Virtualization
Seminar Series

vmware

EMC Disaster Recovery with VMware SRM

Complete Data Protection for VMware Infrastructure

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DISCOVER. CONNECT. VIRTUALIZE.

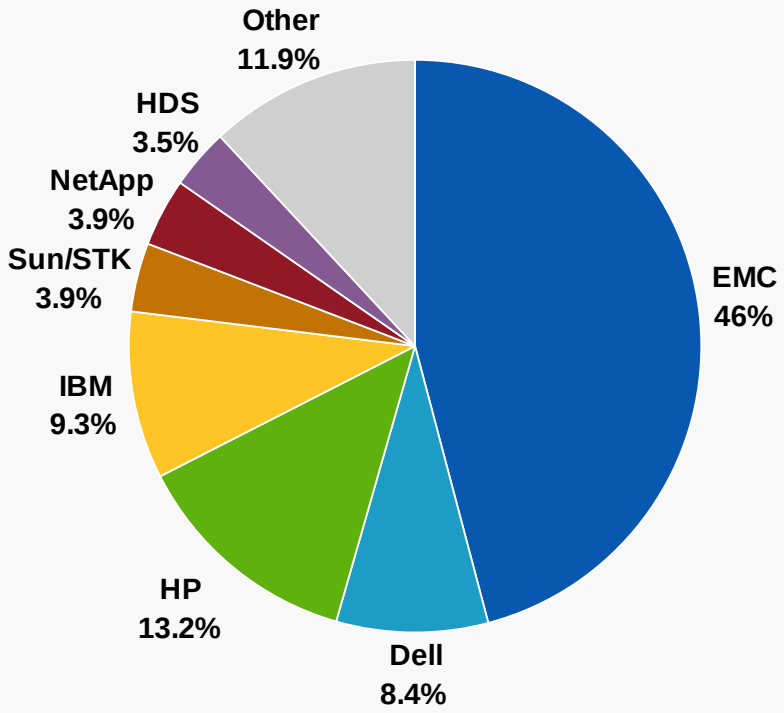
Why EMC is the Leader for VMware Environments

- 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

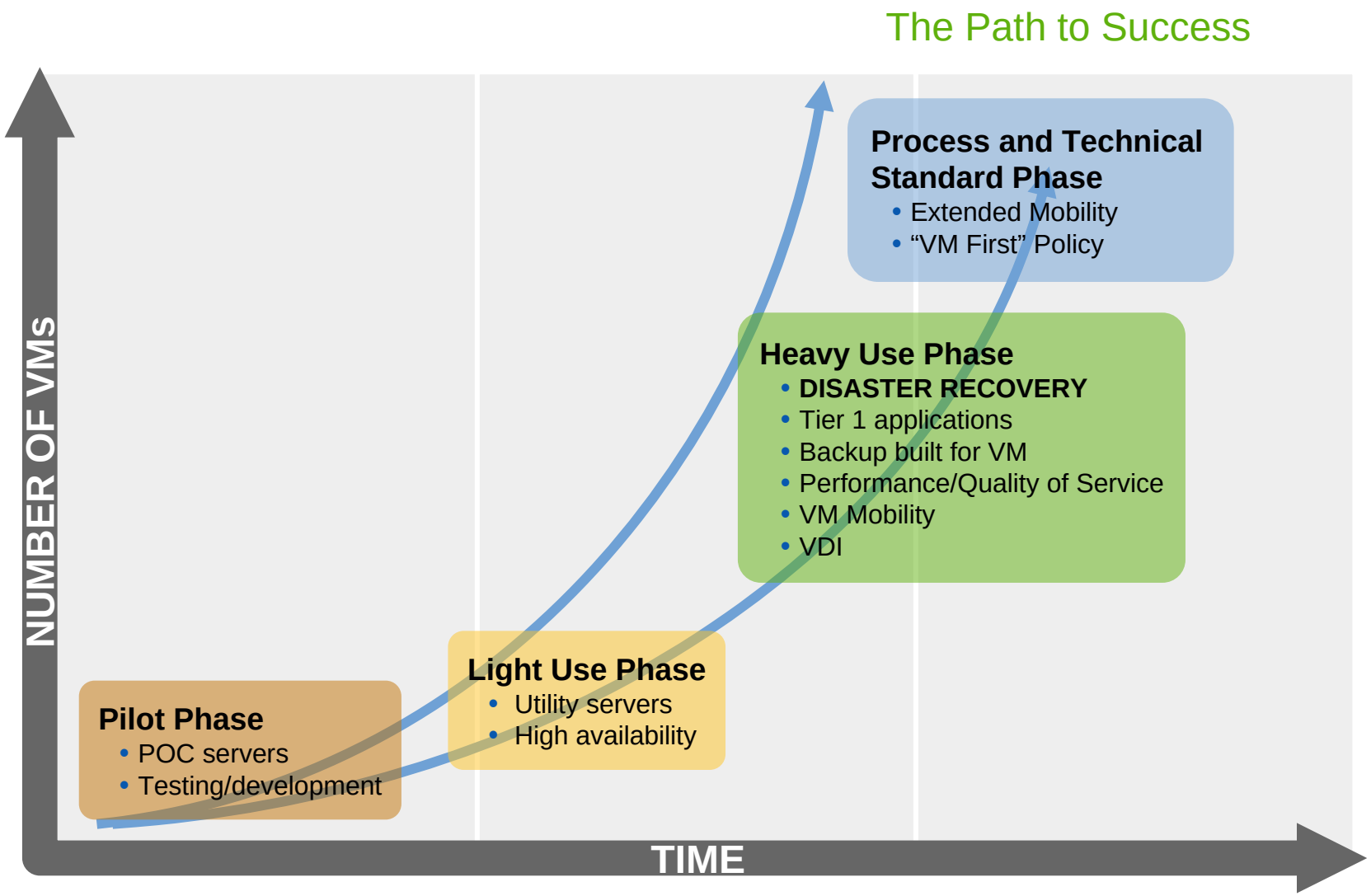
EMC leads all vendors as the storage platform of choice for VMware



(Includes EMC OEM arrays)

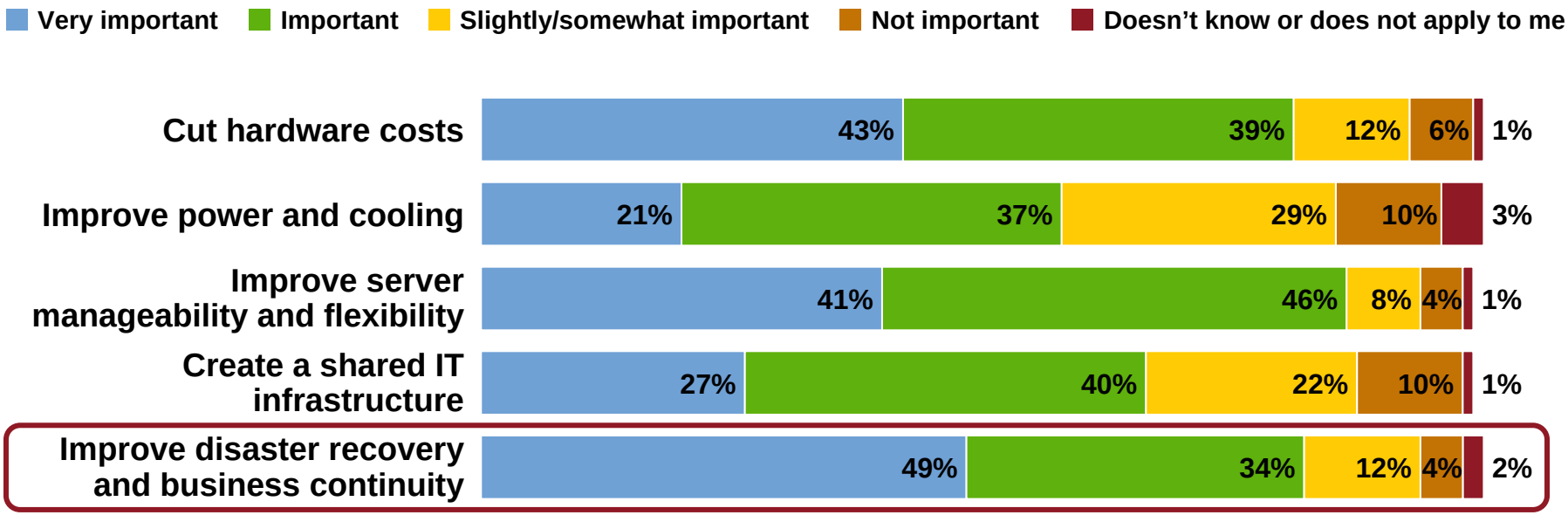
Source: IDC—Server Virtualization (December 2007)

