VMware Cloud Day 2011

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What's New in vSphere 5

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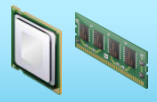
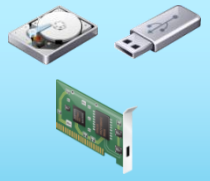
VMware

One platform

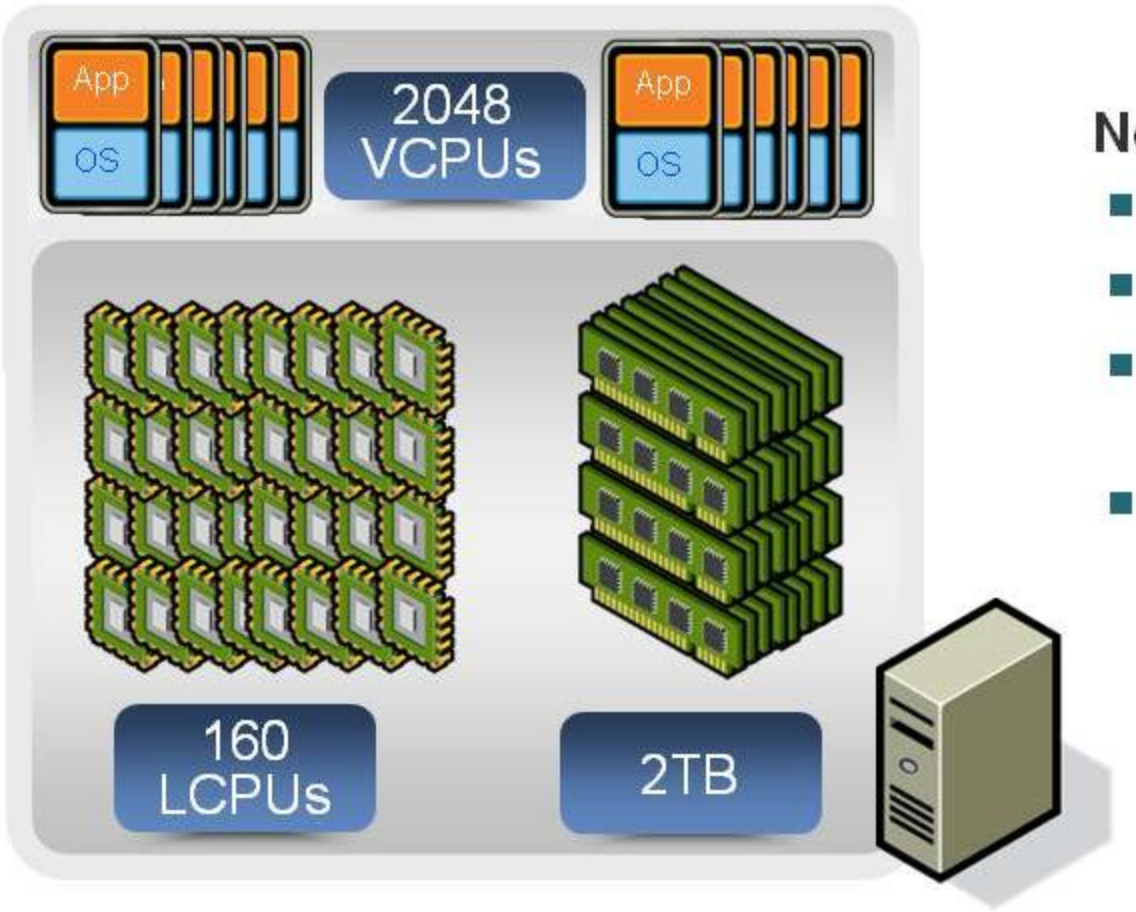
New Virtual Machine Features

- **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

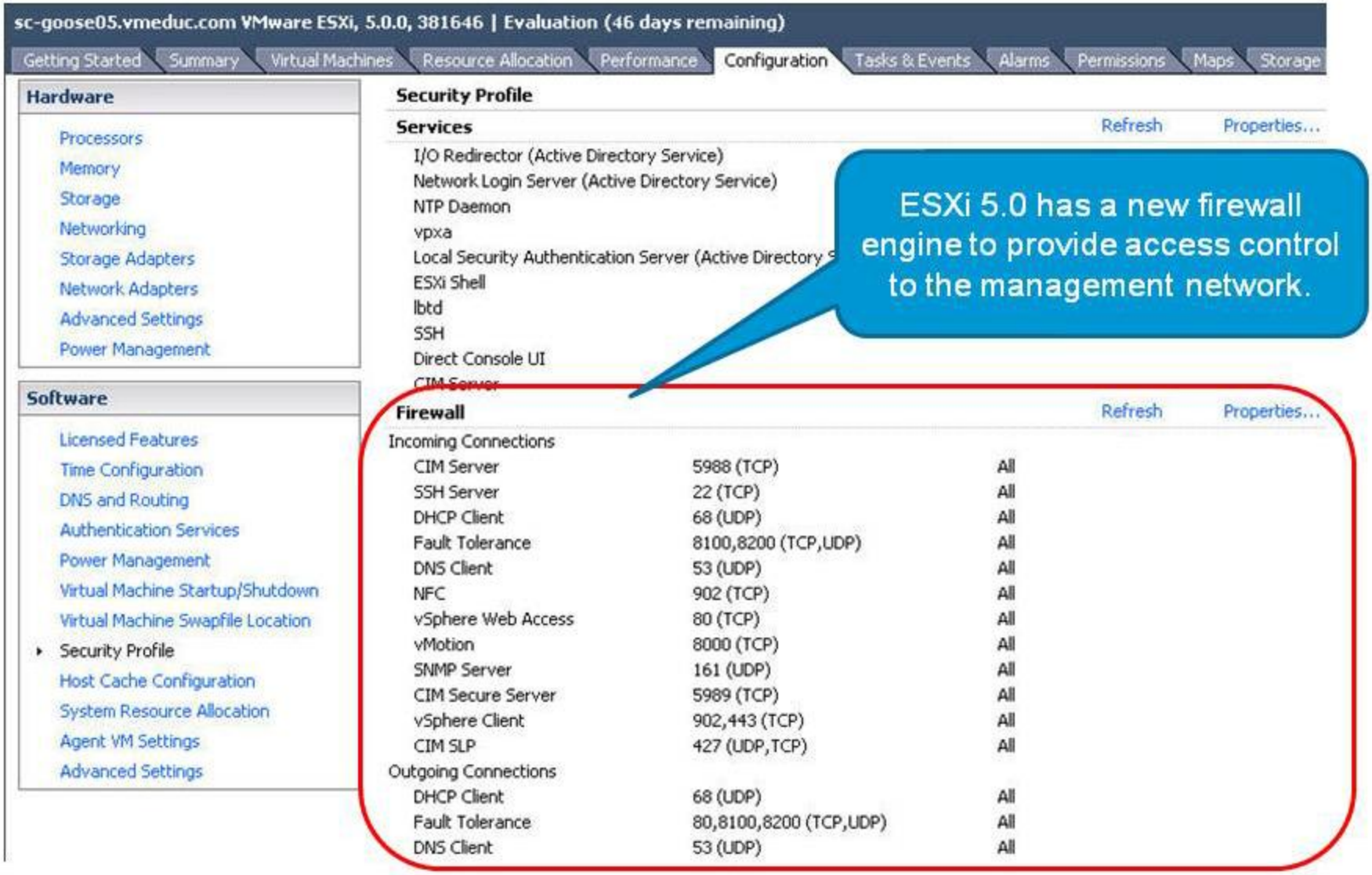
VMFS-5 is a new version of the virtual machine file system that offers improved scalability and performance.

