for virtual machine discovery
  - EMC Smarts integration and Smarts Application Discovery Manager support

**Backed by EMC Reference Architectures, applied technology white papers, and supporting technical documents**

## IDC SERVER VIRTUALIZATION 2007 SURVEY

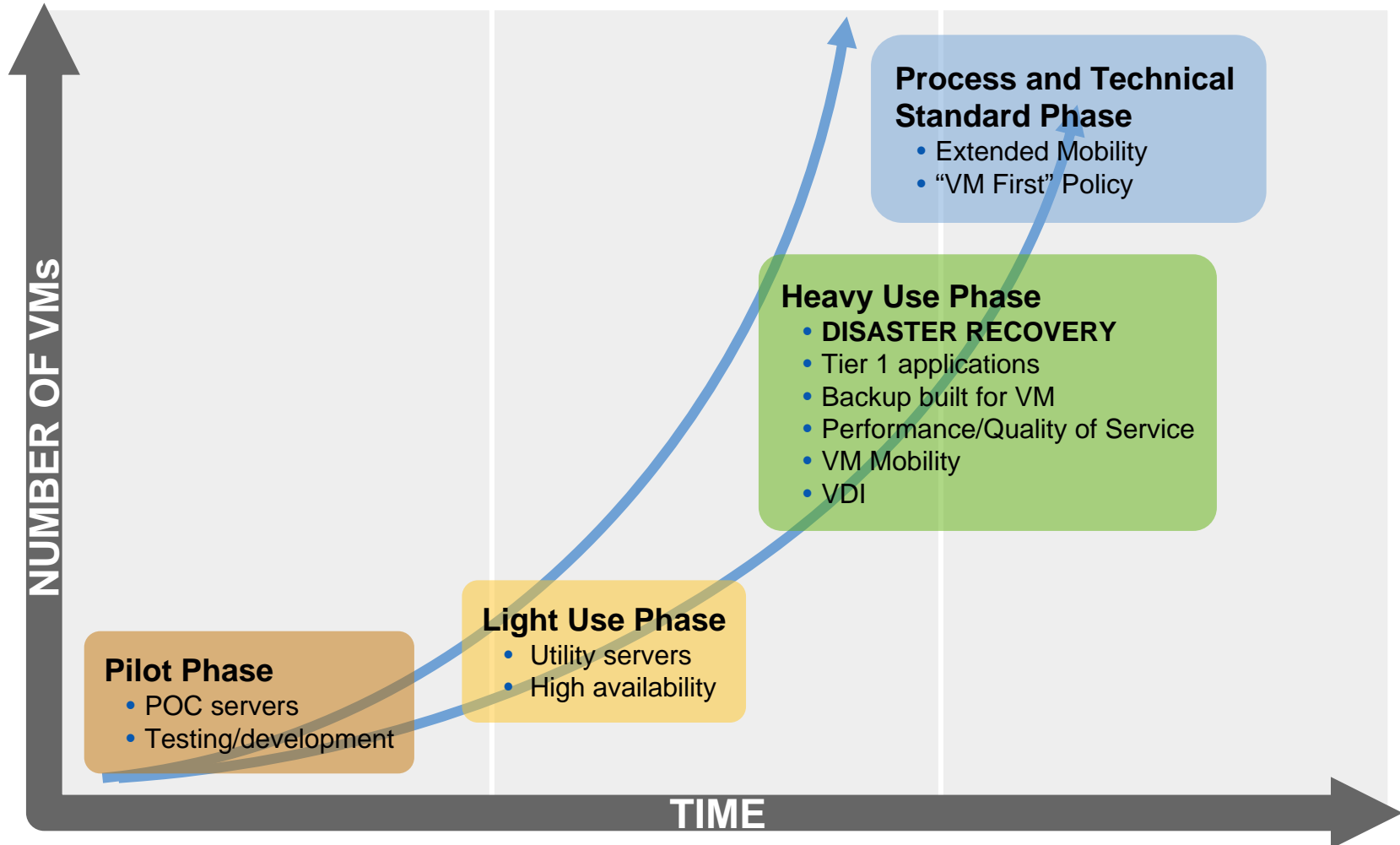
EMC leads all vendors as the storage platform of choice for VMware



Source: IDC—Server Virtualization (December 2007)

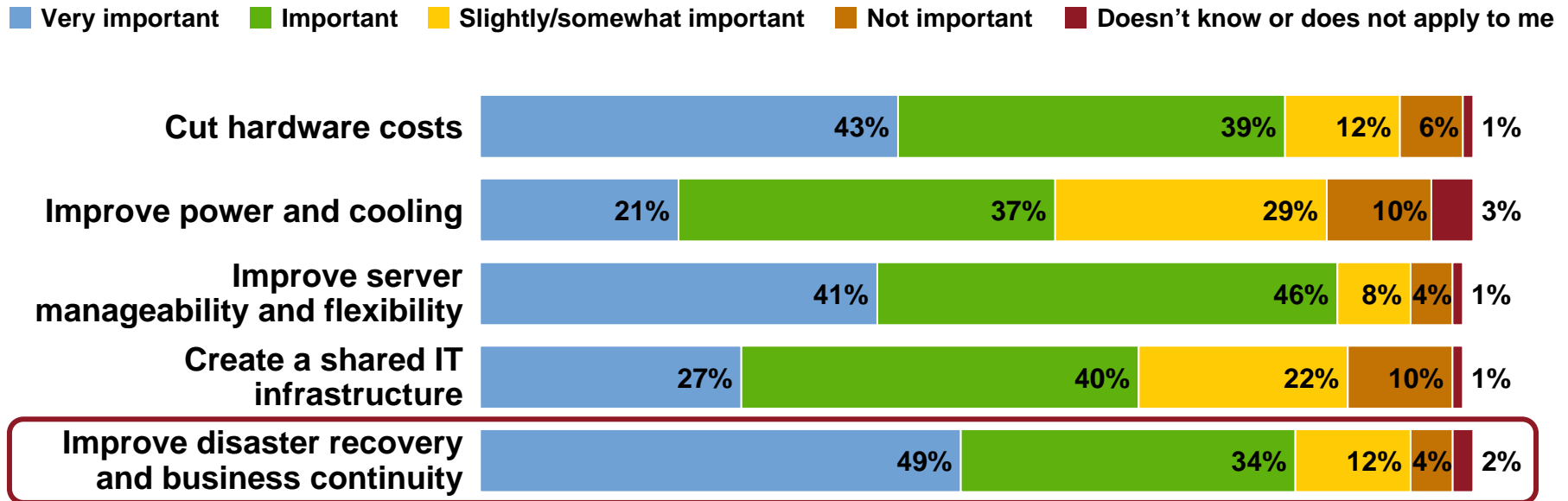
# Market Dynamics—VMware Adoption Continues at a Rapid Pace

