

VMware Cloud Day 2011

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What's New in vSphere 5

Tomasz Krajewski

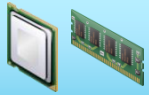
Senior Technical Adviser

VMware

ESXi

New Virtual Machine Features

■ vSphere 5.0 supports the industry's most capable virtual machines



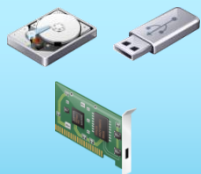
VM Scalability

- **32 virtual CPUs per VM**
- **1TB RAM per VM**
- **4x previous capabilities!**



Richer Desktop Experience

- **3D graphics**



Broader Device Coverage

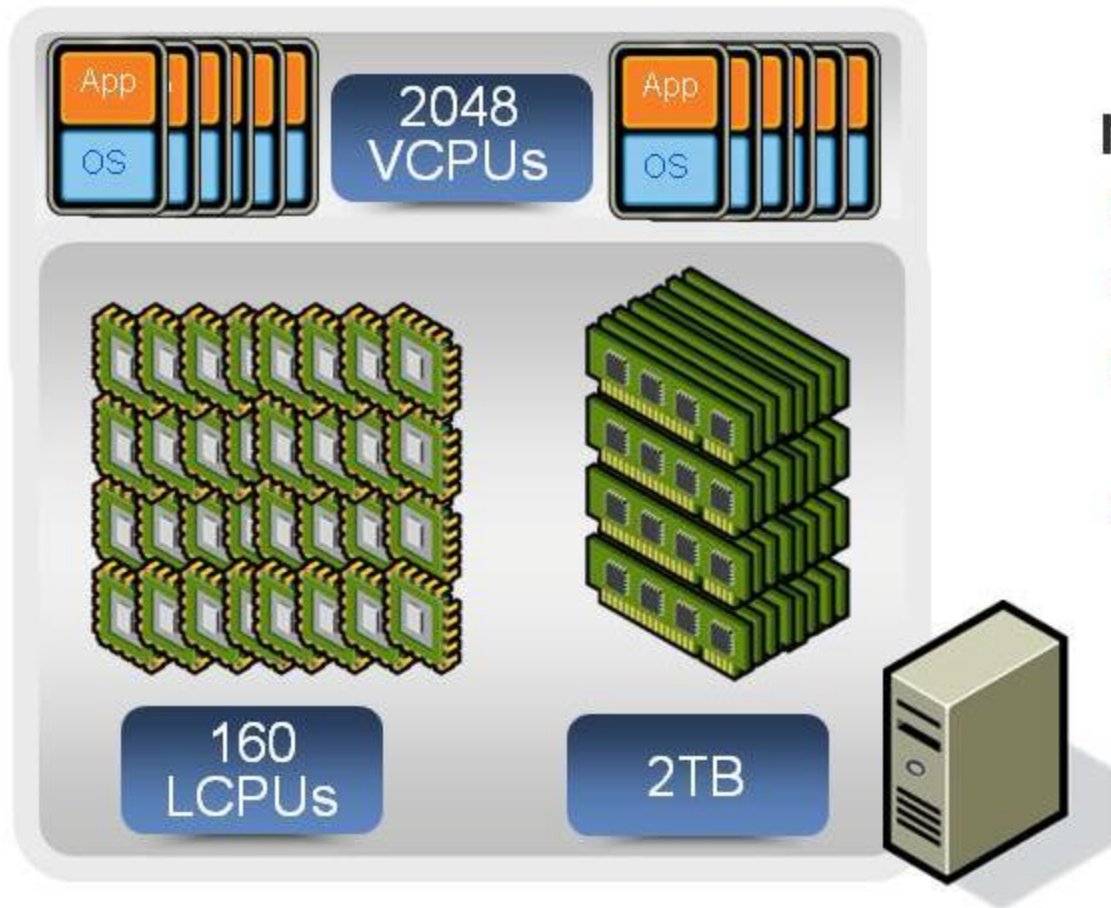
- Client-connected USB devices
- **USB 3.0 devices**
- Smart Card Readers for VM Console Access
- VM BIOS boot order config API and PowerCLI interface
- **EFI BIOS**

Other new features

- UI for multi-core virtual CPUs
- Extended VMware Tools compatibility
- Support for Mac OS X servers

Items which require HW version 8 in orange

Host Maximums



New for ESXi 5.0:

- 2TB host memory
- Up to 160 LCPUs
- 512 virtual machines per host
- 2048 virtual CPUs per host

VMFS-5 is a new version of the virtual machine file system that offers improved scalability and performance.

- The datastore and a single extent can be greater than 2TB.
 - The maximum datastore size is 64TB.
 - Pass-through RDMS can be greater than 2TB, maximum size is 64TB.
 - The maximum file size remains at 2TB.
- Newly-created VMFS-5 datastores use a 1MB file block size only.
- File system sub-block size is 64KB.
- Data of small files (less than or equal to 1KB) is stored directly in the file descriptor.
- GPT replaces the MBR.
 - GTP provides the ability to create VMFS-5 volumes greater than 2TB.

VMFS-5 Versus VMFS-3 Feature Comparison

Feature	VMFS-3	VMFS-5
2TB+ VMFS Volumes	Yes (using extents)	Yes
Support for 2TB+ Physical RDMs	No	Yes
Unified Block size (1MB)	No	Yes
Atomic Test & Set Enhancements (part of VAAI, locking mechanism)	No	Yes
Sub-blocks for space efficiency	64KB (max ~3k)	8KB (max ~30k)
Small file support	No	1KB

ESXi new Firewall

sc-goose05.vmeduc.com VMware ESXi, 5.0.0, 381646 | Evaluation (46 days remaining)

Getting Started Summary Virtual Machines Resource Allocation Performance Configuration Tasks & Events Alarms Permissions Maps Storage

Hardware

- Processors
- Memory
- Storage
- Networking
- Storage Adapters
- Network Adapters
- Advanced Settings
- Power Management

Software

- Licensed Features
- Time Configuration
- DNS and Routing
- Authentication Services
- Power Management
- Virtual Machine Startup/Shutdown
- Virtual Machine Swapfile Location
- Security Profile
- Host Cache Configuration
- System Resource Allocation
- Agent VM Settings
- Advanced Settings

Security Profile

Refresh Properties...

Services

- I/O Redirector (Active Directory Service)
- Network Login Server (Active Directory Service)
- NTP Daemon
- vpxa
- Local Security Authentication Server (Active Directory Service)
- ESXi Shell
- lbtd
- SSH
- Direct Console UI
- CIM Server

Firewall

Refresh Properties...