Market Dynamics—VMware Adoption Continues at a Rapid Pace



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.

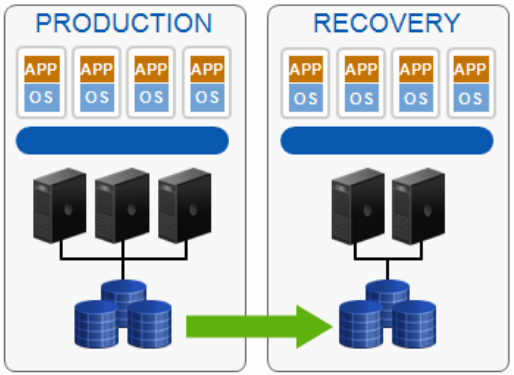
Enabling Technology—EMC Replication Manager & VMware

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

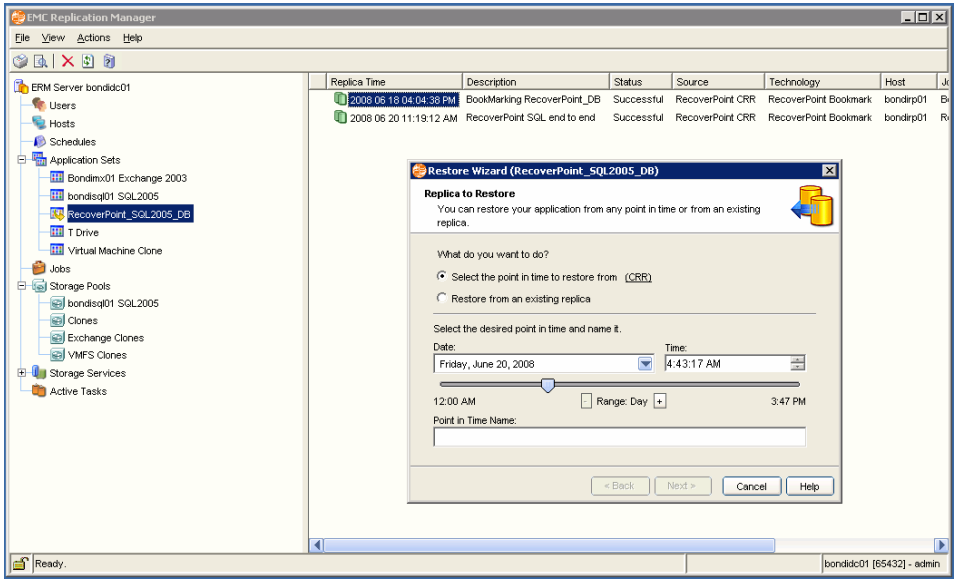
Virtualized components

- RDM/VMFS Luns that comprise those applications



Replication Manager & VMware

Application Replication /Recovery for Virtualized Components

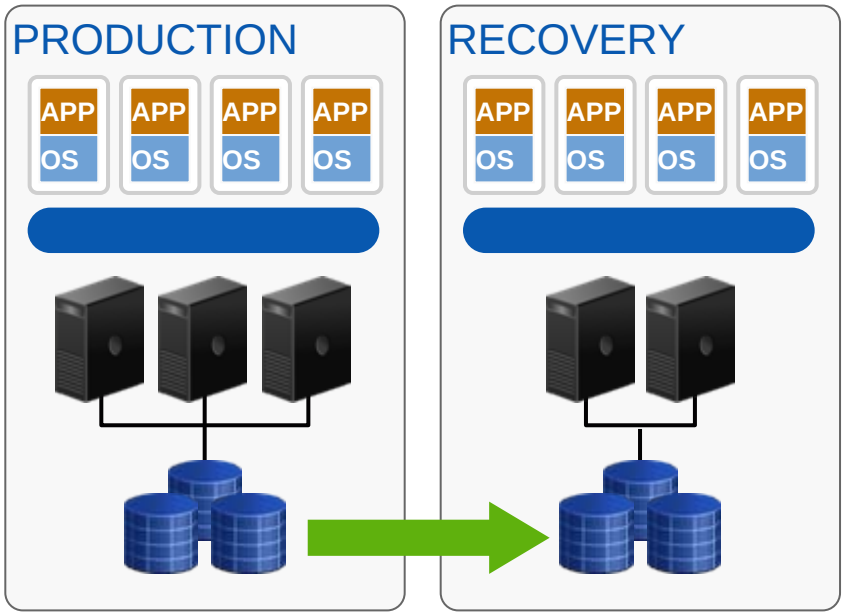


Enabling Technology—VMware Site Recovery Manager

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

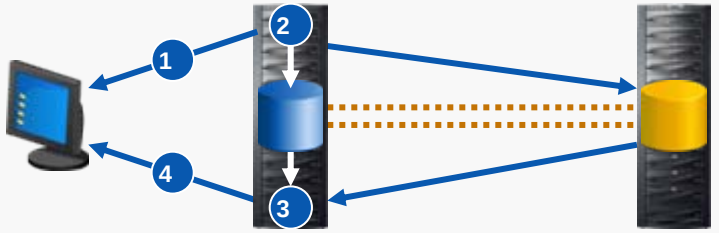
EMC² where information lives

SRDF Family

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