- 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



Storage DRS

What Does Storage DRS Solve?

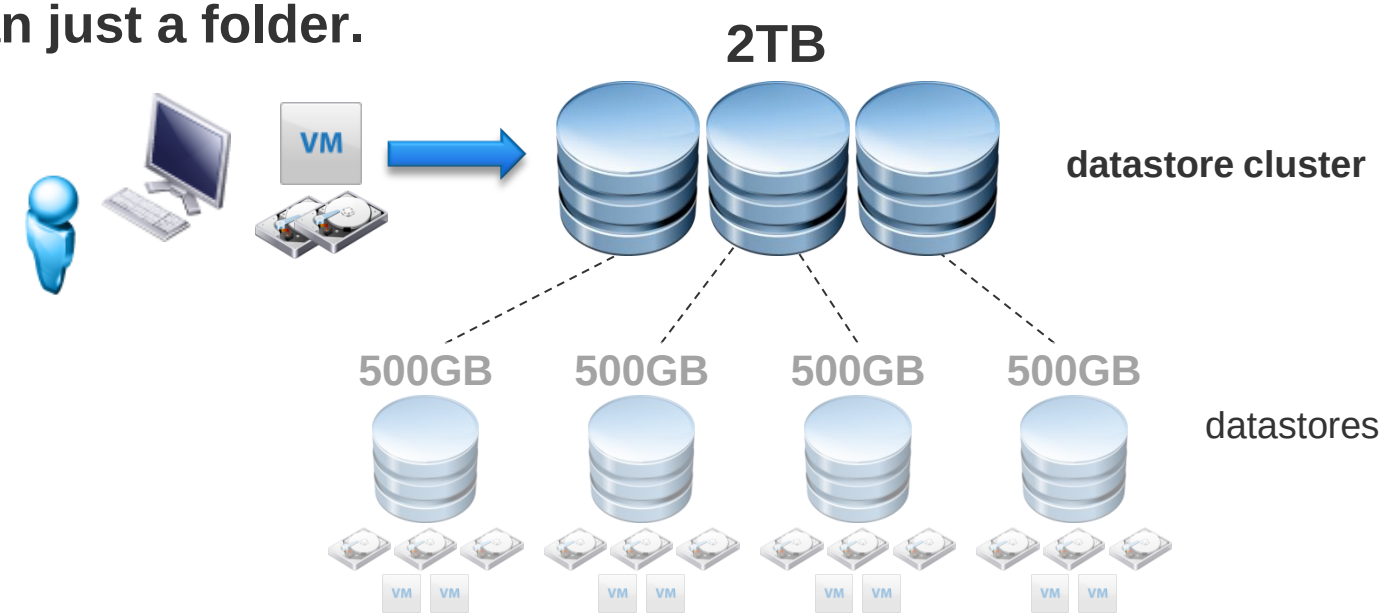
- **Without Storage DRS:**
  - Identify the datastore with the most disk space and lowest latency.
  - Validate which virtual machines are placed on the datastore and ensure there are no conflicts.
  - Create Virtual Machine and hope for the best.
- **With Storage DRS:**
  - Automatic selection of the 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.**