Service	Connections	Protocol
Incoming Connections		
CIM Server	5988	(TCP)
SSH Server	22	(TCP)
DHCP Client	68	(UDP)
Fault Tolerance	8100,8200	(TCP,UDP)
DNS Client	53	(UDP)
NFC	902	(TCP)
vSphere Web Access	80	(TCP)
vMotion	8000	(TCP)
SNMP Server	161	(UDP)
CIM Secure Server	5989	(TCP)
vSphere Client	902,443	(TCP)
CIM SLP	427	(UDP, TCP)
Outgoing Connections		
DHCP Client	68	(UDP)
Fault Tolerance	80,8100,8200	(TCP,UDP)
DNS Client	53	(UDP)

ESXi 5.0 has a new firewall engine to provide access control to the management network.

Storage DRS

What Does Storage DRS Solve?

■ Without Storage DRS:

- Identify the datastore with the most disk space and lowest latency.
- Validate which virtual machines are placed on the datastore and ensure there are no conflicts.
- Create Virtual Machine and hope for the best.

■ With Storage DRS:

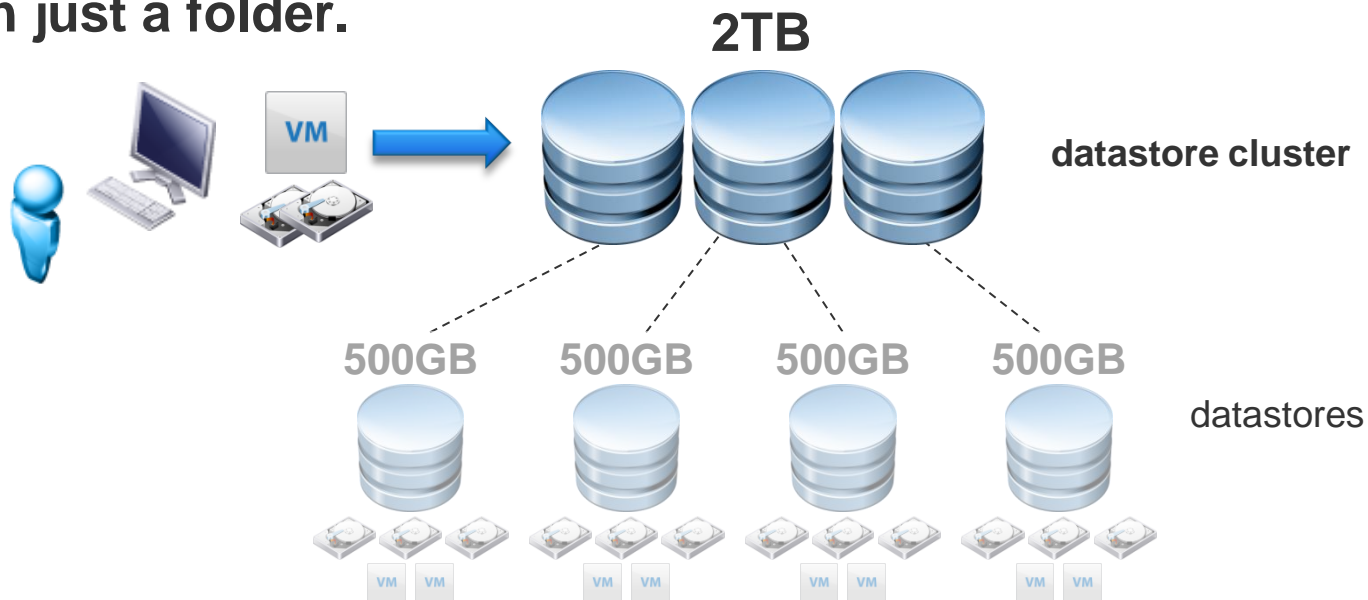
- Automatic selection of the best placement for your VM.
- Advanced balancing mechanism to avoid storage performance bottlenecks or “out of space” problems.
- VM or VMDK Affinity Rules.

What Does Storage DRS Provide?

- **Storage DRS provides the following:**
 1. Initial Placement of VMs and VMDKS based on available space and I/O capacity.
 2. Load balancing between datastores in a datastore cluster via Storage vMotion based on storage space utilization.
 3. Load balancing via Storage vMotion based on I/O metrics, i.e. latency.
- **Storage DRS also includes Affinity/Anti-Affinity Rules for VMs and VMDKs;**
 - VMDK Affinity – Keep a VM's VMDKs together on the same datastore. This is the default affinity rule.
 - VMDK Anti-Affinity – Keep a VM's VMDKs separate on different datastores.
 - Virtual Machine Anti-Affinity – Keep VMs separate on different datastores.
- **Affinity rules cannot be violated during normal operations.**

Datastore Cluster

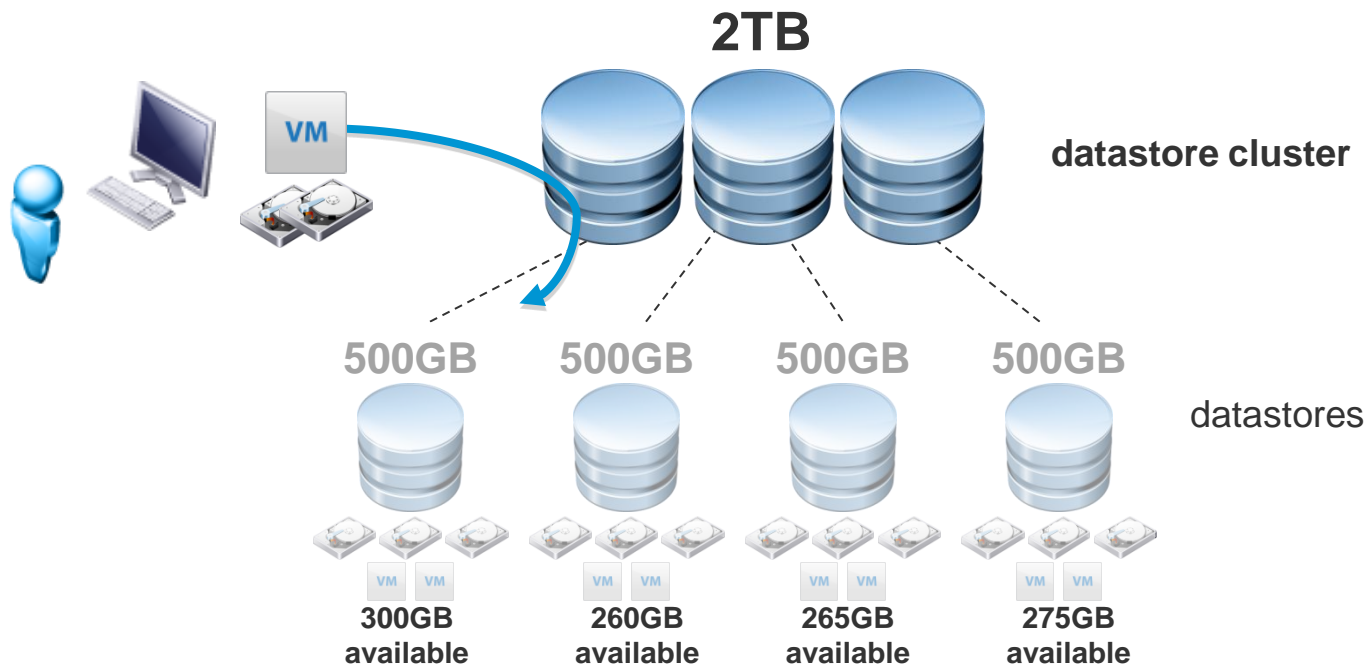
- An integral part of SDRS is to create a group of datastores called a **datastore cluster**.
 - **Datastore Cluster without Storage DRS** – Simply a group of datastores.
 - **Datastore Cluster with Storage DRS** – Load Balancing domain similar to a DRS Cluster.
- A **datastore cluster**, without SDRS is just a datastore folder. It is the functionality provided by SDRS which makes it more than just a folder.