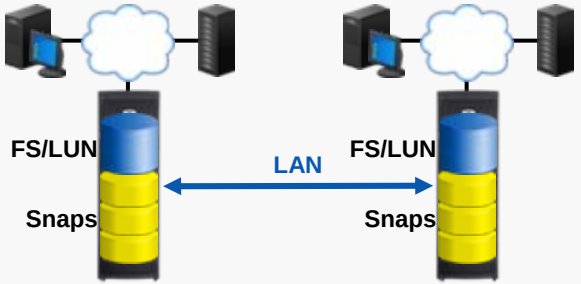
MirrorView

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



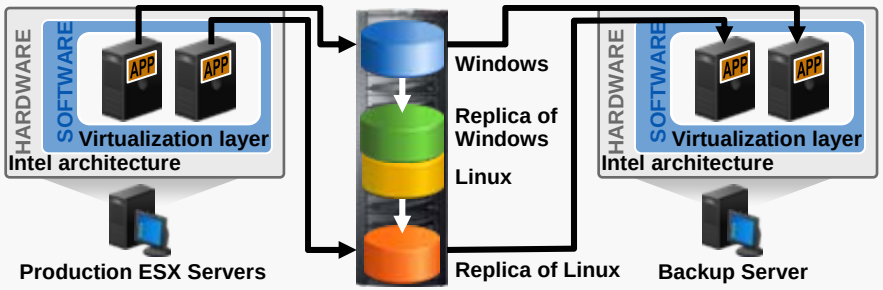
Celerra Replicator

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

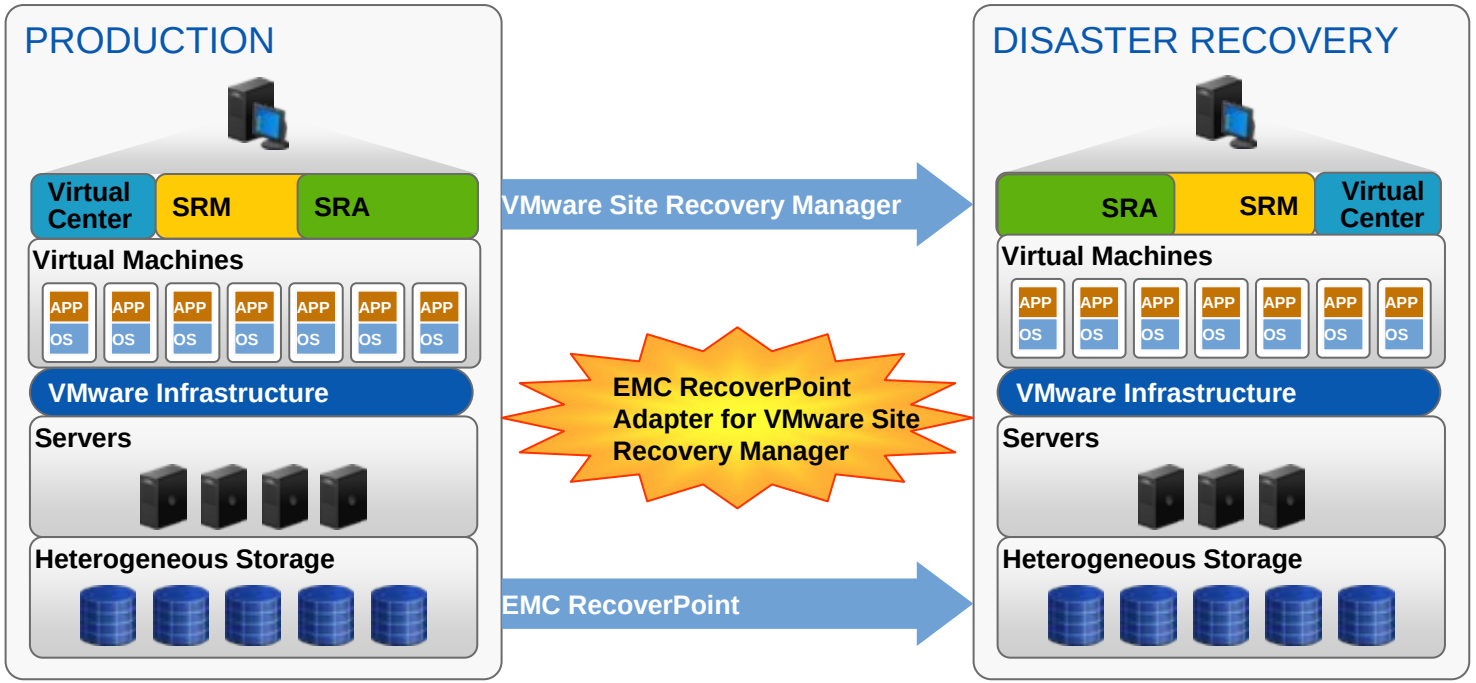
- EMC is responsible for creating, certifying, and supporting replication adapters
- Adapters available from VMware product download site http://www.vmware.com/download/download.do?downloadGroup=SRM100
- New adapters do not require updates to Site Recovery Manager
- Storage must support replication and 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)

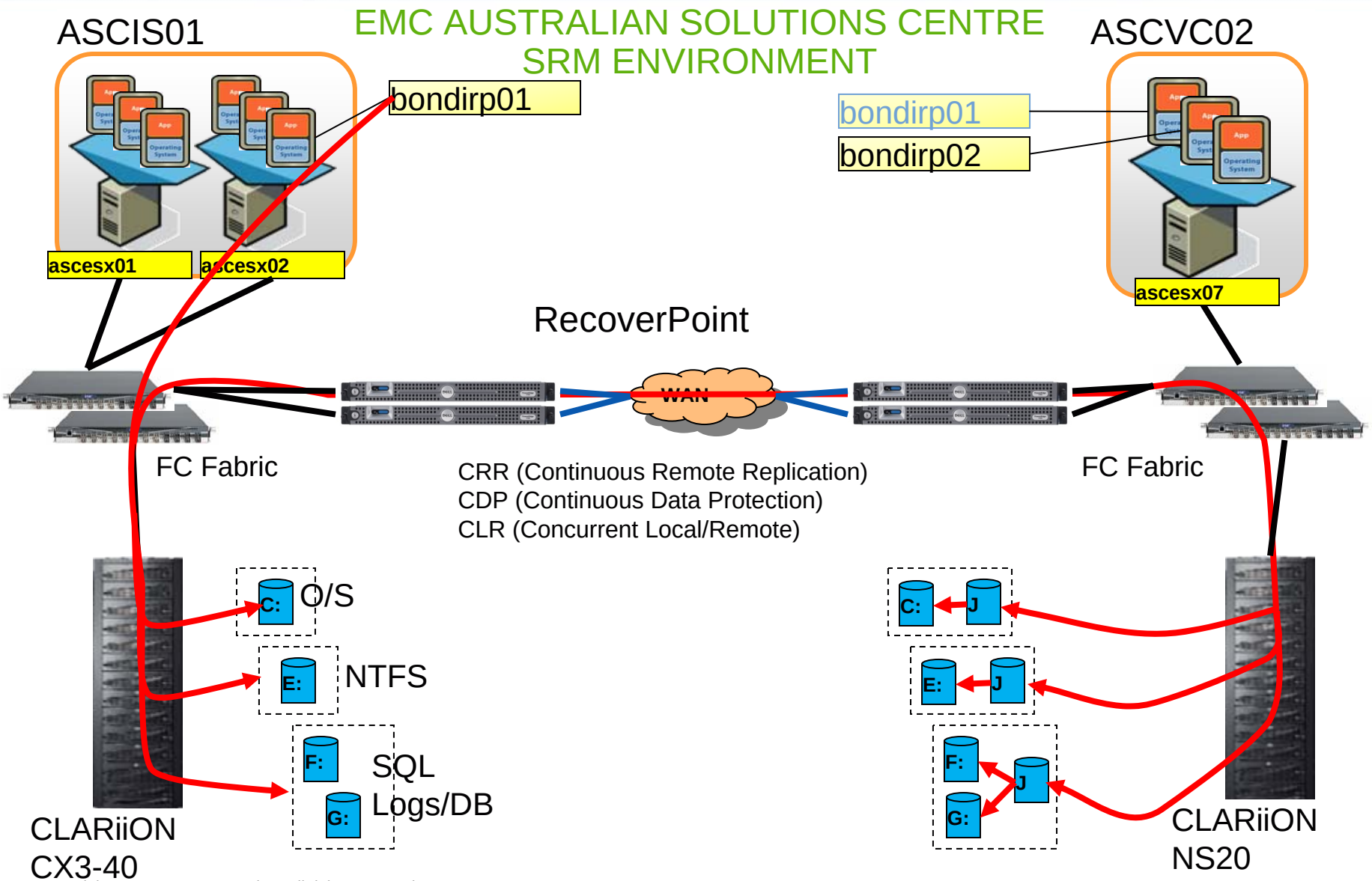
Example—EMC RecoverPoint with VMware Site Recovery Manager