## The Path to Success



# Market Dynamics—Disaster Recovery is a Top VMware Requirement

“How important are the following motivations for adopting server virtualization?”



**Base:** 197 server decision-makers at North American and European enterprises that are interested in, are implementing in the next 12 months, or have already implemented server virtualization for x86 servers (percentages may not total 100 because of rounding)

Source: Enterprise and SMB Hardware Survey, North America and Europe, Q3 2007; Forrester Research, Inc.

# Enabling Technology—EMC Replication Manager & VMware

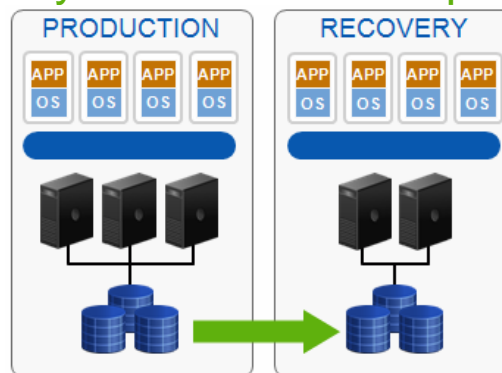
## Business Continuity and Disaster Recovery for VM Sub Components with Application Level Consistency

- Single interface for multiple applications and replication technologies
- Application & Storage aware
- Automated replication and recovery for individual application components e.g.

- File Systems
- Exchange Storage Groups
- Oracle/SQL databases

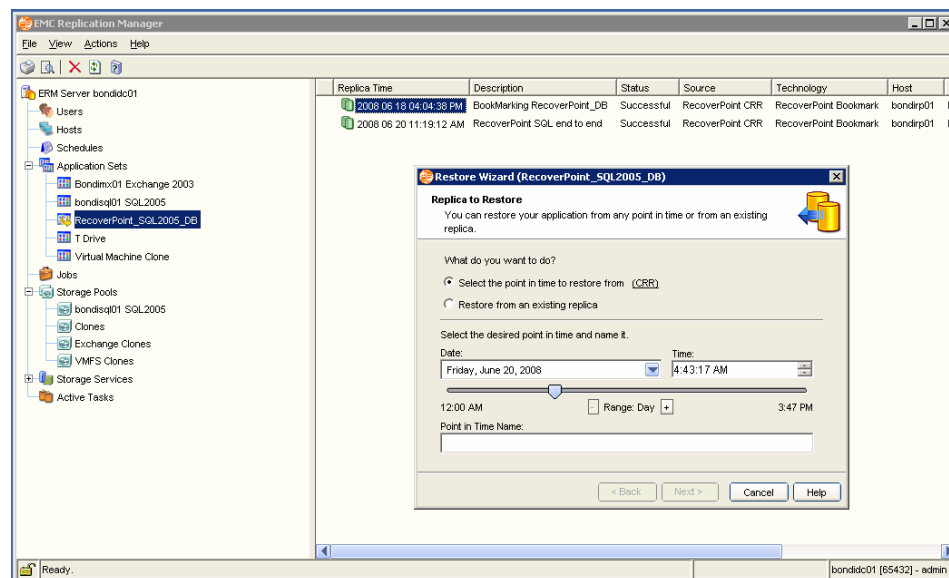
### Virtualized components

- RDM/VMFS Luns that comprise those applications



## Replication Manager & VMware

Application Replication /Recovery for Virtualized Components

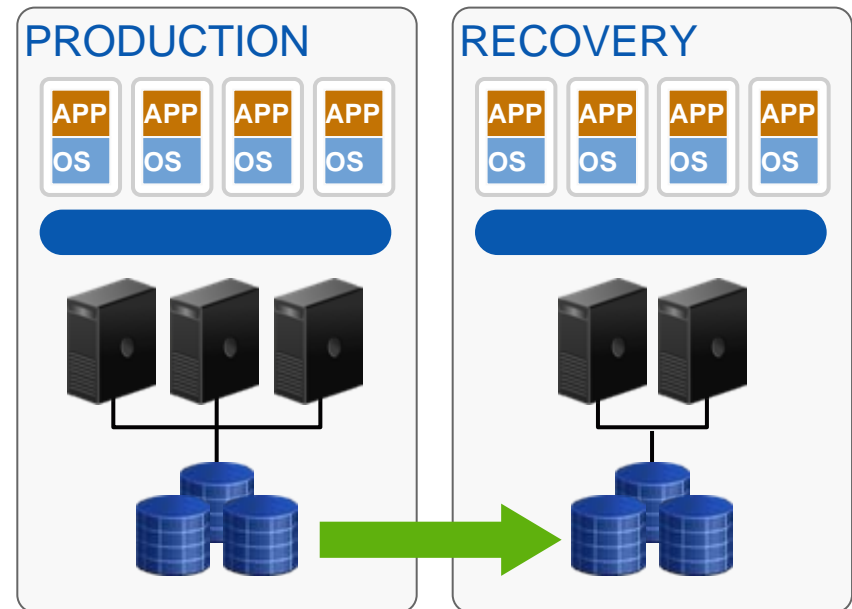


# Enabling Technology—VMware Site Recovery Manager

## Site Recovery Manager Leverages VMware Infrastructure and EMC Advanced Replication Software to Automate Disaster Recovery