Storage DRS Operations

■ Initial Placement – VM/VMDK create/clone/relocate.

- When creating a VM you select a datastore cluster rather than an individual datastore and let SDRS choose the appropriate datastore.
- SDRS will select a datastore based on space utilization and I/O load.
- By default, all the VMDKs of a VM will be placed on the same datastore within a datastore cluster (VMDK Affinity Rule), but you can choose to have VMDKs assigned to different datastore clusters.



Storage DRS Operations – Load Balancing

Load balancing – SDRS triggers on space usage & latency threshold.

- **Algorithm makes migration recommendations when I/O response time and/or space utilization thresholds have been exceeded.**
 - Space utilization statistics are constantly gathered by vCenter, default threshold 80%.
 - I/O load trend is **currently** evaluated every 8 hours based on a past day history, default threshold 15ms.
- **Load Balancing is based on I/O workload and space which ensures that no datastore exceeds the configured thresholds.**
- **Storage DRS will do a cost / benefit analysis!**
- **For I/O load balancing Storage DRS leverages Storage I/O Control functionality.**

Storage DRS Operations

New Datastore Cluster

SDRS Runtime Rules

How do you want this Datastore Cluster configured?

[General](#)
[SDRS Automation](#)
SDRS Runtime Rules
Select Hosts and Clusters
Select Datastores
Ready to Complete

I/O Metric Inclusion
Select this option if you want I/O metrics considered as a part of any SDRS recommendations or automated migrations in this datastore cluster. This will also enable Storage I/O Control on all datastores in this cluster.
 Enable I/O metric for SDRS recommendations

I/O load balancing functionality is available only when all hosts connected to the datastores in this datastore cluster are of version 5.0.

Storage DRS Thresholds
Runtime thresholds govern when storage DRS performs or recommends migrations (based on your selected automation level). Utilized space dictates the minimum level of consumed space that is the threshold for action, and I/O latency dictates the minimum I/O latency below which I/O load balancing moves will not be considered.

Utilized Space: 50% 100% %

I/O Latency: 5ms 100ms ms

[Hide Advanced Options](#)

Advanced Options

No recommendations until utilization difference between source and destination is: 1% 50% %

Check imbalances every:

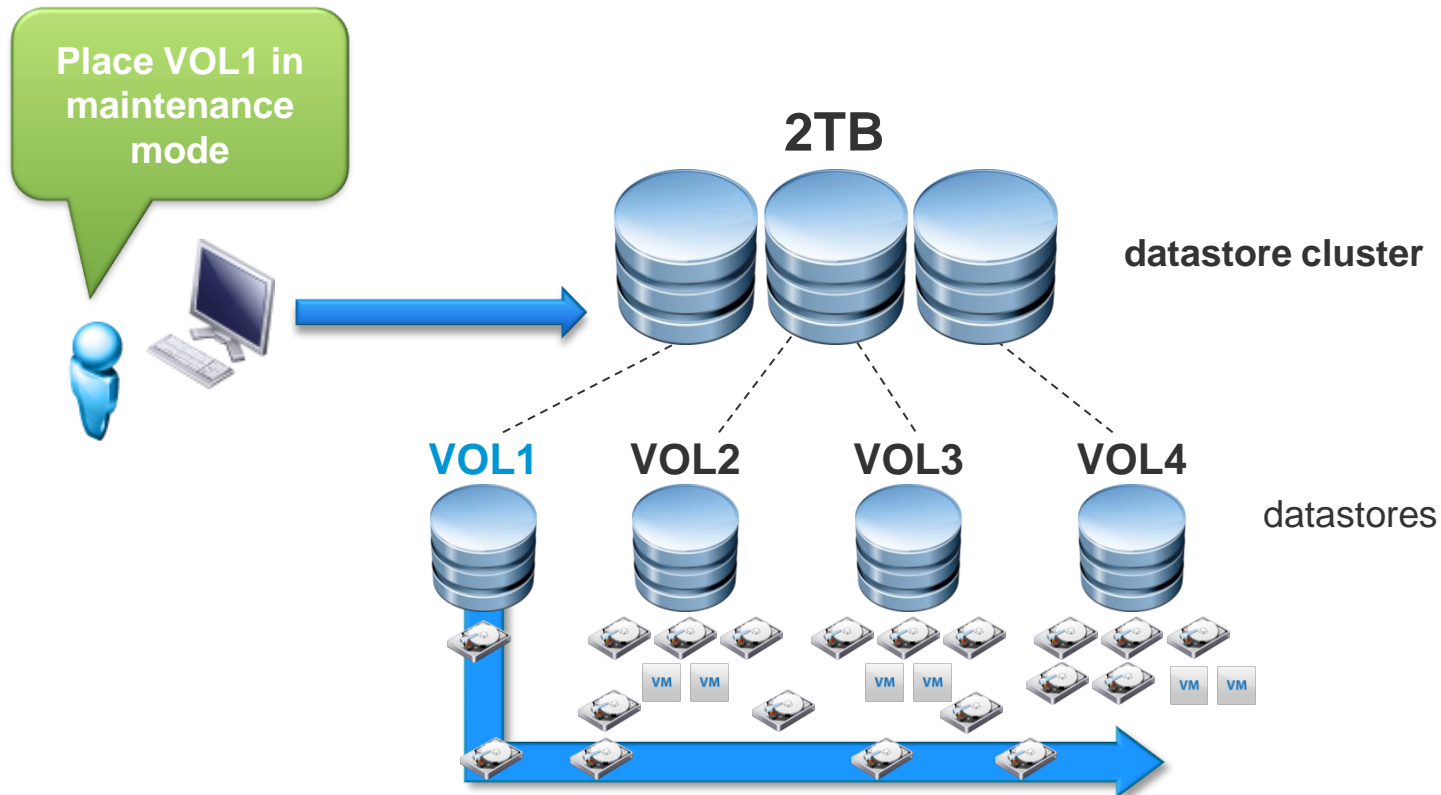
I/O imbalance threshold: Aggressive Conservative

The I/O imbalance threshold determines the amount of imbalance that Storage DRS should tolerate. Aggressive setting would make Storage DRS correct small imbalances, if possible and moving it toward conservative would make Storage DRS produce recommendations only in cases when the imbalance across datastores is very high.