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



SRM and RecoverPoint Failover Example

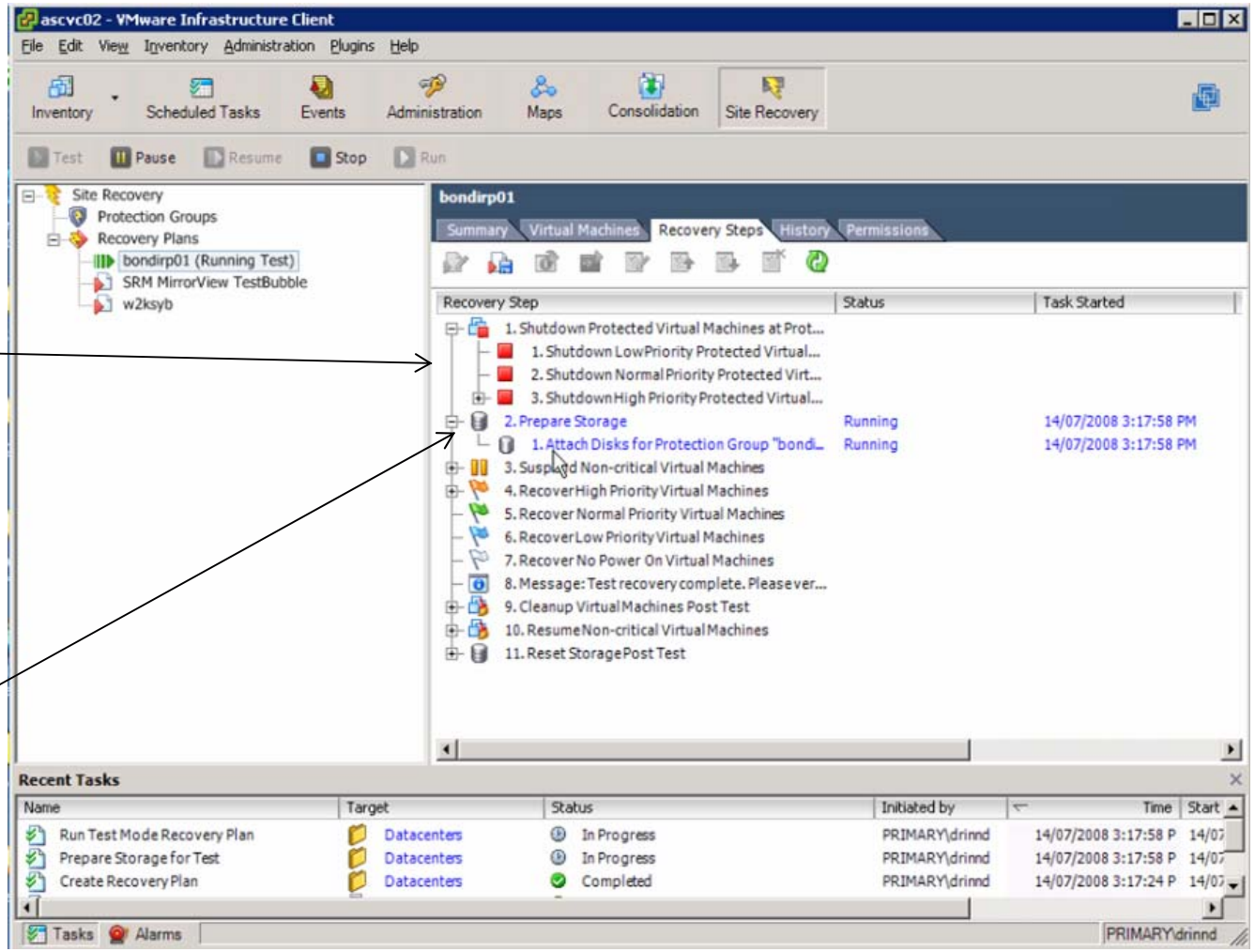
SRM DR TEST

Failover/Test is Initiated from DR site

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

<u>Prepare Storage</u>

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