- Recovery of a Single VM or an Entire Site
- Turns complex manual recovery runbooks into automated recovery plans
- Delivers central management of recovery plans from VirtualCenter
- Simplifies and automates disaster recovery workflows:
  - Setup, testing, failover

**Makes disaster recovery rapid, reliable, manageable, affordable**



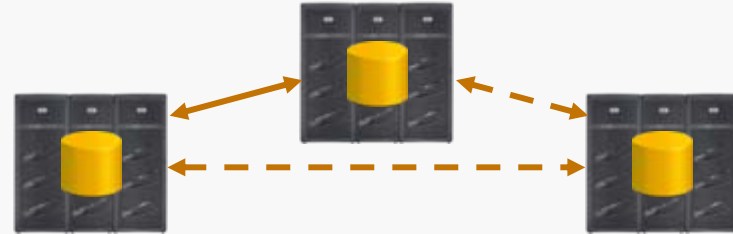
### Site Recover Manager Requires Replication Technology

EMC SRDF family, MirrorView, Celerra Replicator, and RecoverPoint

# Enabling Technology— EMC Advanced Replication Technologies

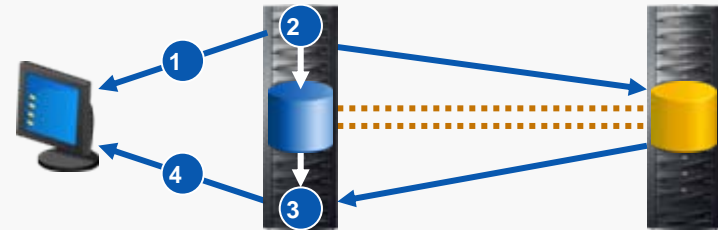
## SRDF Family

The ultimate business continuity and disaster recovery solution for the broadest range of use cases



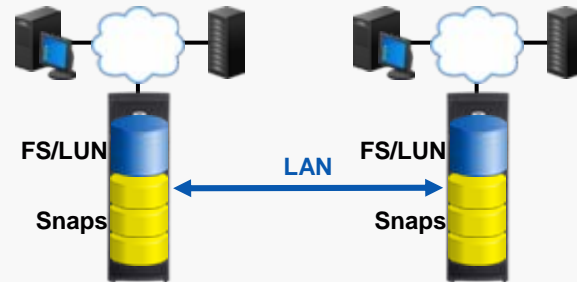
## MirrorView

Synchronous replication for flexible recovery-point and recovery-time objective requirements



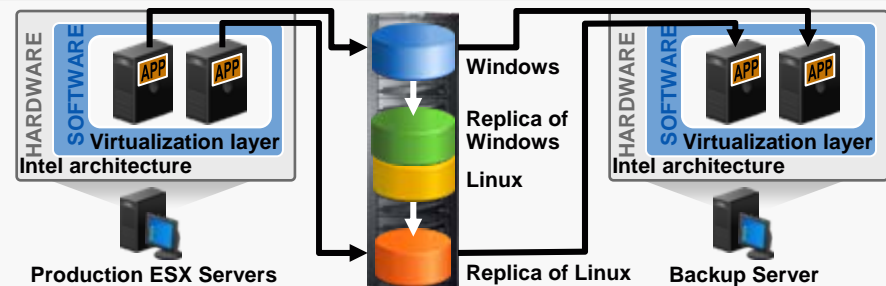
## Celerra Replicator

IP replication with Quality of Service to optimize LAN/WAN bandwidth utilization



## RecoverPoint

Host, array, fabric continuous data protection (CDP), continuous remote replication (CRR), concurrent local and remote (CLR) data protection; and compression



# EMC Storage Replication Adapters for VMware

- > EMC is responsible for creating, certifying, and supporting replication adapters
- > Adapters available from VMware product download site  
<http://www.vmware.com/download/download.do?downloadGroup=SRM100>
- > New adapters do not require updates to Site Recovery Manager
- > Storage must support replication and be on VMware Storage HCL
- > No Charge item