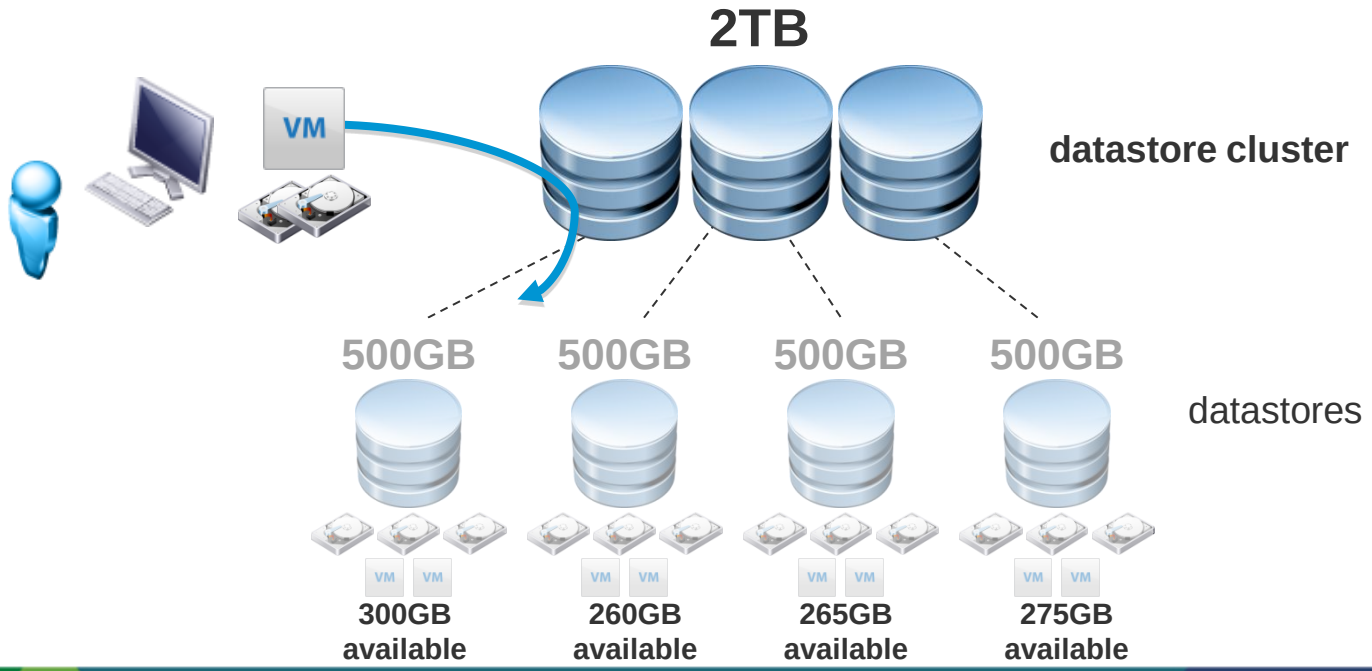
Datastore Cluster

- **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.