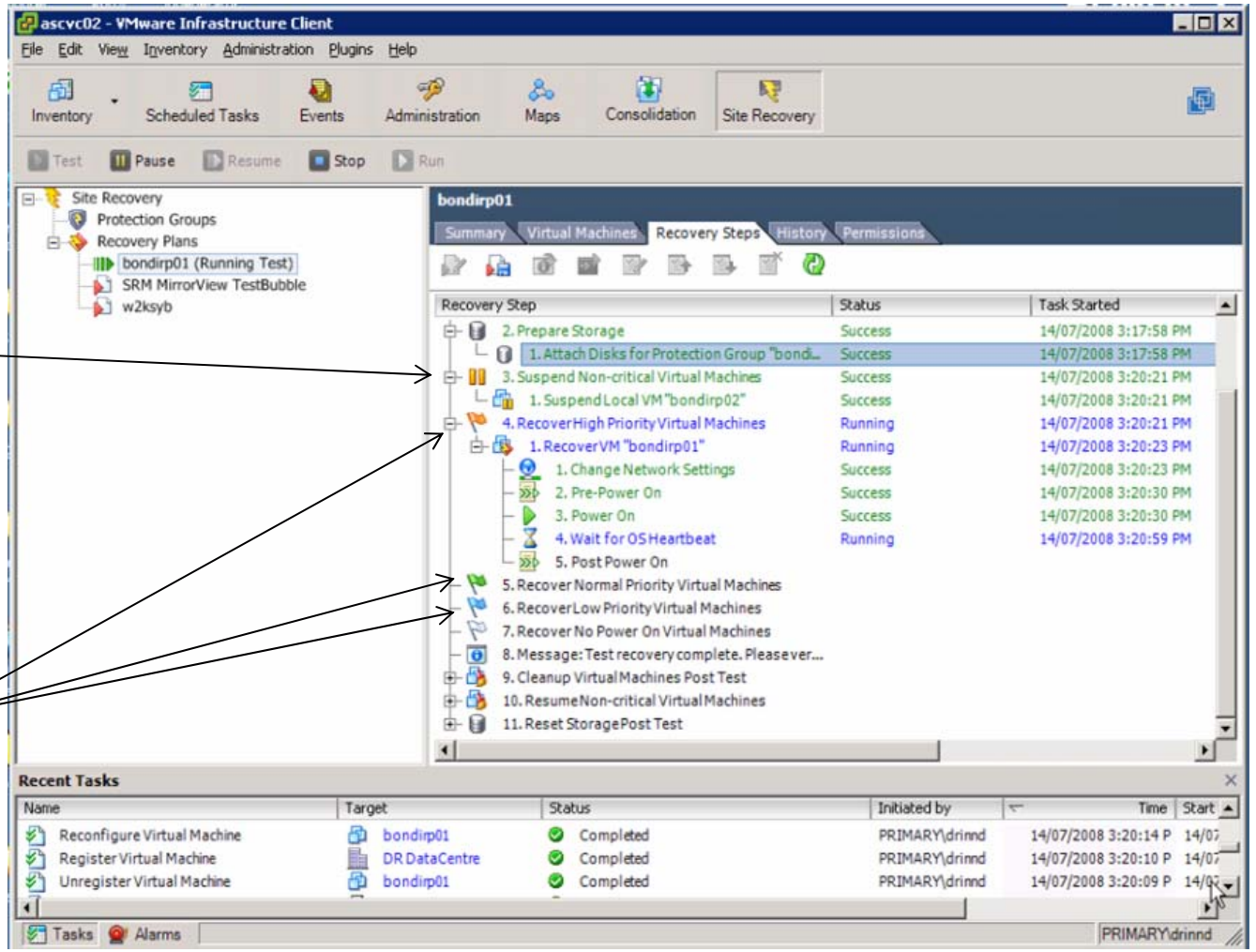


SRM and RecoverPoint Failover Example

SRM DR TEST

Free Up ESX Resources at DR Site if Necessary

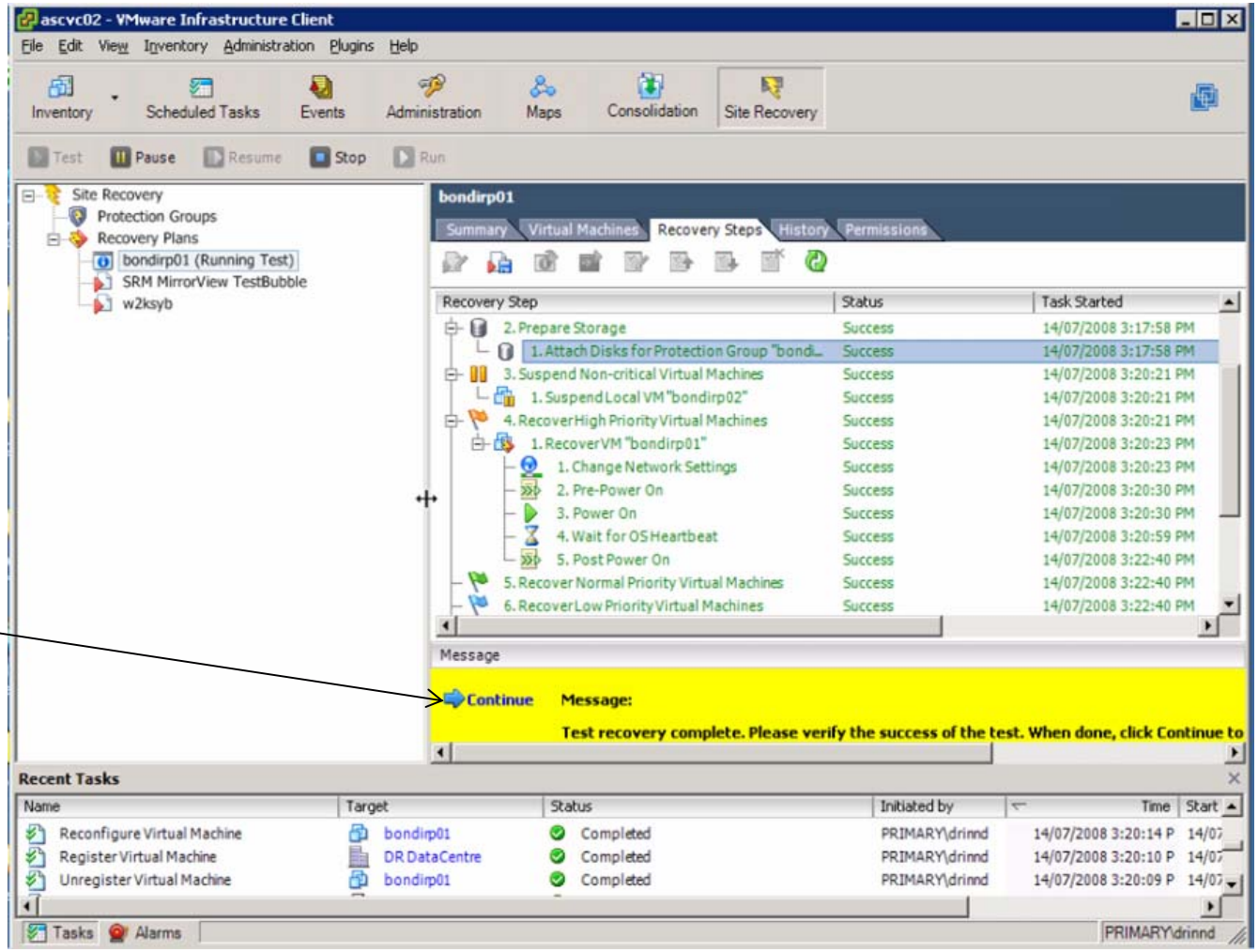
- Power Up Recovered VM's in a Pre-Defined Order
- Pause Points can be added to wait for operator intervention etc.