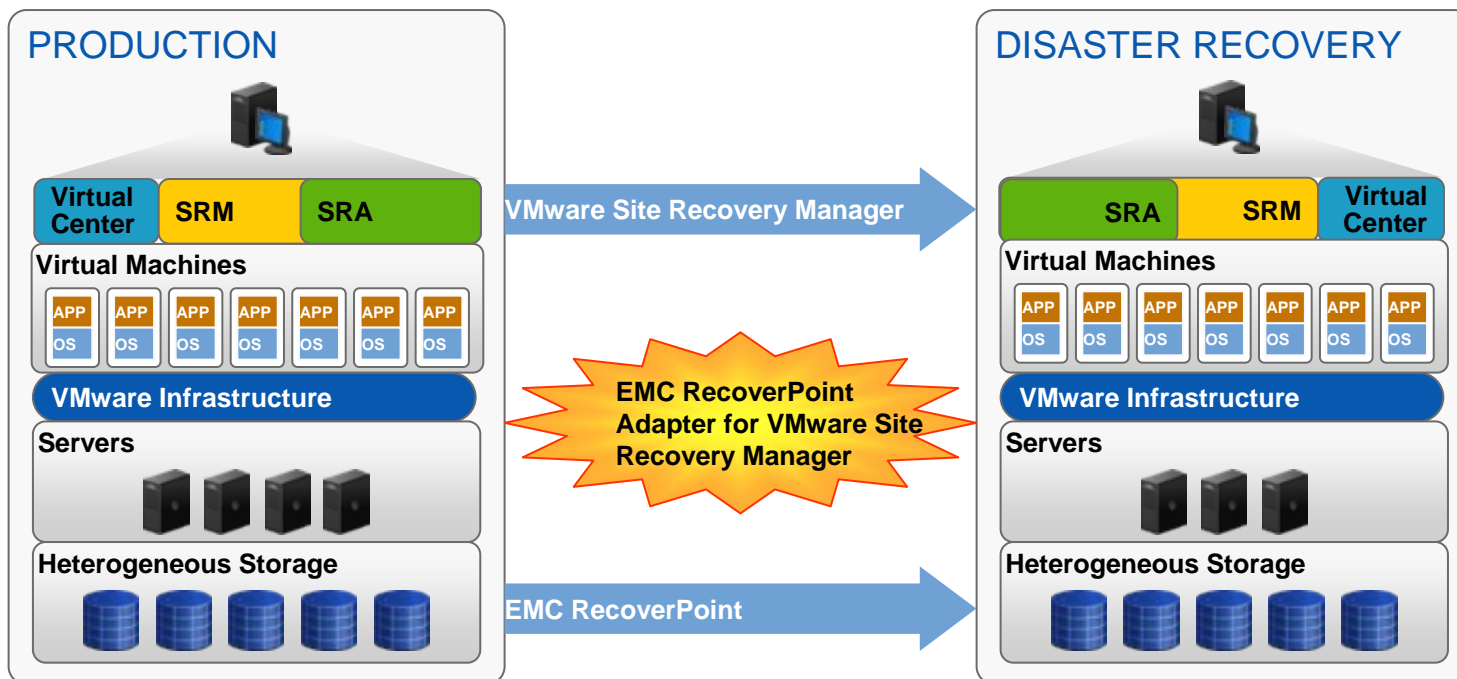
EMC Celerra Storage Replication Adapter	.exe (md5sum:56be01515f987f4acc708e8c427bc548)
EMC CLARiiON Storage Replication Adapter	.exe (md5sum:7077b9284e55eb44a131ef51ec378ca6)
EMC RecoverPoint Storage Replication Adapter	.exe (md5sum:9deb1df73fb7a19b00f142e20cbf0bea)
EMC Symmetrix Storage Replication Adapter	.zip (md5sum:8b9e9859201b53b0fde321446664d5c6)



# Example—EMC RecoverPoint with VMware Site Recovery Manager

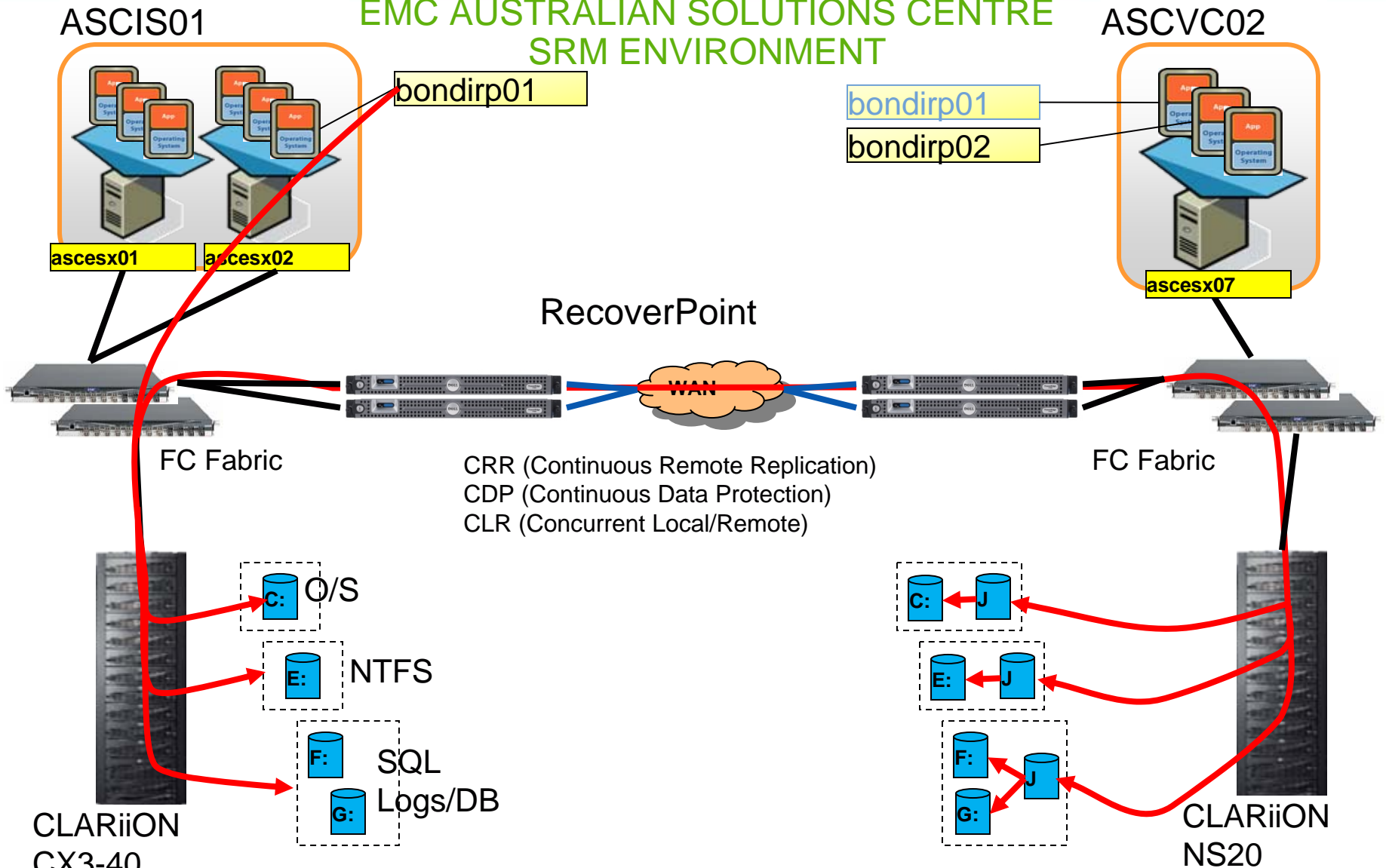
## Heterogeneous, Network-Based Replication