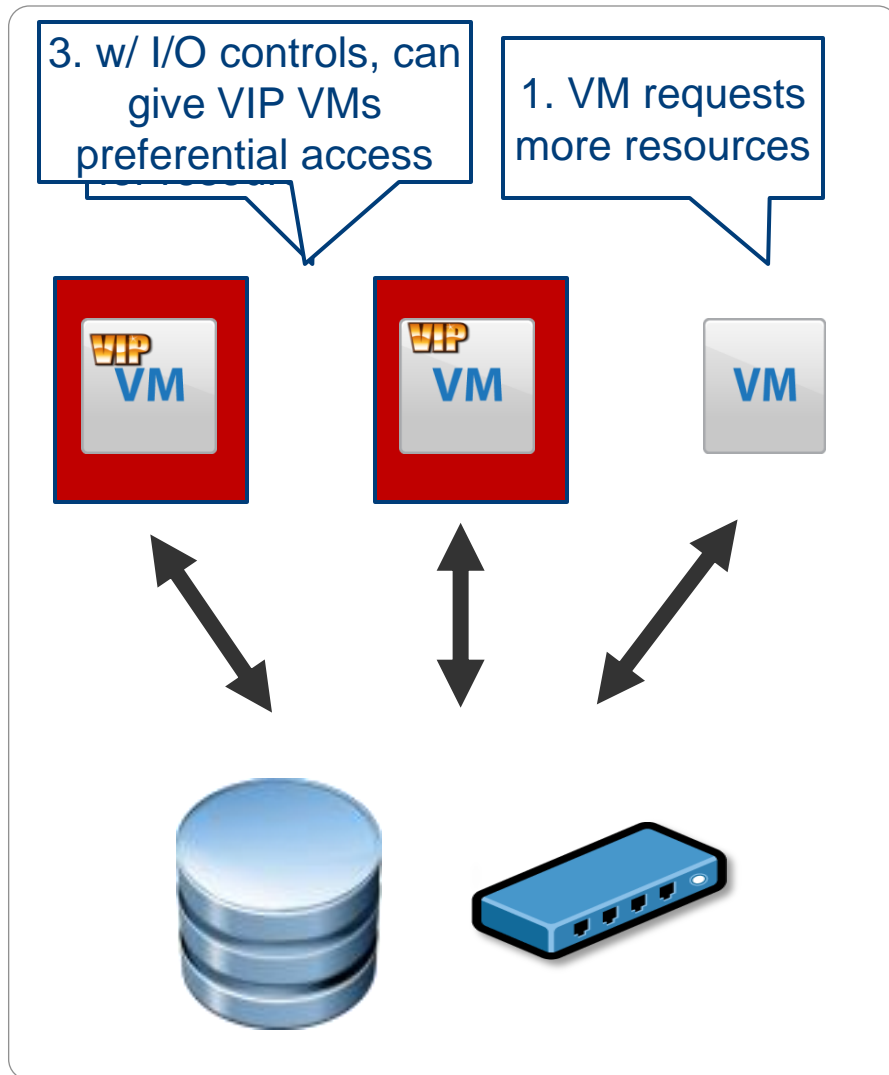
Storage DRS Operations – Datastore Maintenance Mode

■ Datastore Maintenance Mode

- Evacuates all VMs & VMDKs from selected datastore.
- Note that this action will not move VM Templates.
- Currently, SDRS only handles registered VMs.



Performance Guarantees – Network and Storage I/O Control



Overview

- Set up SLAs for use of storage and network resources
 - Added per virtual machine settings for Network I/O Control
 - Added NFS support for Storage I/O Control

Benefits

- Eliminate the “noisy neighbor” problem
- More granular SLA settings for network traffic
- Extend Storage SLAs to more VMs

vSphere 5.0 – vMotion Enhancements

- **The original vMotion keeps getting better!**
- **Multi-NIC Support**
 - Support up to four 10Gbps or sixteen 1Gbps NICs. (ea. NIC must have its own IP).
 - Single vMotion can now scale over multiple NICs. (load balance across multiple NICs).
 - Faster vMotion times allow for a higher number of concurrent vMotions.
- **Reduced Application Overhead**
 - Slowdown During Page Send (SDPS) feature throttles busy VMs to reduce timeouts and improve success.
 - Ensures less than 1 Second switchover time in almost all cases.
- **Support for higher latency networks (up to ~10ms)**
 - Extend vMotion capabilities over slower networks.

vSphere 5.0 – vMotion Enhancements

■ Improved Error Reporting

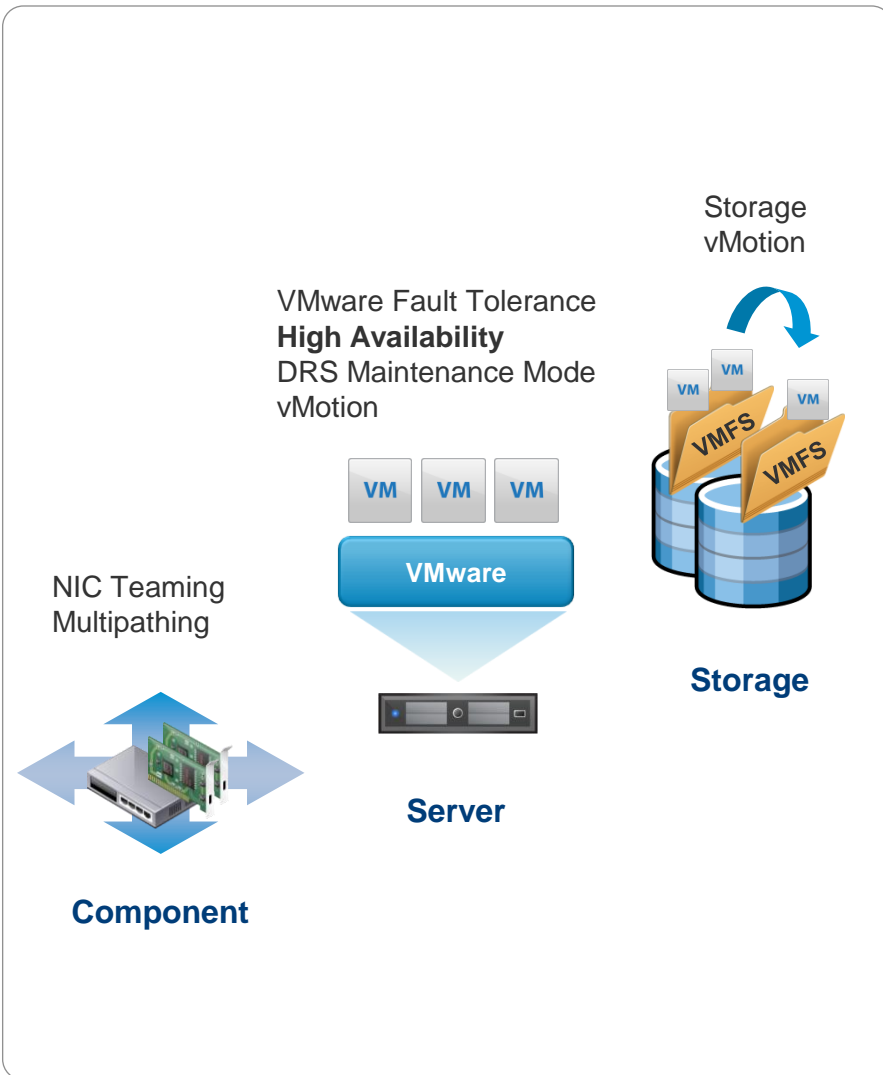
- More detailed logging allows for better troubleshooting.
- Access detailed error messages directly from VC through VOB integration.