SRM and RecoverPoint Failover Example

SRM DR TEST

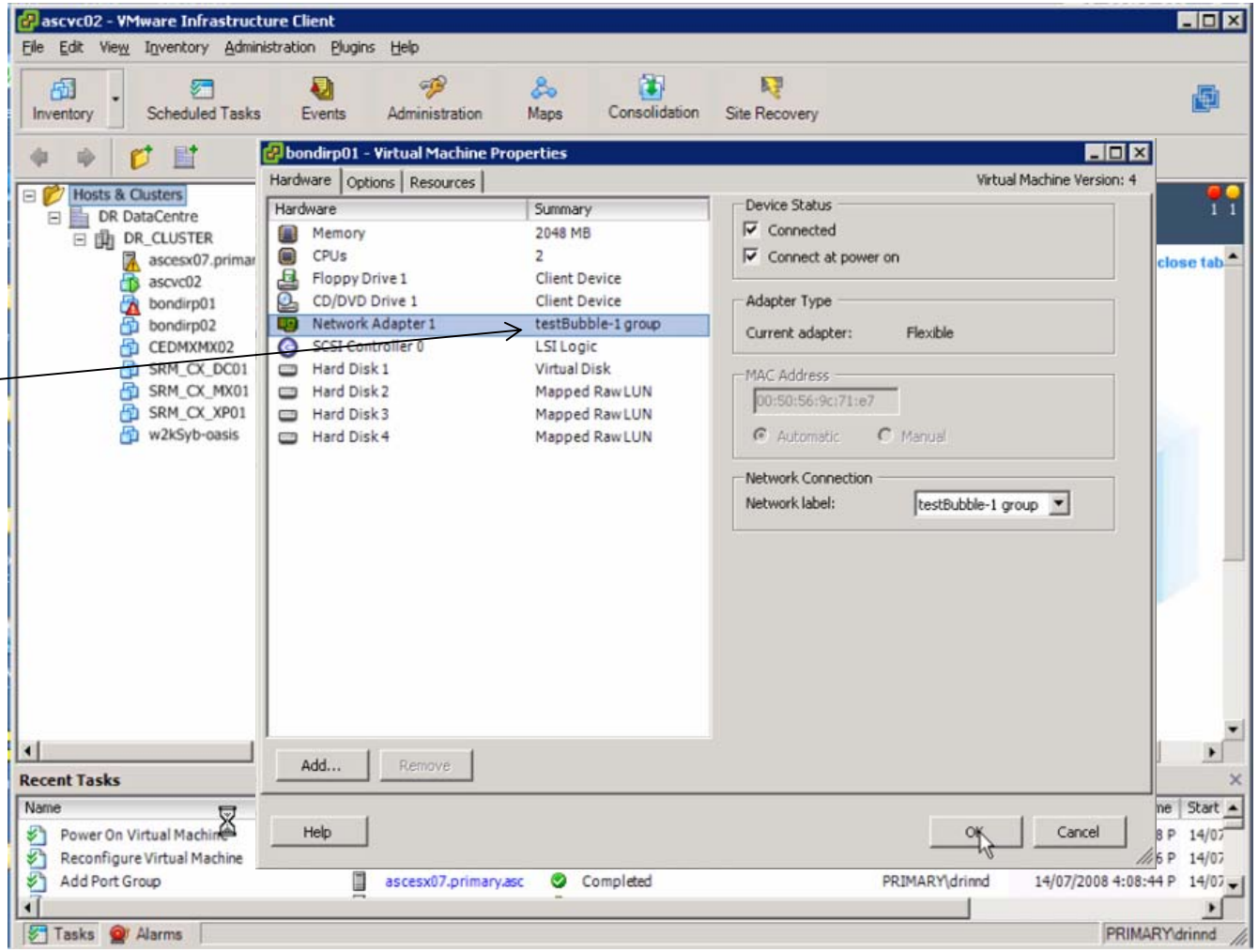
Pause Point
Verify Success Of Test



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

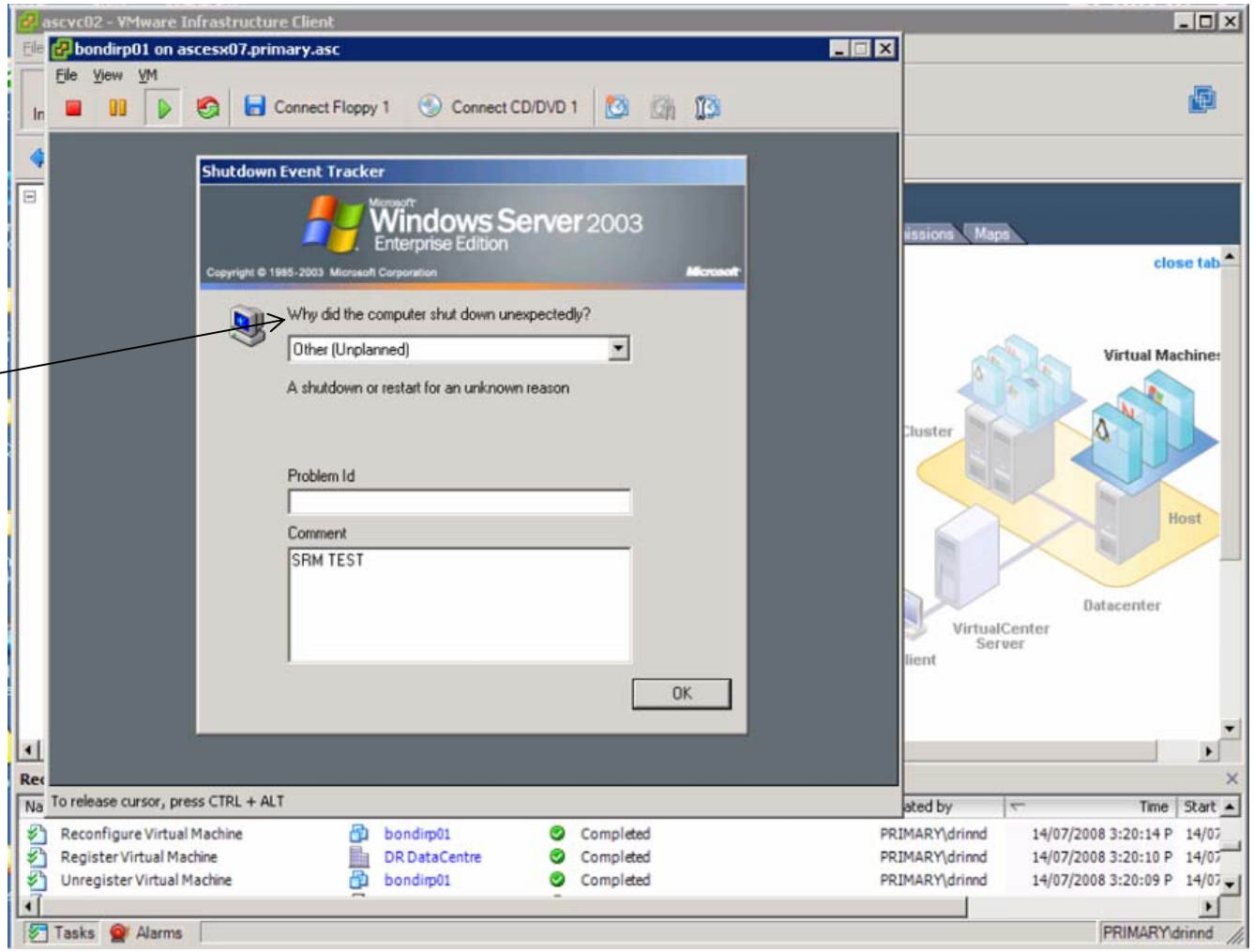


SRM and RecoverPoint Failover Example

SRM DR TEST

Placeholder is brought up in a “Crash Consistent” state

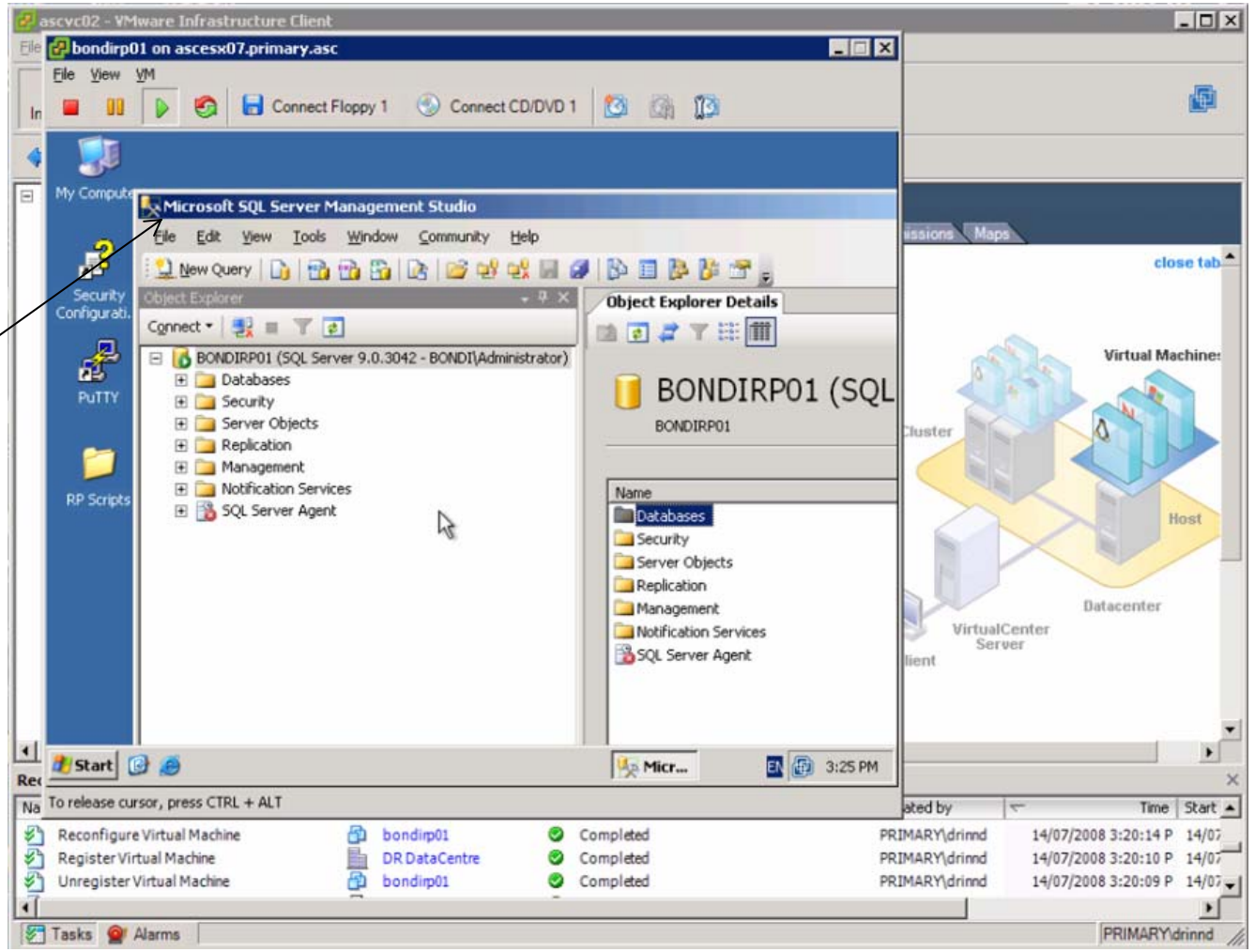
True DR Test



SRM and RecoverPoint Failover Example

SRM DR TEST

Test Recovered Application(s)