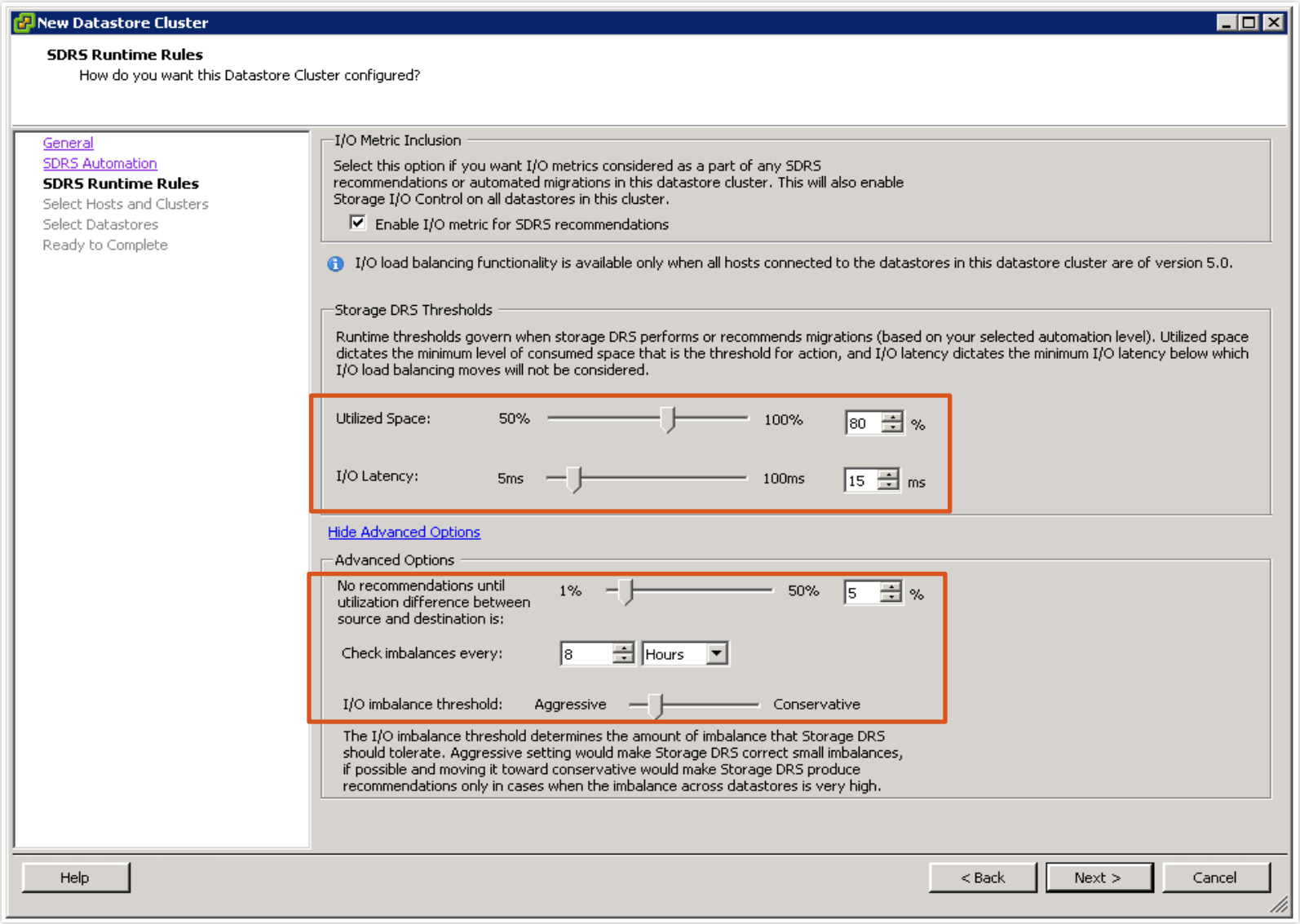


Storage DRS Operations – Load Balancing

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

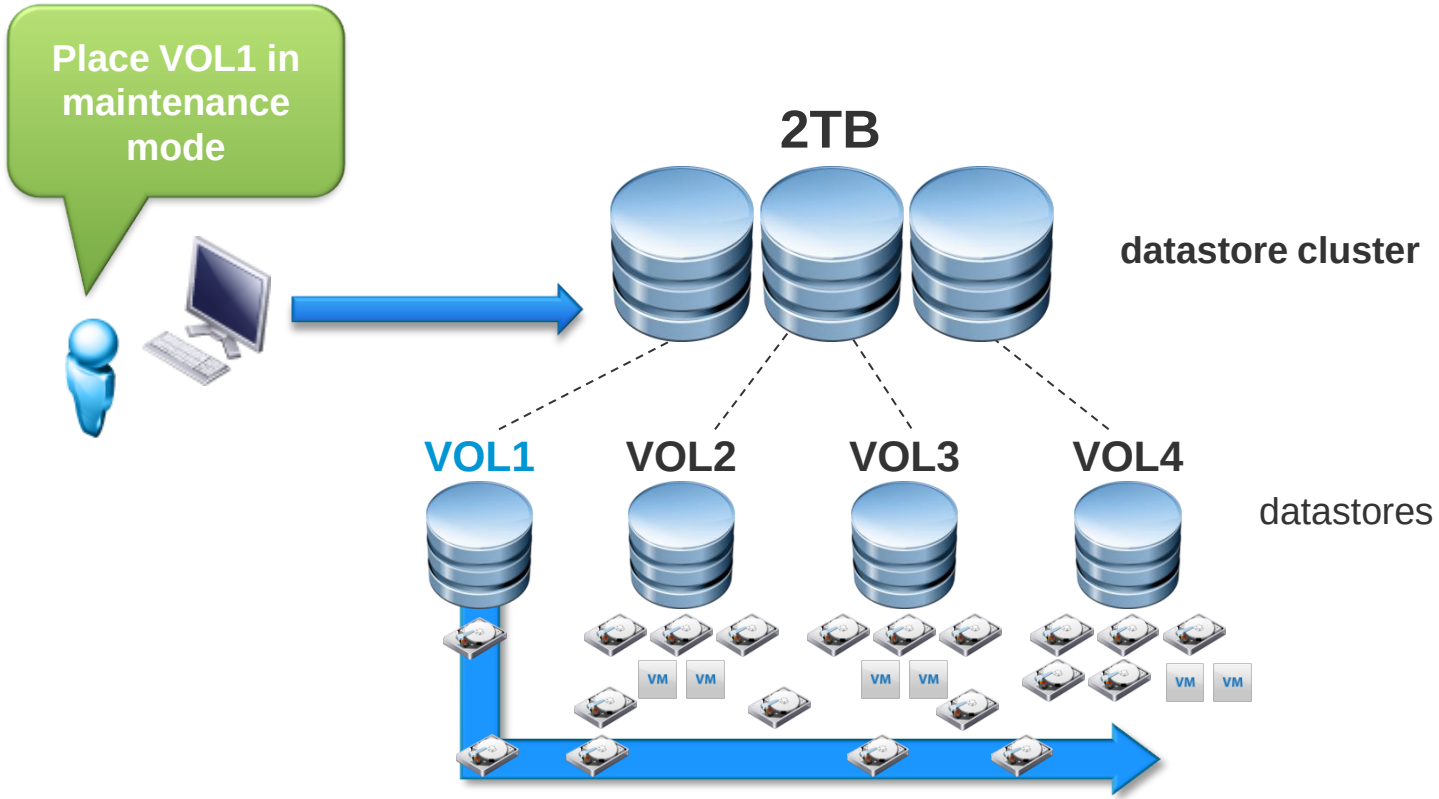
- **Algorithm makes migration recommendations when I/O response time and/or space utilization thresholds have been exceeded.**
  - Space utilization statistics are constantly gathered by vCenter, default threshold 80%.
  - I/O load trend is **currently** evaluated every 8 hours based on a past day history, 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