■ Improved Resource Pool Integration

- vMotion now puts VMs in the proper resource pool vs. waiting for DRS.

High Availability

New HA Architecture



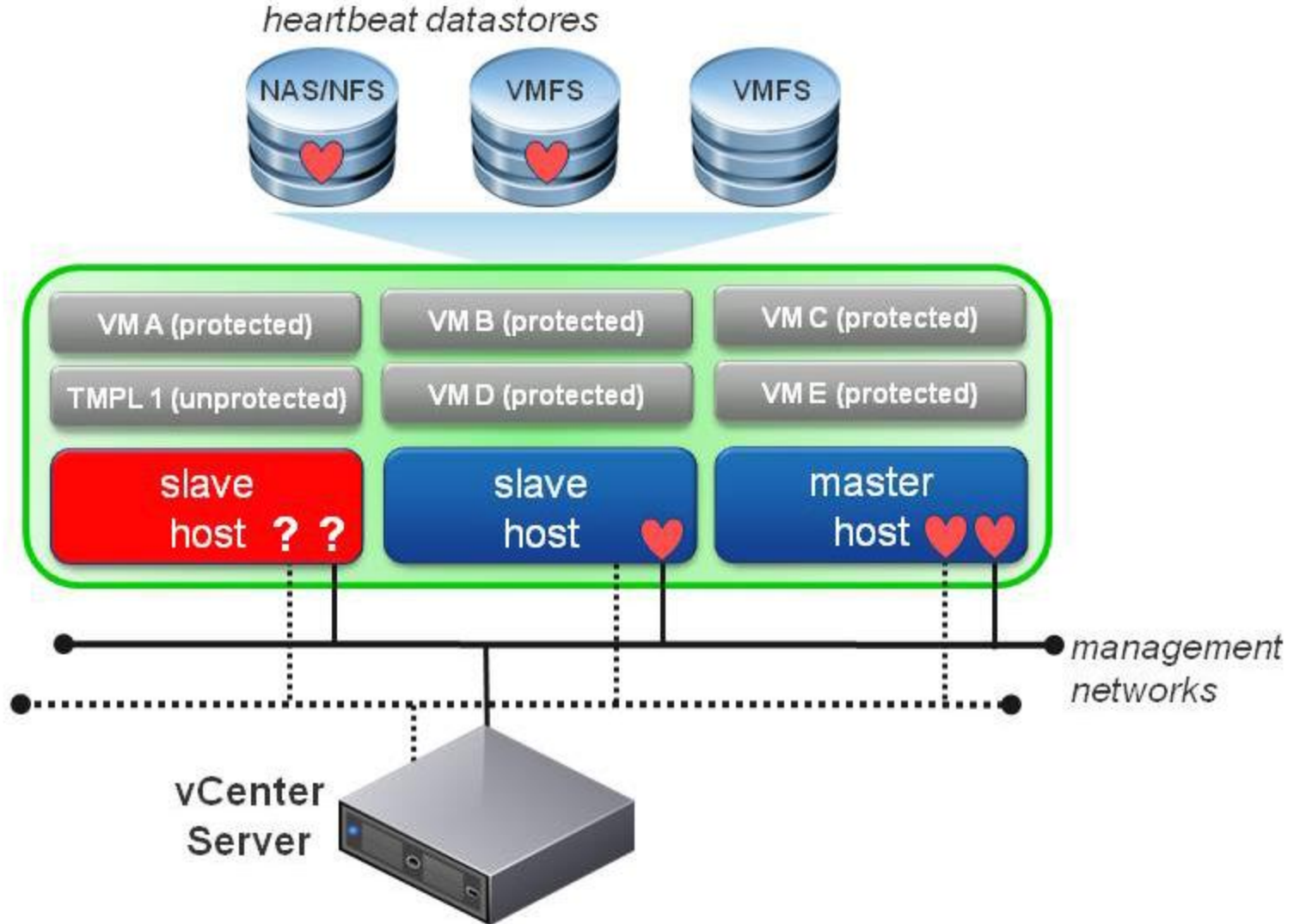
Overview

- New architecture for High Availability feature of vSphere

Benefits





- Simplified clustering setup and configuration
- Enhanced reliability through better resource guarantees and monitoring
- Enhanced scalability

New HA Architecture



HA States

- A new host property to report the HA state of a host.
- The state is reported on host summary panel and optionally in the host list.
- **Possible States include:**
 - N/A (HA not configured)
 - Election (Master election in progress)
 - Master (Can be more than one)
 - Connected (To Master over network)
 - Network Partitioned
 - Network Isolated
 - Dead
 - Agent Unreachable
 - Initialization Error
 - Unconfig Error

General	
Manufacturer:	VMware, Inc.
Model:	VMware Virtual Platform
CPU Cores:	1 CPU x 2.261 GHz
Processor Type:	Intel(R) Xeon(R) CPU E5520 @ 2.27GHz
License:	vSphere 5 Enterprise Plus Licensed for 1 physical CPU...
Processor Sockets:	1
Cores per Socket:	1
Logical Processors:	1
Hyperthreading:	Inactive
Number of NICs:	3
State:	Connected
Virtual Machines and Templates:	5
vMotion Enabled:	Yes
VMware EVC Mode:	Disabled 
HA State	 Running (Master) 
Host Configured for FT:	No 

Log Files

- Each host has only one log file : `/var/log/fdm.log`.
- This is much easier to troubleshoot than previous versions of vSphere HA.
- This should be the first place to look at for all:
 - Partitioning Issues
 - Isolation Issues
 - VM Protection Issues
 - Election Issues
 - Failure to failover issues.