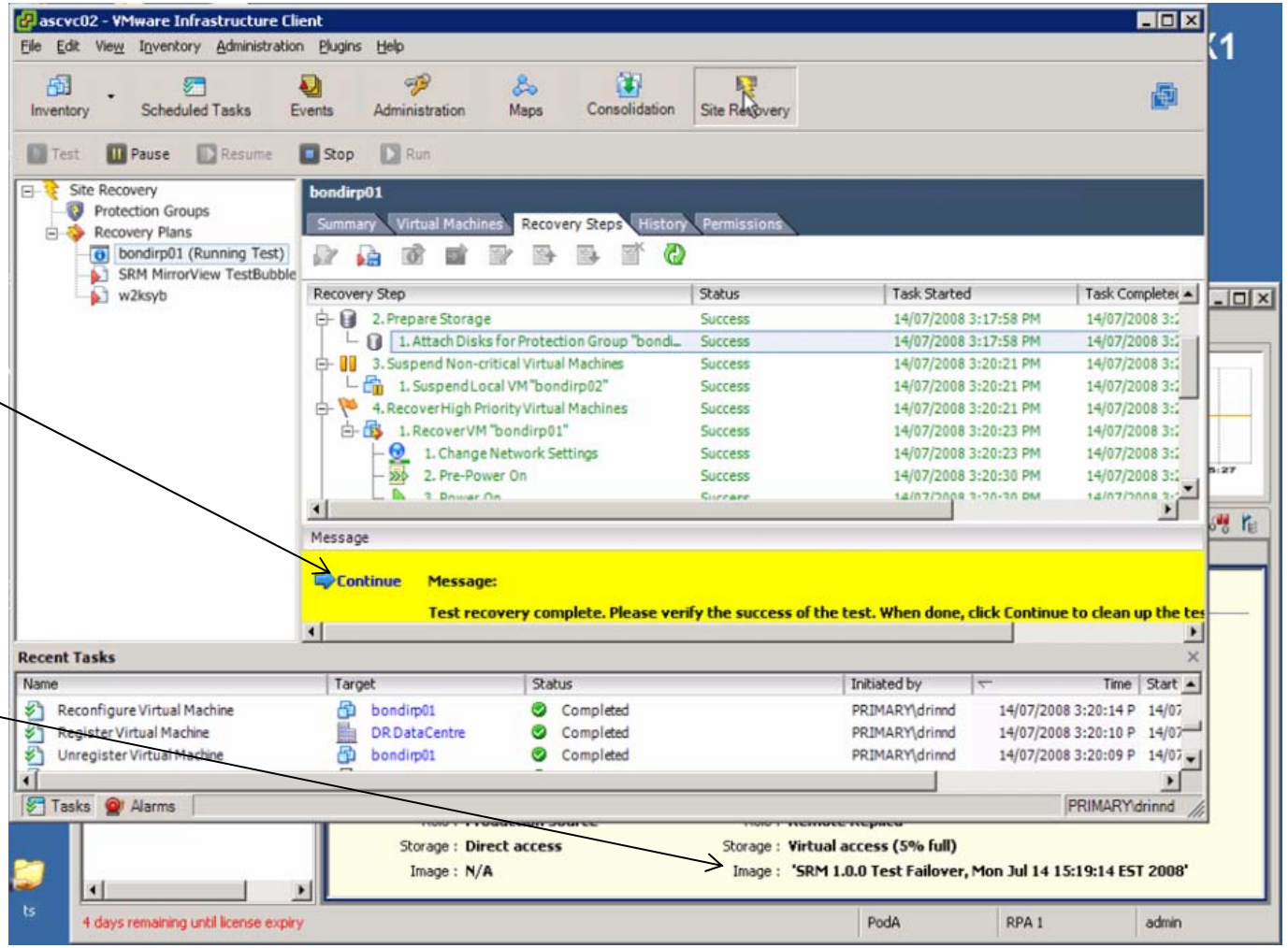


SRM and RecoverPoint Failover Example

SRM DR TEST

Continue After Application Recovery Tests

Note: RecoverPoint Snapshot Previously Initiated via SRM/SRA integration

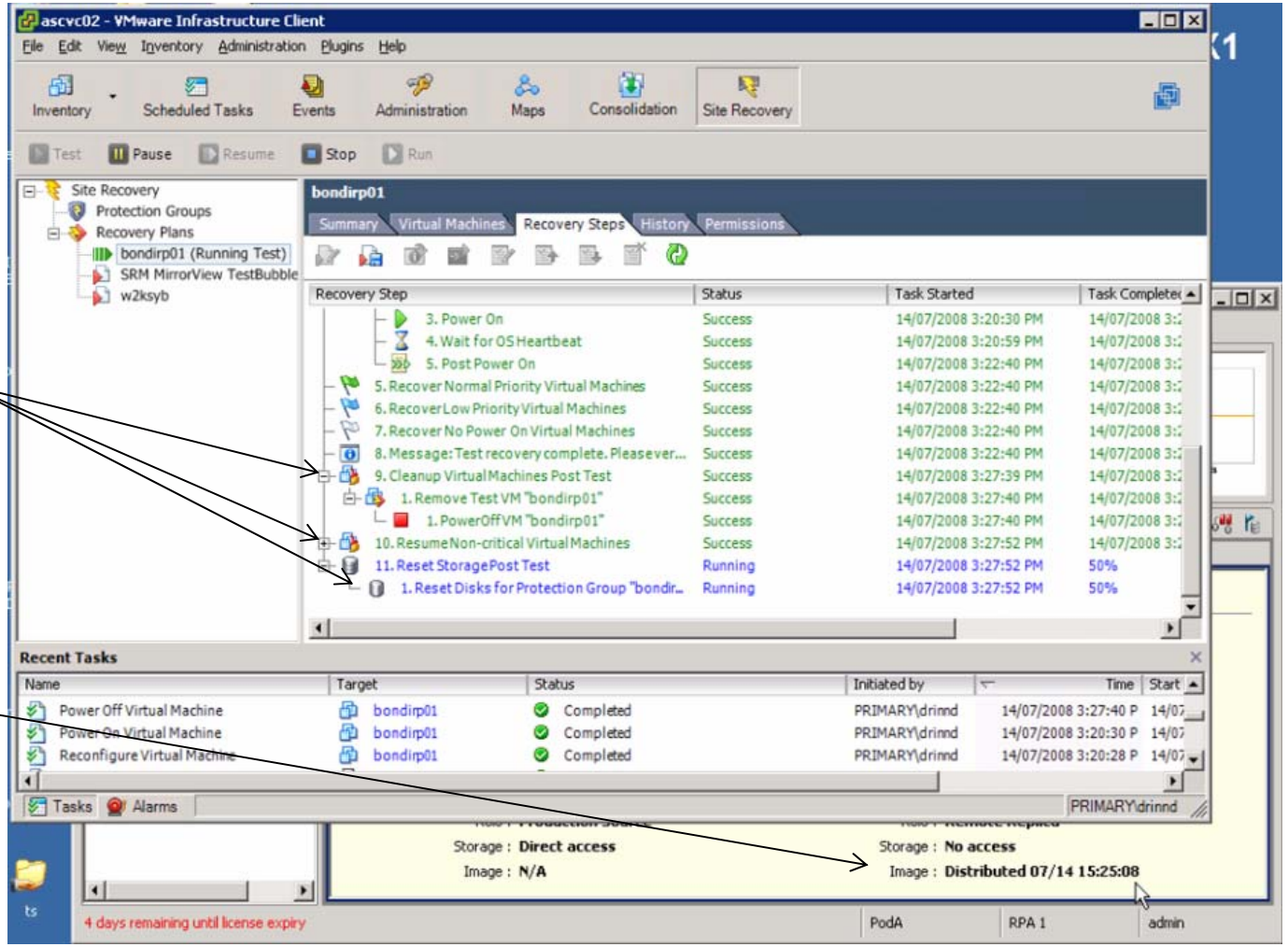


SRM and RecoverPoint Failover Example

SRM DR TEST

Return to Normal Running State

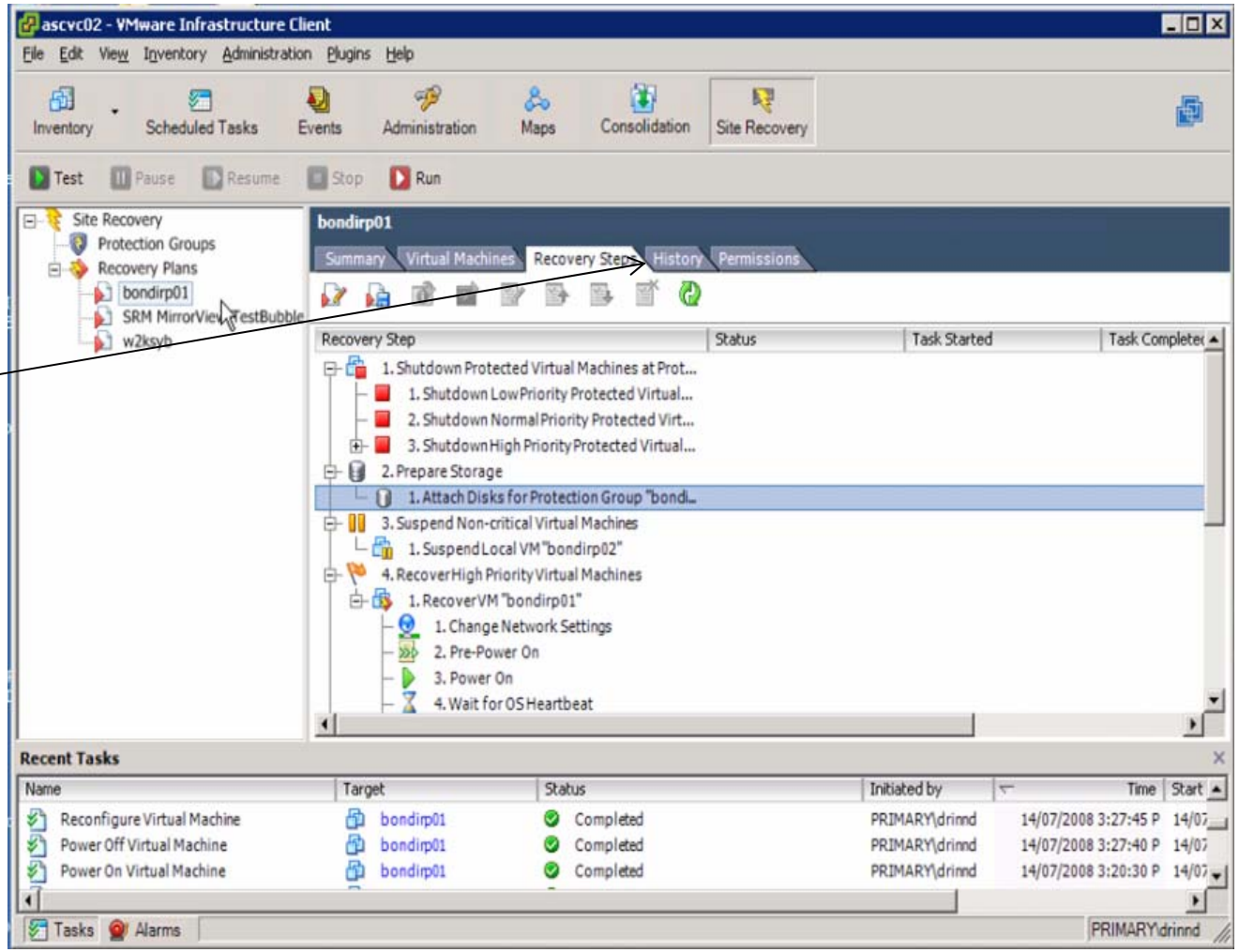