- Replicate VMware VMFS (Virtual Machine File System) across heterogeneous storage
- Compress data, optimize bandwidth (up to 10 times)
- Protect and recover a single virtual machine or the entire VMware ESX Server
- Protect virtual environments with local and/or remote point-in-time recovery



# SRM and RecoverPoint Failover Example

## EMC AUSTRALIAN SOLUTIONS CENTRE SRM ENVIRONMENT



# SRM and RecoverPoint Failover Example

## SRM DR TEST

Failover/Test is Initiated from DR site

Shut Down Protected Production VM's (Not performed during Failover Test)

Prepare Storage

- SRM Communicates with Underlying Hardware via SRA
- All Scanning/Mounting/Importing Operations are Automated

The screenshot displays the VMware Infrastructure Client interface for Site Recovery Manager (SRM). The left pane shows the hierarchy: Site Recovery > Protection Groups > Recovery Plans > bondirp01 (Running Test). The main pane shows the 'Recovery Steps' for 'bondirp01'. The steps are as follows:

Recovery Step	Status	Task Started
1. Shutdown Protected Virtual Machines at Prot...		
1. Shutdown LowPriority Protected Virtual...		
2. Shutdown Normal Priority Protected Virt...		
3. Shutdown High Priority Protected Virtual...		
2. Prepare Storage	Running	14/07/2008 3:17:58 PM
1. Attach Disks for Protection Group "bond...	Running	14/07/2008 3:17:58 PM
3. Suspend Non-critical Virtual Machines		
4. Recover High Priority Virtual Machines		
5. Recover Normal Priority Virtual Machines		
6. Recover Low Priority Virtual Machines		
7. Recover No Power On Virtual Machines		
8. Message: Test recovery complete. Please ver...		
9. Cleanup Virtual Machines Post Test		
10. Resume Non-critical Virtual Machines		
11. Reset Storage Post Test		

The 'Recent Tasks' pane at the bottom shows the following tasks:

Name	Target	Status	Initiated by	Time	Start
Run Test Mode Recovery Plan	Datacenters	In Progress	PRIMARY\drindd	14/07/2008 3:17:58 P	14/07
Prepare Storage for Test	Datacenters	In Progress	PRIMARY\drindd	14/07/2008 3:17:58 P	14/07
Create Recovery Plan	Datacenters	Completed	PRIMARY\drindd	14/07/2008 3:17:24 P	14/07

# SRM and RecoverPoint Failover Example

## SRM DR TEST

Free Up ESX Resources at DR Site if Necessary

- Power Up Recovered VM's in a Pre-Defined Order
- Pause Points can be added to wait for operator intervention etc.

The screenshot shows the VMware Infrastructure Client interface with the Site Recovery console open for a recovery plan named 'bondirp01 (Running Test)'. The console displays a list of recovery steps with their status and start times. The 'Recover High Priority Virtual Machines' step is currently running, and its sub-step 'Recover VM "bondirp01"' is also running. The 'Recent Tasks' window at the bottom shows that previous steps like 'Reconfigure Virtual Machine', 'Register Virtual Machine', and 'Unregister Virtual Machine' have been completed successfully.

Recovery Step	Status	Task Started
2. Prepare Storage	Success	14/07/2008 3:17:58 PM
1. Attach Disks for Protection Group "bondirp01"	Success	14/07/2008 3:17:58 PM
3. Suspend Non-critical Virtual Machines	Success	14/07/2008 3:20:21 PM
1. Suspend Local VM "bondirp02"	Success	14/07/2008 3:20:21 PM
4. Recover High Priority Virtual Machines	Running	14/07/2008 3:20:21 PM
1. Recover VM "bondirp01"	Running	14/07/2008 3:20:23 PM
1. Change Network Settings	Success	14/07/2008 3:20:23 PM
2. Pre-Power On	Success	14/07/2008 3:20:30 PM
3. Power On	Success	14/07/2008 3:20:30 PM
4. Wait for OS Heartbeat	Running	14/07/2008 3:20:59 PM
5. Post Power On		
5. Recover Normal Priority Virtual Machines		
6. Recover Low Priority Virtual Machines		
7. Recover No Power On Virtual Machines		
8. Message: Test recovery complete. Please verify...		
9. Cleanup Virtual Machines Post Test		
10. Resume Non-critical Virtual Machines		
11. Reset Storage Post Test		

Name	Target	Status	Initiated by	Time	Start
Reconfigure Virtual Machine	bondirp01	Completed	PRIMARY\drind	14/07/2008 3:20:14 P	14/07/2008 3:20:14 P
Register Virtual Machine	DR DataCentre	Completed	PRIMARY\drind	14/07/2008 3:20:10 P	14/07/2008 3:20:10 P
Unregister Virtual Machine	bondirp01	Completed	PRIMARY\drind	14/07/2008 3:20:09 P	14/07/2008 3:20:09 P

# SRM and RecoverPoint Failover Example

## SRM DR TEST

ascvc02 - VMware Infrastructure Client

File Edit View Inventory Administration Plugins Help

Inventory Scheduled Tasks Events Administration Maps Consolidation Site Recovery

Test Pause Resume Stop Run

Site Recovery

- Protection Groups
  - Recovery Plans
    - bondirp01 (Running Test)
    - SRM MirrorView TestBubble
    - w2ksyb

**bondirp01**

Summary Virtual Machines Recovery Steps History Permissions

Recovery Step	Status	Task Started
2. Prepare Storage	Success	14/07/2008 3:17:58 PM
1. Attach Disks for Protection Group "bond...	Success	14/07/2008 3:17:58 PM
3. Suspend Non-critical Virtual Machines	Success	14/07/2008 3:20:21 PM
1. Suspend Local VM "bondirp02"	Success	14/07/2008 3:20:21 PM
4. Recover High Priority Virtual Machines	Success	14/07/2008 3:20:21 PM
1. Recover VM "bondirp01"	Success	14/07/2008 3:20:23 PM
1. Change Network Settings	Success	14/07/2008 3:20:23 PM
2. Pre-Power On	Success	14/07/2008 3:20:30 PM
3. Power On	Success	14/07/2008 3:20:30 PM
4. Wait for OS Heartbeat	Success	14/07/2008 3:20:59 PM
5. Post Power On	Success	14/07/2008 3:22:40 PM
5. Recover Normal Priority Virtual Machines	Success	14/07/2008 3:22:40 PM
6. Recover Low Priority Virtual Machines	Success	14/07/2008 3:22:40 PM

Message

Continue Message:  
Test recovery complete. Please verify the success of the test. When done, click Continue to...