What is Auto Deploy

vCenter Server with Auto Deploy

Image Profiles



Host Profiles



vSphere



vSphere



vSphere



VM

VM

VM

VM

VM

VM

Overview

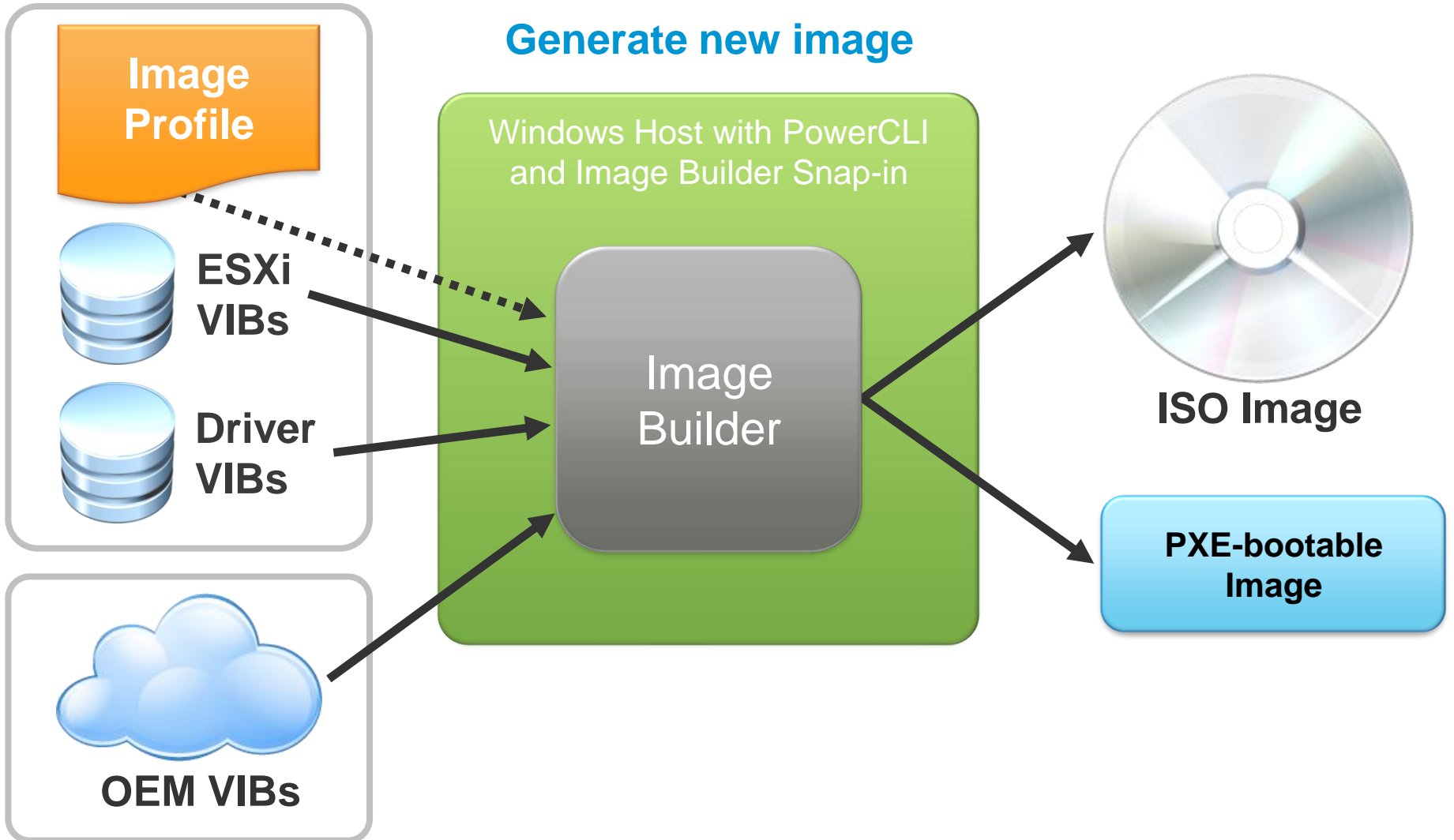
- Deploy and patch vSphere hosts in minutes using a new “on the fly” model
- Coordination with vSphere Host Profiles

Benefits

- Rapid provisioning: initial deployment and patching of hosts
- Centralized host and image management
- Reduce manual deployment and patch processes

Building an Image

Depots



vSphere Web Client

Launchbar

Inventory Objects

Tabs

Create custom actions

Sidebar Extension

The screenshot shows the vSphere Web Client interface with several annotations:

- Launchbar:** A dropdown menu at the top left with the text "Launch".
- Inventory Objects:** A tree view on the left side showing a hierarchy of objects, including "WIN-19B7R1V4Q4S", "DogFoodCenter", "VMworld Europe", and "conrad-esx.eng.vmware.com".
- Portlets:** A central area displaying details for the selected object "WIN-19B7R1V4Q4S", including "Summary", "Monitor", "Manage", and "Relationships" tabs. It shows "Status" as "Active Tasks: None" and "Annotations" with a "Notes" field and an "Edit" button.
- Task Console:** A sidebar extension on the right showing "Recent Tasks" and "My Tasks". The "My Tasks" section is expanded to show a list of tasks: "Power Off virtual machine", "Reconfigure virtual machine", and "New Virtual Machine".
- More Actions:** A gear icon in the top right corner of the main content area, which opens a context menu with options like "New Resource Pool", "New vApp", and "Create VM".

At the bottom of the interface, there is a status bar that reads "Transferring data from 10.20.105.38..." and a VMware logo in the bottom right corner.

Portlets

Add right-click extensions

Features of the vSphere Web Client

■ Customize the GUI

- Create custom views to reflect the information you need to see, the way you like to see it

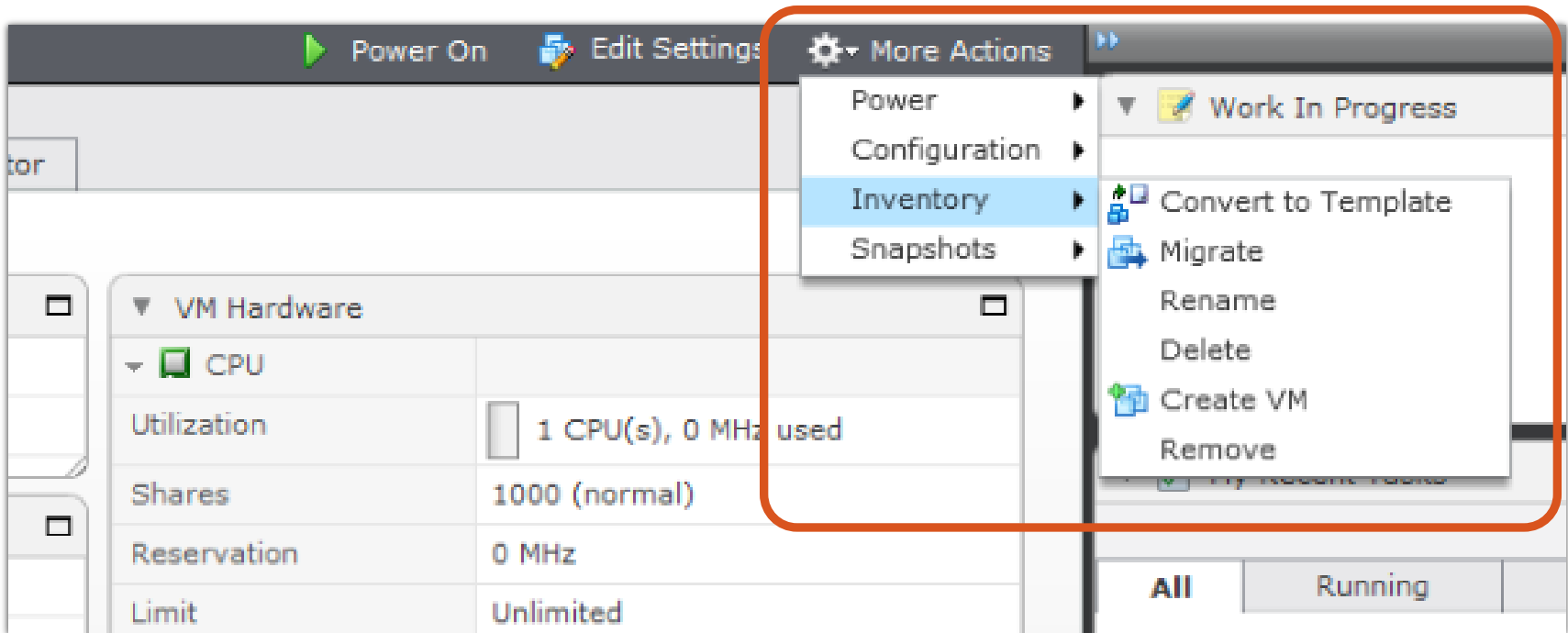
The screenshot displays the vSphere Web Client interface for a virtual machine named VM_50. The interface is organized into several sections:

- Summary Tab:** Includes sub-tabs for Tasks, Resource Management, and Monitor.
- Status:** Shows an overall status of 'Normal' with a green checkmark and 'Active Tasks' as 'None'.
- Guest OS Details:** Lists 'Power State' as 'Powered Off', 'Guest OS' as 'Other (32-bit)', 'IP Addresses', 'DNS Name', 'VMware Tools' as 'Not running (Not installed)', and a 'Console' window showing a black screen with a link to 'Install client integration plug-in...'. An 'Annotations' section with a 'Notes' field and an 'Edit' button is also present.
- VM Hardware:** A detailed view of the virtual machine's hardware configuration:
 - CPU:** Utilization (1 CPU(s), 0 MHz used), Shares (1000 (normal)), Reservation (0 MHz), Limit (Unlimited), HT Sharing (any).
 - Memory:** Utilization (512 MB, 0 MB used), Shares (5120 (normal)), Reservation (0 MB), Limit (Unlimited), Host Overhead (0).
 - Hard disk 1:** 1.00 GB.
 - CD/DVD drive 1:** The virtual machine is not powered on.
 - Network adapter 1:** MAC Address (00:50:56:af:27:60), Network (VM Network (disconnected)).
 - Other:** Additional Hardware.
 - HW Version:** 8.

Features of the vSphere Web Client

■ Ready Access to Common Actions

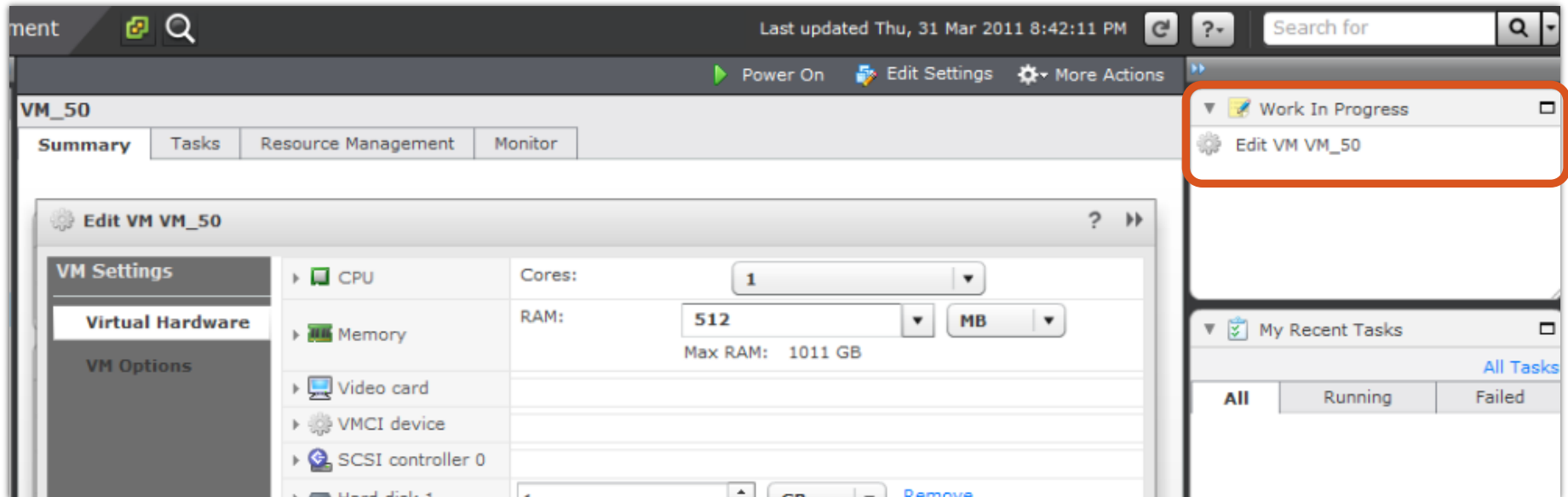
- Quick access to common tasks provided out of the box



Features of the vSphere Web Client

■ Support interrupt driven workflows

- Allow jumping in and out of workflows easily – continuing exactly from where you left off without having to repeat a process



vCenter Server Appliance

■ vCenter Server Appliance (VCSA) consists of:

- A pre-packaged 64 bit application running on SLES 11
 - Distributed with sparse disks
 - Disk Footprint

Distribution	Min Deployed	Max Deployed
3.6GB	~5GB	~80GB

- Memory Footprint
- A built in enterprise level database with optional support for a remote Oracle databases.
- Limits are the same for VC and VCSA
 - Embedded DB
 - 5 hosts/50 VMs
 - External DB
 - <1000 hosts/<10,000 VMs (64 bit)
- A web-based configuration interface