RecoverPoint Snapshot Removed via SRM/SRA integration



SRM and RecoverPoint Failover Example

SRM DR TEST

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



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

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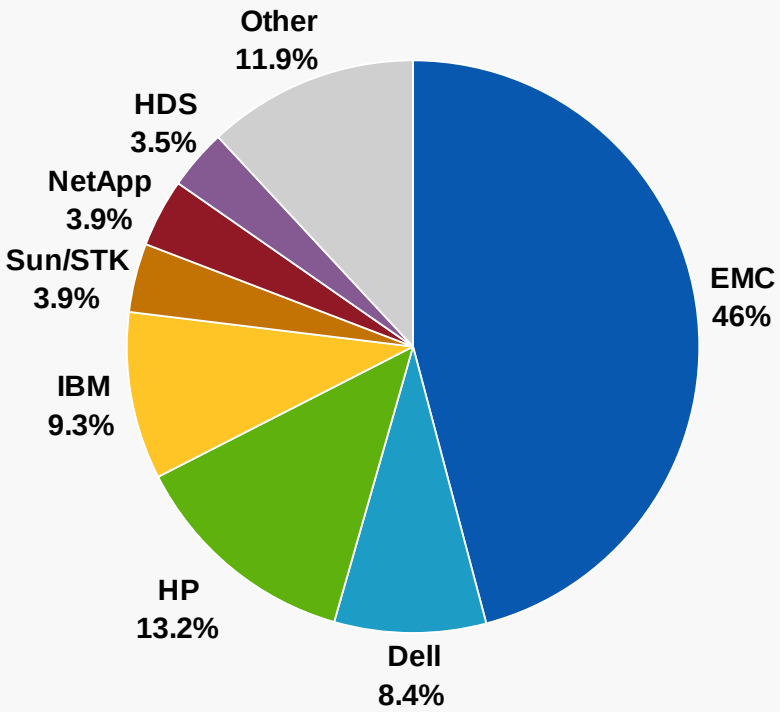

(Includes EMC OEM arrays)

Source: IDC—Server Virtualization (Dec 2007)


EMC²
where information lives®