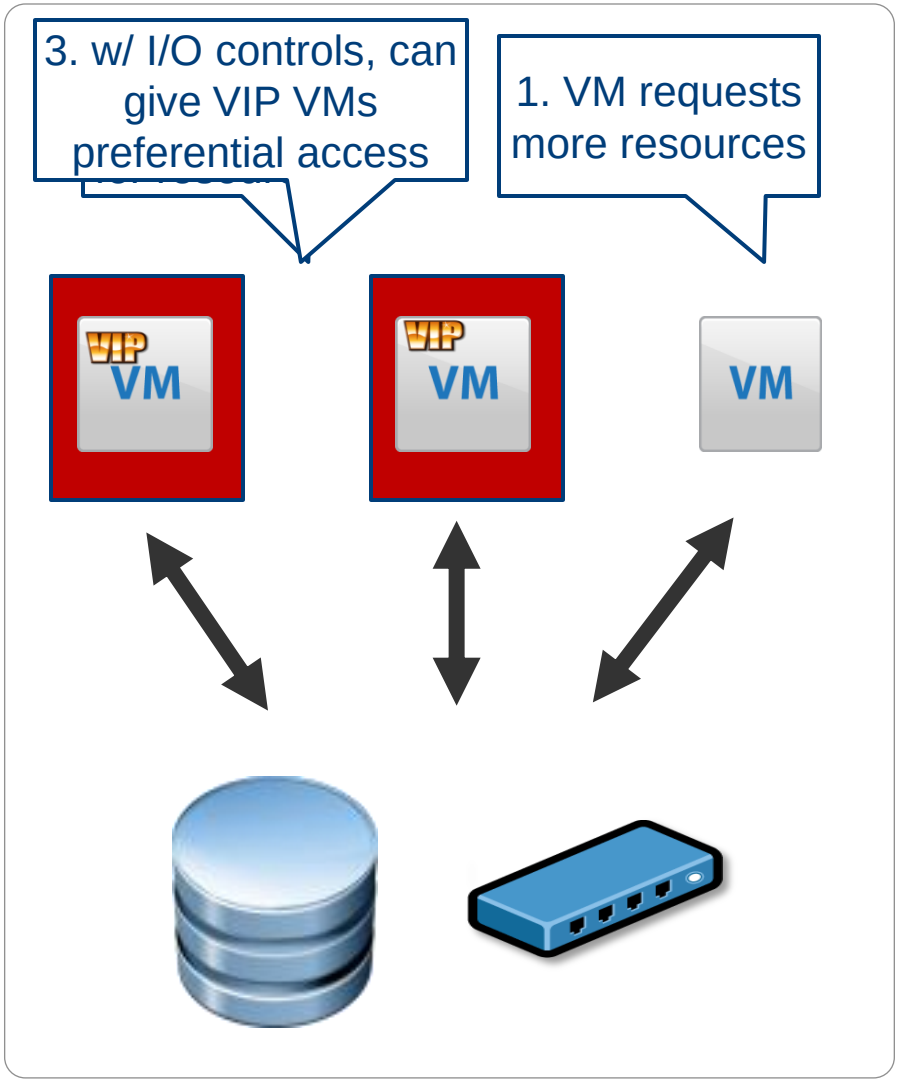


Storage DRS Operations – Datastore Maintenance Mode

- **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

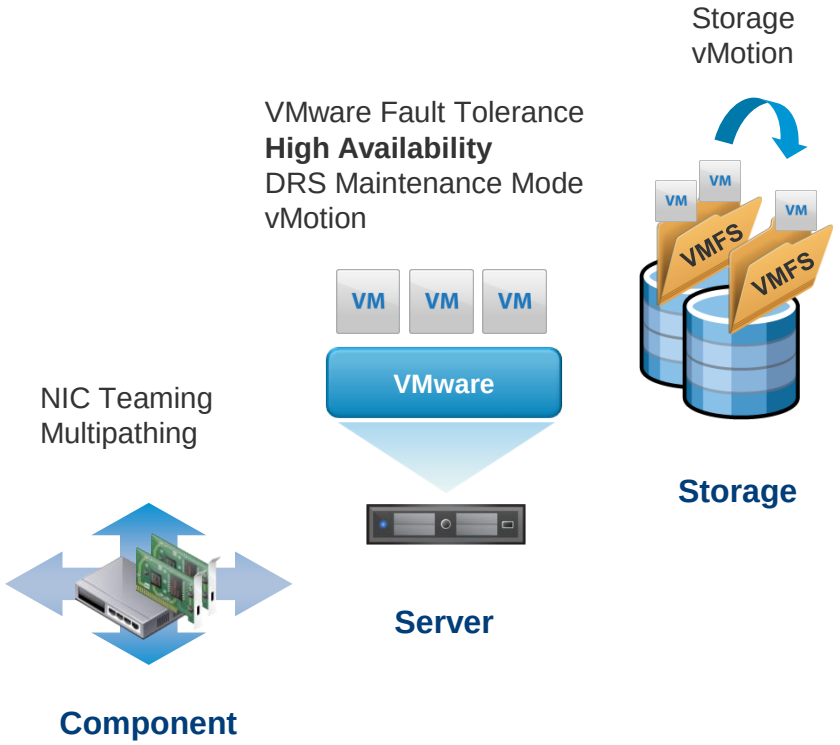
- **The original vMotion keeps getting better!**
- **Multi-NIC Support**
  - Support up to four 10Gbps or sixteen 1Gbps NICs. (ea. NIC must have its own IP).
  - Single vMotion can now scale over multiple NICs. (load balance across multiple NICs).
  - Faster vMotion times allow for a higher number of 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