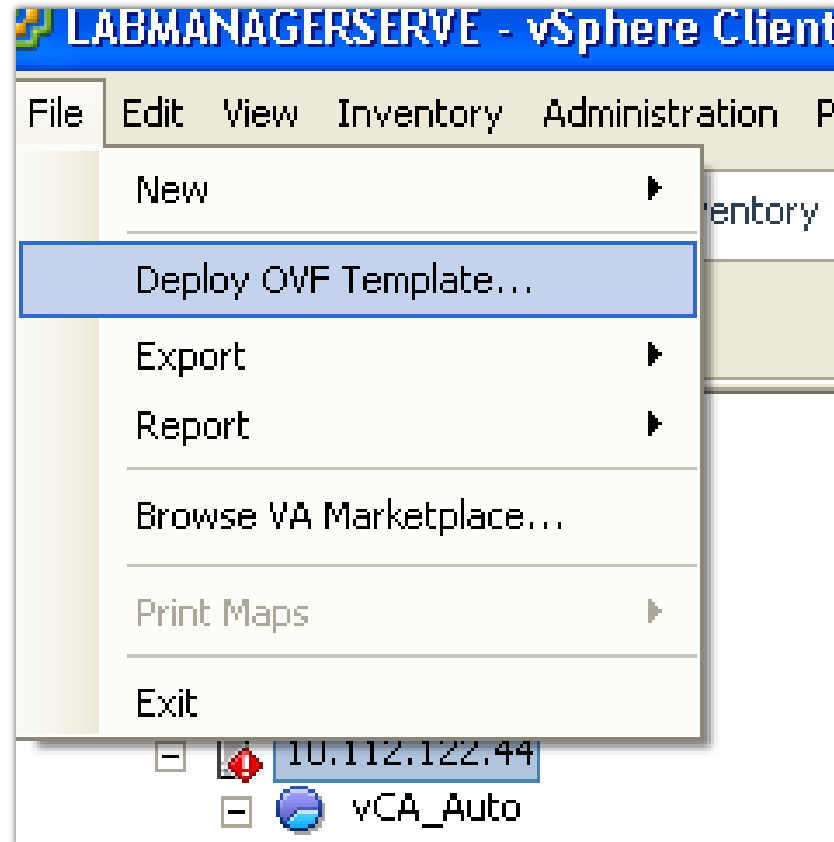


Feature Overview

- **vCenter Server Appliance supports:**
 - The vSphere Web Client
 - Authentication through AD and NIS
 - Feature parity with vCenter Server on Windows
 - **Except –**
 - Linked Mode support
 - Requires ADAM (AD LDS)
 - IPv6 support
 - External DB Support
 - Oracle is the only supported external DB for the first release
 - No vCenter Heartbeat support
 - HA is provided through vSphere HA

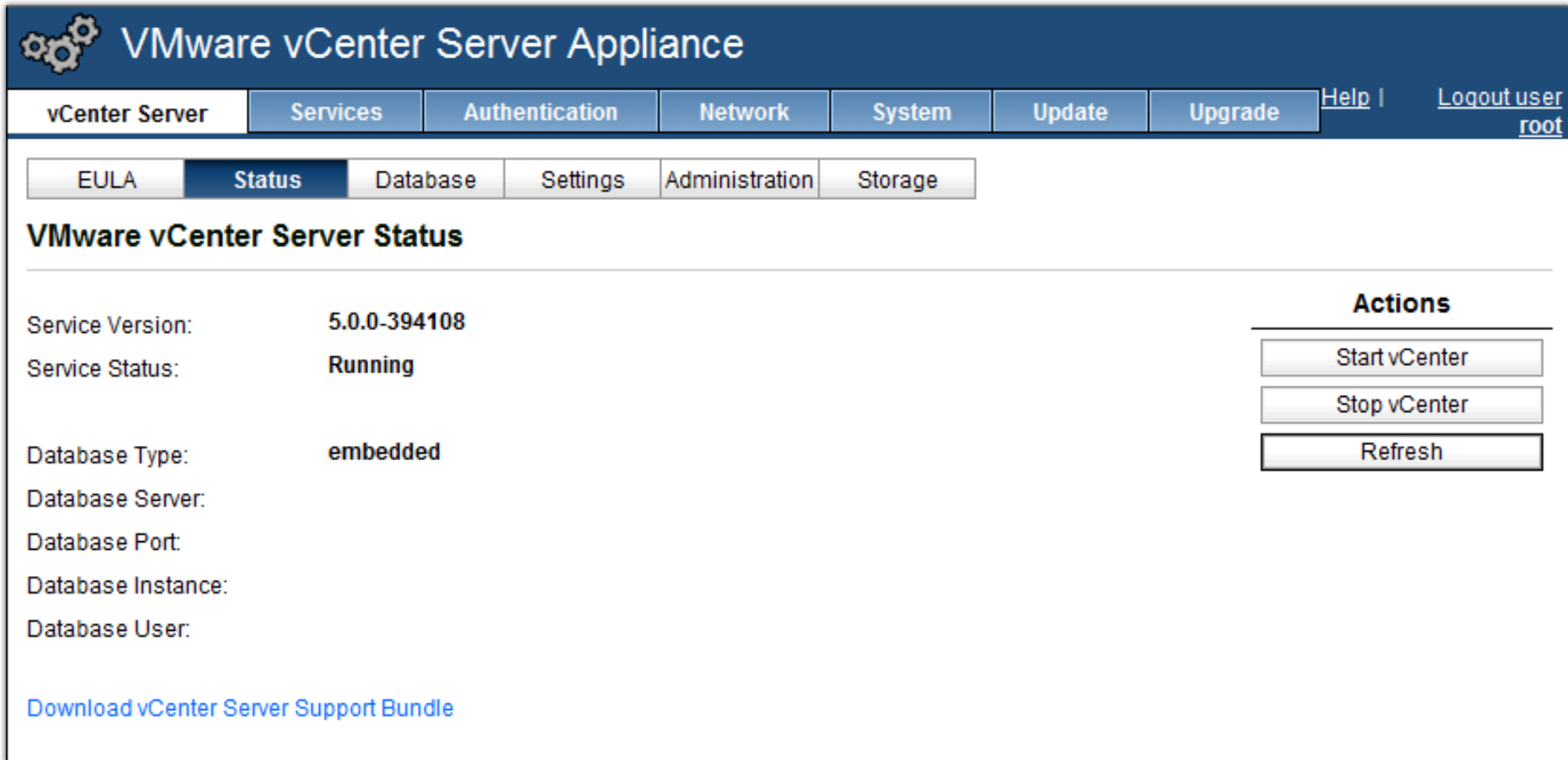
vCenter Server Appliance Deployment

- **Simply deploy from a OVF template!**
 - Install takes ~5 minutes



Configuration

- Complete configuration is possible through a powerful web-based interface!



The screenshot displays the VMware vCenter Server Appliance web interface. The top navigation bar includes tabs for vCenter Server, Services, Authentication, Network, System, Update, and Upgrade, along with links for Help and Logout user root. Below this, a secondary navigation bar highlights the Status tab, with other options like EULA, Database, Settings, Administration, and Storage. The main content area is titled "VMware vCenter Server Status" and features a table of system information and a column of actions.

VMware vCenter Server Status		Actions
Service Version:	5.0.0-394108	<input type="button" value="Start vCenter"/> <input type="button" value="Stop vCenter"/> <input type="button" value="Refresh"/>
Service Status:	Running	
Database Type:	embedded	
Database Server:		
Database Port:		
Database Instance:		
Database User:		

[Download vCenter Server Support Bundle](#)

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