Recent Tasks

Name	Target	Status	Initiated by	Time	Start
Reconfigure Virtual Machine	bondirp01	Completed	PRIMARY\drind	14/07/2008 3:20:14 P	14/07
Register Virtual Machine	DR DataCentre	Completed	PRIMARY\drind	14/07/2008 3:20:10 P	14/07
Unregister Virtual Machine	bondirp01	Completed	PRIMARY\drind	14/07/2008 3:20:09 P	14/07

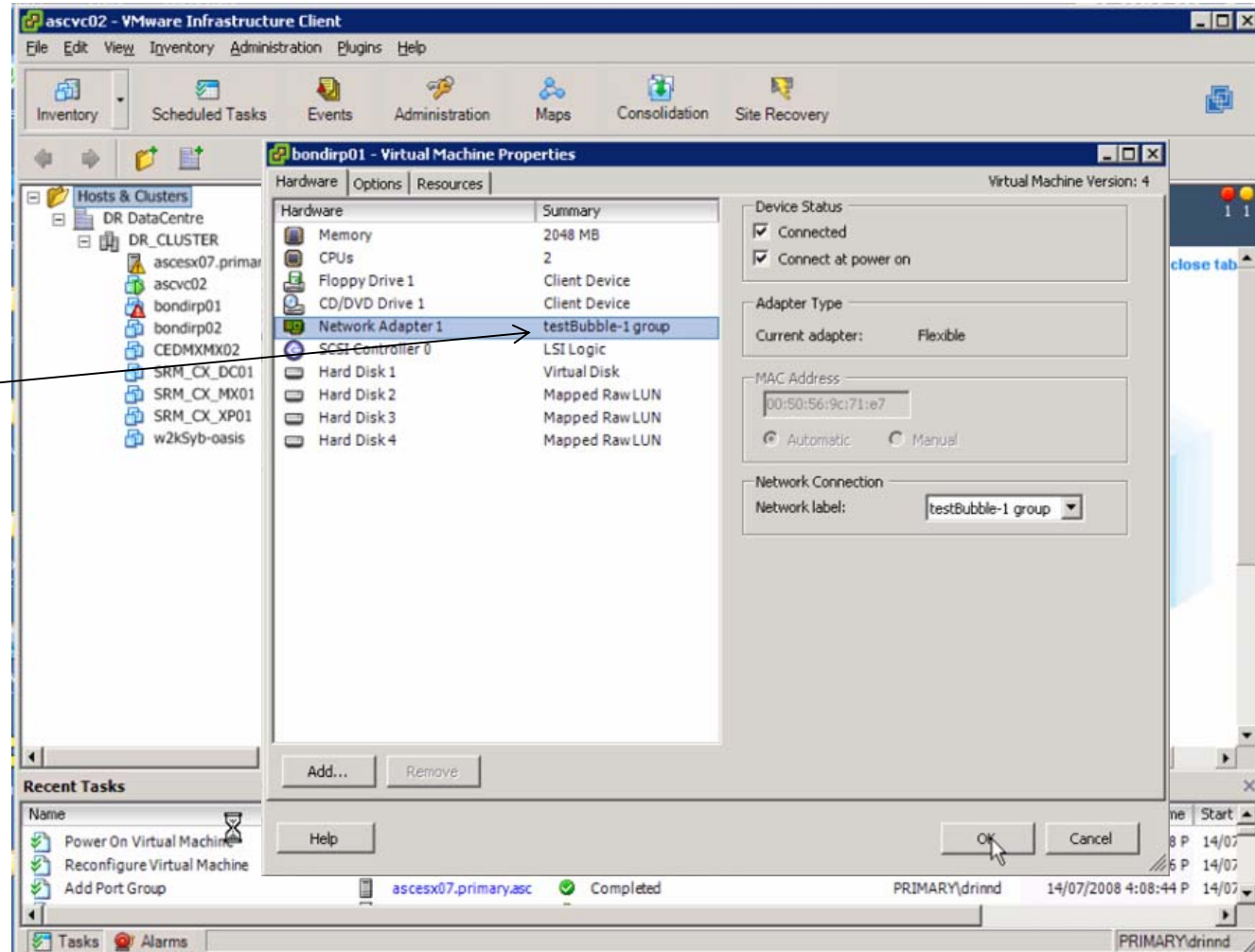
Tasks Alarms PRIMARY\drind

Pause Point  
Verify Success Of Test

# SRM and RecoverPoint Failover Example

## SRM DR TEST

The Placeholder VM is brought up in a network “Test Bubble” to ensure isolation from Production machine



# SRM and RecoverPoint Failover Example

## SRM DR TEST

Placeholder is brought up in a “Crash Consistent” state

True DR Test

Task List:

Name	Operation	Status	By	Time	Start
Reconfigure Virtual Machine	bondirp01	Completed	PRIMARY\drind	14/07/2008 3:20:14 P	14/07
Register Virtual Machine	DR DataCentre	Completed	PRIMARY\drind	14/07/2008 3:20:10 P	14/07
Unregister Virtual Machine	bondirp01	Completed	PRIMARY\drind	14/07/2008 3:20:09 P	14/07

# SRM and RecoverPoint Failover Example

## SRM DR TEST

Test Recovered Application(s)

The screenshot displays the VMware Infrastructure Client interface. The main window shows 'Microsoft SQL Server Management Studio' connected to 'BONDIRP01 (SQL Server 9.0.3042 - BOND1\Administrator)'. The Object Explorer shows a tree view of server components: Databases, Security, Server Objects, Replication, Management, Notification Services, and SQL Server Agent. The Object Explorer Details pane shows the same tree view for 'BONDIRP01 (SQL)'. A task list at the bottom shows three completed tasks: 'Reconfigure Virtual Machine', 'Register Virtual Machine', and 'Unregister Virtual Machine', all performed by 'PRIMARY\drind' on 14/07/2008 at 3:20:14 P, 3:20:10 P, and 3:20:09 P respectively.