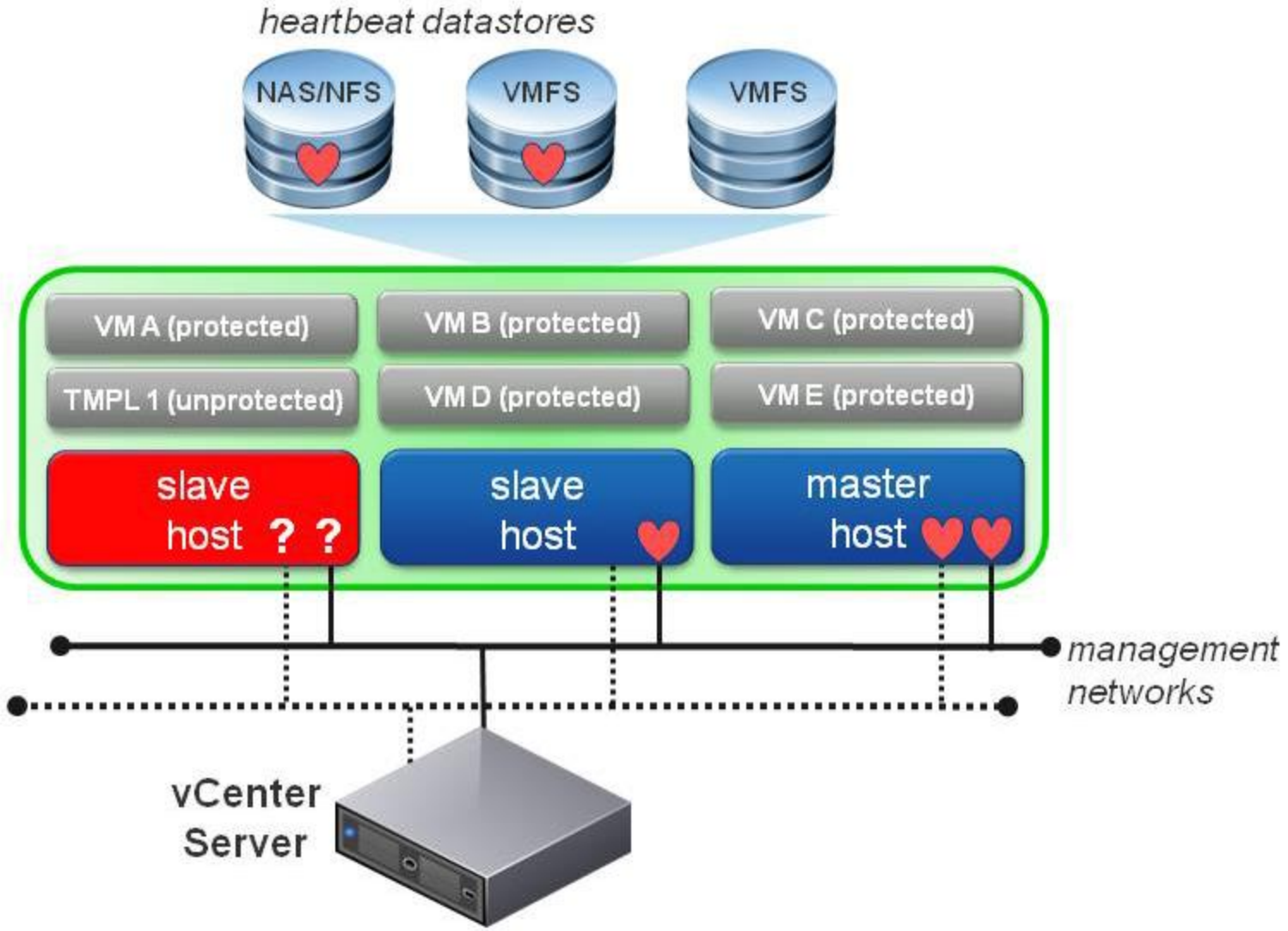
Overview

- New architecture for High Availability feature of vSphere

Benefits

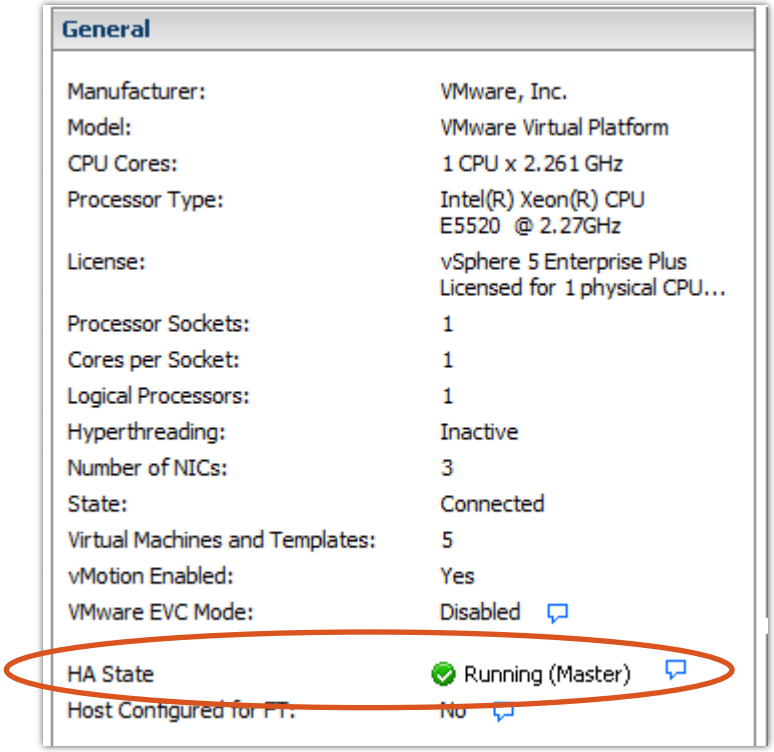
- Simplified clustering setup and configuration
- Enhanced reliability through better resource guarantees and monitoring
- Enhanced scalability

New HA Architecture



HA States

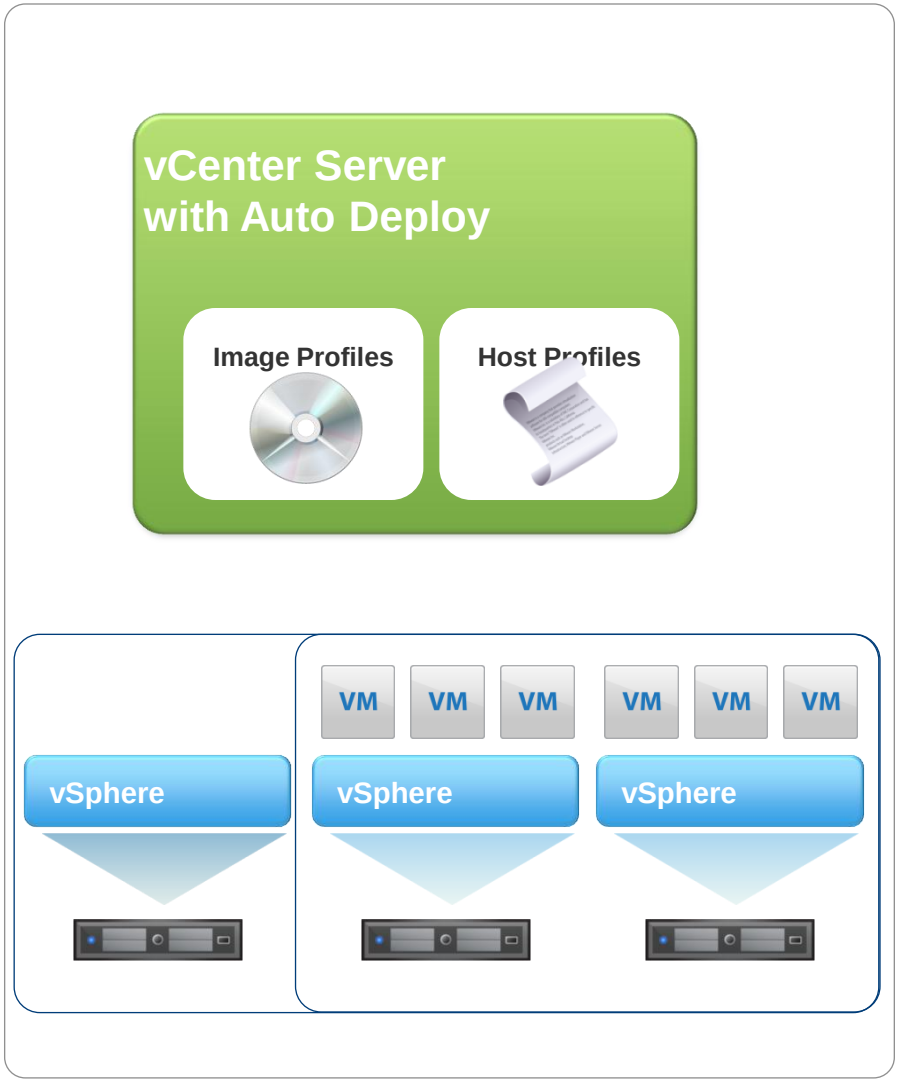
- **A new host property to report the HA state of a host.**
- **The state is reported on host summary panel and optionally in the host list.**
- **Possible States include:**
  - N/A (HA not configured)
  - Election (Master election in progress)
  - Master (Can be more than one)
  - Connected (To Master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