Name	Completed by	Time	Start
Reconfigure Virtual Machine	PRIMARY\drind	14/07/2008 3:20:14 P	14/07
Register Virtual Machine	PRIMARY\drind	14/07/2008 3:20:10 P	14/07
Unregister Virtual Machine	PRIMARY\drind	14/07/2008 3:20:09 P	14/07



# SRM and RecoverPoint Failover Example

## SRM DR TEST

Continue After  
Application Recovery  
Tests

Note: RecoverPoint  
Snapshot Previously  
Initiated via SRM/SRA  
integration

**Recovery Step**

Recovery Step	Status	Task Started	Task Completed
2. Prepare Storage	Success	14/07/2008 3:17:58 PM	14/07/2008 3:17:58 PM
1. Attach Disks for Protection Group "bondirp01"	Success	14/07/2008 3:17:58 PM	14/07/2008 3:17:58 PM
3. Suspend Non-critical Virtual Machines	Success	14/07/2008 3:20:21 PM	14/07/2008 3:20:21 PM
1. Suspend Local VM "bondirp02"	Success	14/07/2008 3:20:21 PM	14/07/2008 3:20:21 PM
4. Recover High Priority Virtual Machines	Success	14/07/2008 3:20:21 PM	14/07/2008 3:20:21 PM
1. Recover VM "bondirp01"	Success	14/07/2008 3:20:23 PM	14/07/2008 3:20:23 PM
1. Change Network Settings	Success	14/07/2008 3:20:23 PM	14/07/2008 3:20:23 PM
2. Pre-Power On	Success	14/07/2008 3:20:30 PM	14/07/2008 3:20:30 PM
3. Power On	Success	14/07/2008 3:20:30 PM	14/07/2008 3:20:30 PM

**Message:**  
Continue Message:  
Test recovery complete. Please verify the success of the test. When done, click Continue to clean up the test.

**Recent Tasks**

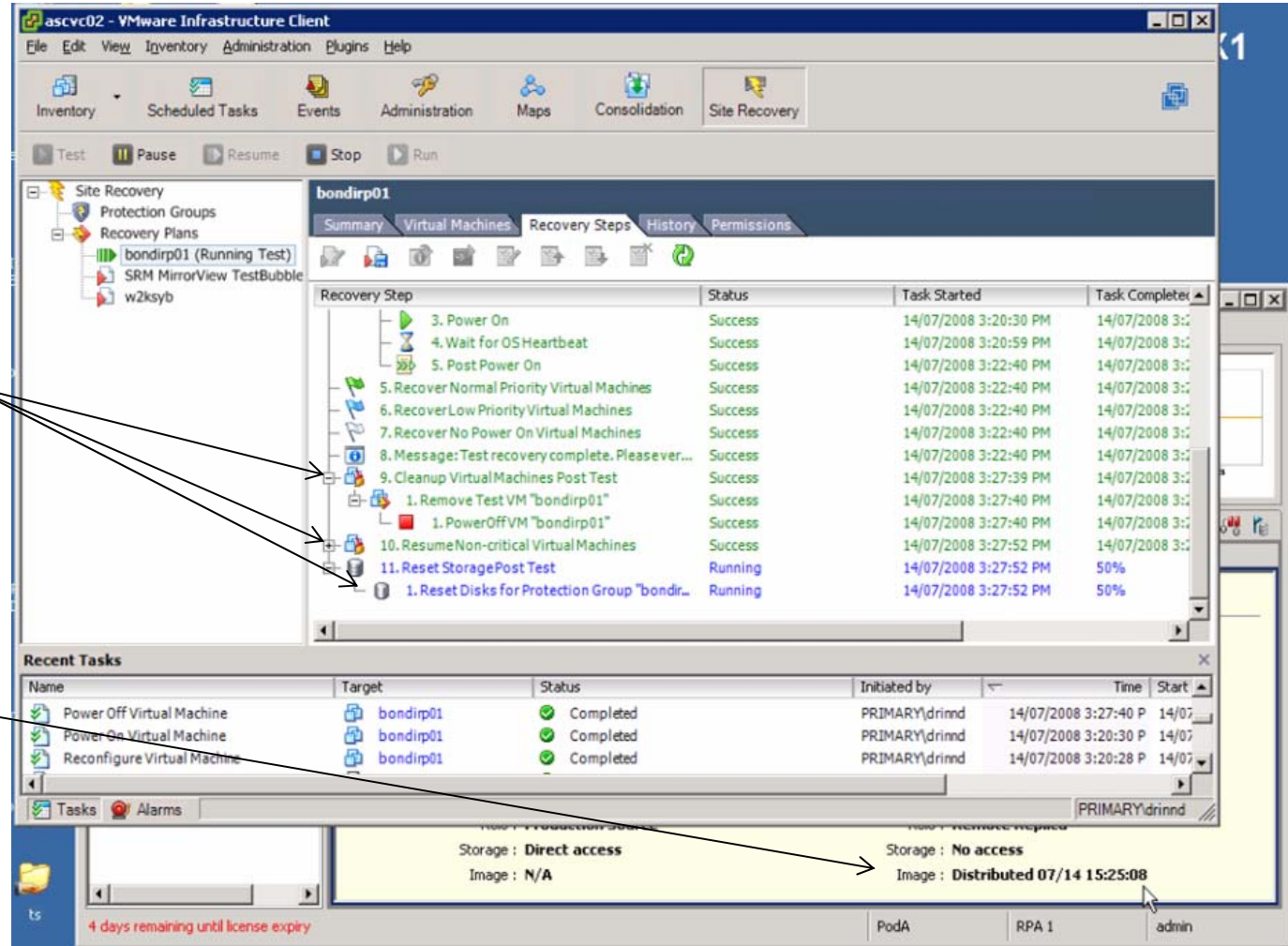
Name	Target	Status	Initiated by	Time	Start
Reconfigure Virtual Machine	bondirp01	Completed	PRIMARY\drind	14/07/2008 3:20:14 P	14/07
Register Virtual Machine	DR DataCentre	Completed	PRIMARY\drind	14/07/2008 3:20:10 P	14/07
Unregister Virtual Machine	bondirp01	Completed	PRIMARY\drind	14/07/2008 3:20:09 P	14/07