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



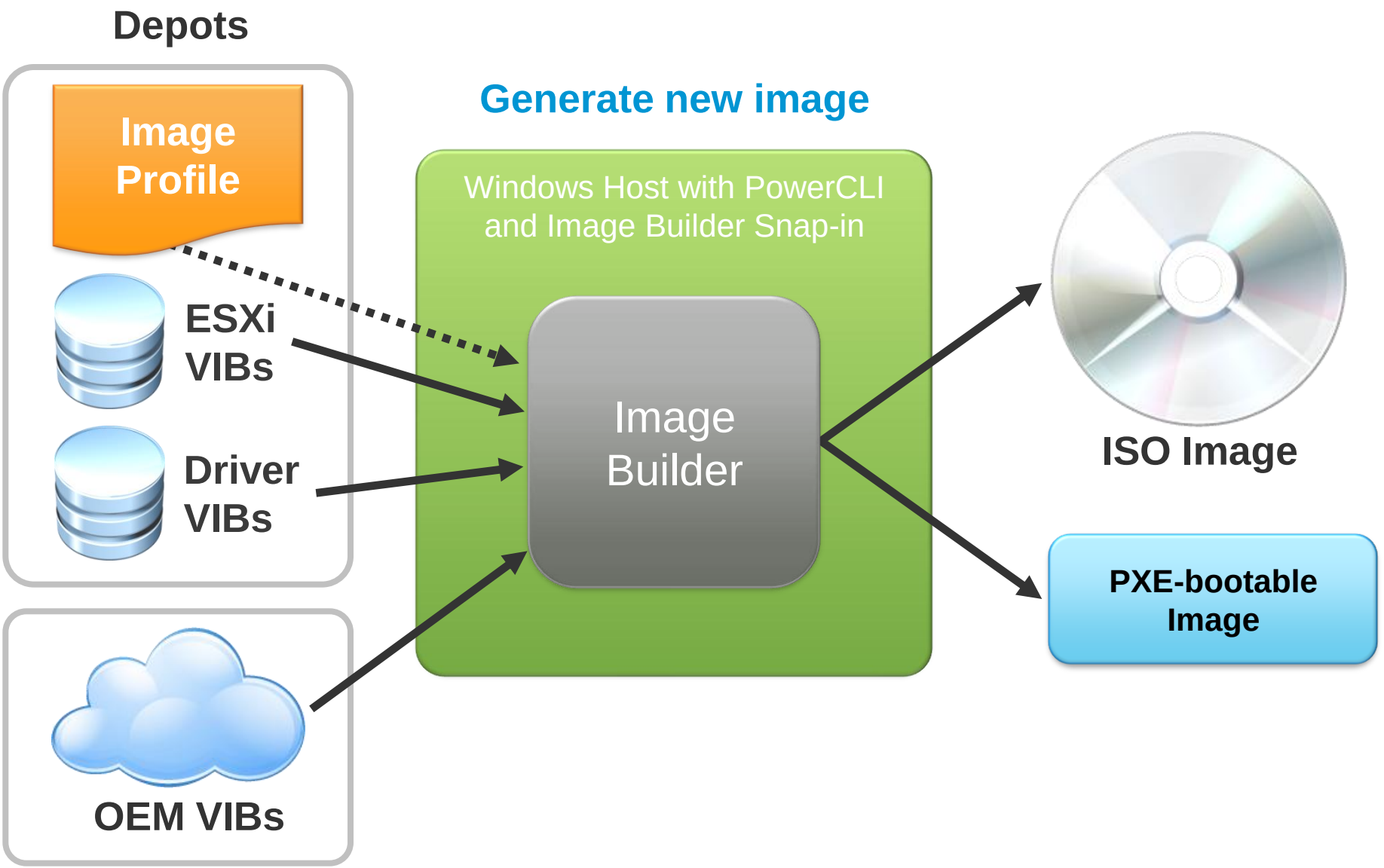
Overview

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