Storage : Direct access  
Image : N/A

Storage : Virtual access (5% full)  
Image : 'SRM 1.0.0 Test Failover, Mon Jul 14 15:19:14 EST 2008'

# SRM and RecoverPoint Failover Example

## SRM DR TEST



Return to Normal Running State

RecoverPoint Snapshot Removed via SRM/SRA integration

# SRM and RecoverPoint Failover Example

## SRM DR TEST

Test History(s) can be Viewed/Export for Audit Purposes

The screenshot shows the VMware Infrastructure Client interface. The left pane displays a tree view under 'Site Recovery' with 'bondirp01' selected. The main pane shows the 'Recovery Steps' for 'bondirp01'. A 'Test' button is visible above the main pane. The 'Recent Tasks' pane at the bottom shows a list of completed tasks.

Recovery Step	Status	Task Started	Task Complete
1. Shutdown Protected Virtual Machines at Prot...			
1. Shutdown Low Priority Protected Virtual...			
2. Shutdown Normal Priority Protected Virt...			
3. Shutdown High Priority Protected Virtual...			
2. Prepare Storage			
1. Attach Disks for Protection Group "bondl...			
3. Suspend Non-critical Virtual Machines			
1. Suspend Local VM "bondirp02"			
4. Recover High Priority Virtual Machines			
1. Recover VM "bondirp01"			
1. Change Network Settings			
2. Pre-Power On			
3. Power On			
4. Wait for OS Heartbeat			

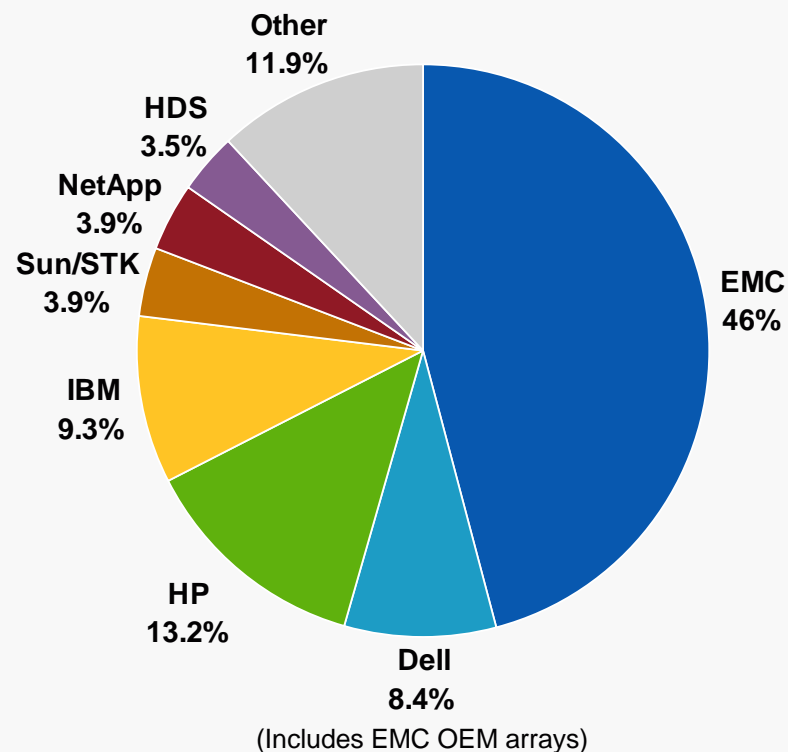
Name	Target	Status	Initiated by	Time	Start
Reconfigure Virtual Machine	bondirp01	Completed	PRIMARY\drind	14/07/2008 3:27:45 P	14/07
Power Off Virtual Machine	bondirp01	Completed	PRIMARY\drind	14/07/2008 3:27:40 P	14/07
Power On Virtual Machine	bondirp01	Completed	PRIMARY\drind	14/07/2008 3:20:30 P	14/07

# Why EMC for VMware Site Recovery Manager

- Industry-leading technologies and solutions for advanced disaster recovery
  - Proven track record for designing, deploying, and maintaining physical and virtual environments
- Ability to deploy VMware Site Recovery Manager into the existing infrastructure to protect investments
  - Integrates with existing EMC replication software—SRDF family, MirrorView, Celerra Replicator
  - Supports heterogeneous storage environments with RecoverPoint
- EMC-developed best practices
  - White Paper: Improving VMware Disaster Recovery with EMC RecoverPoint - Applied Technology
  - Reference Architectures for EMC Solutions for Microsoft SQL Server 2005 on VMware ESX Server with EMC CLARiiON CX3 Series
  - EMC TechBooks for VMware ESX Server with Symmetrix, CLARiiON, and Celerra

**EMC leads all vendors as the storage platform of choice for VMware**

## IDC SERVER VIRTUALIZATION 2007 SURVEY



Source: IDC—Server Virtualization (Dec 2007)

**EMC<sup>2</sup>**<sup>®</sup>

**where information lives<sup>®</sup>**