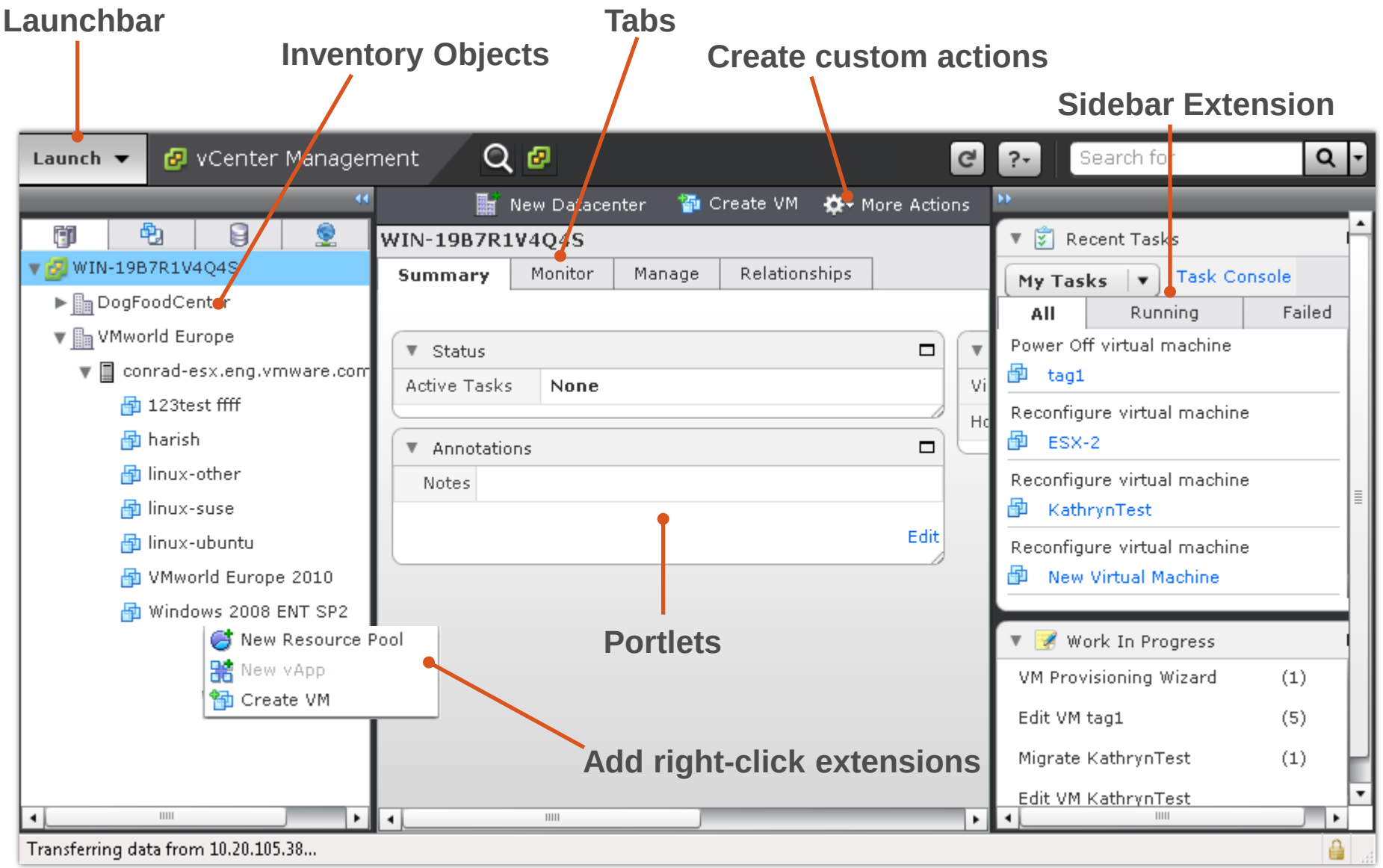
Benefits

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

Building an Image

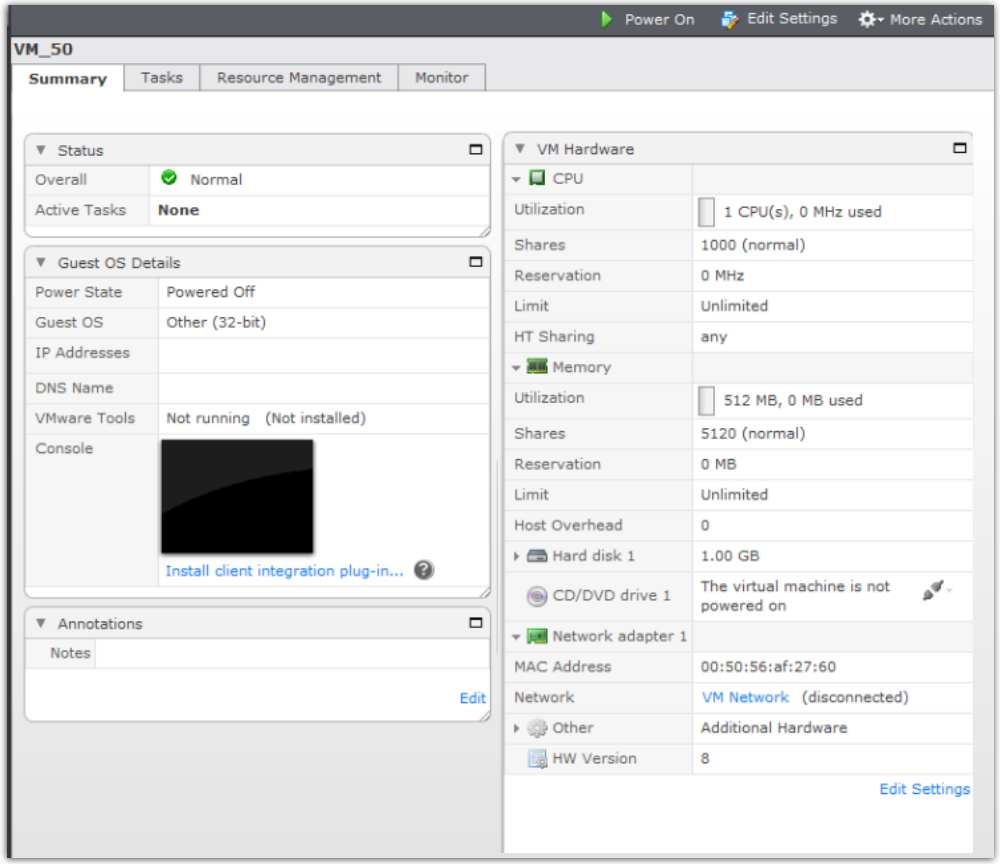


vSphere Web Client



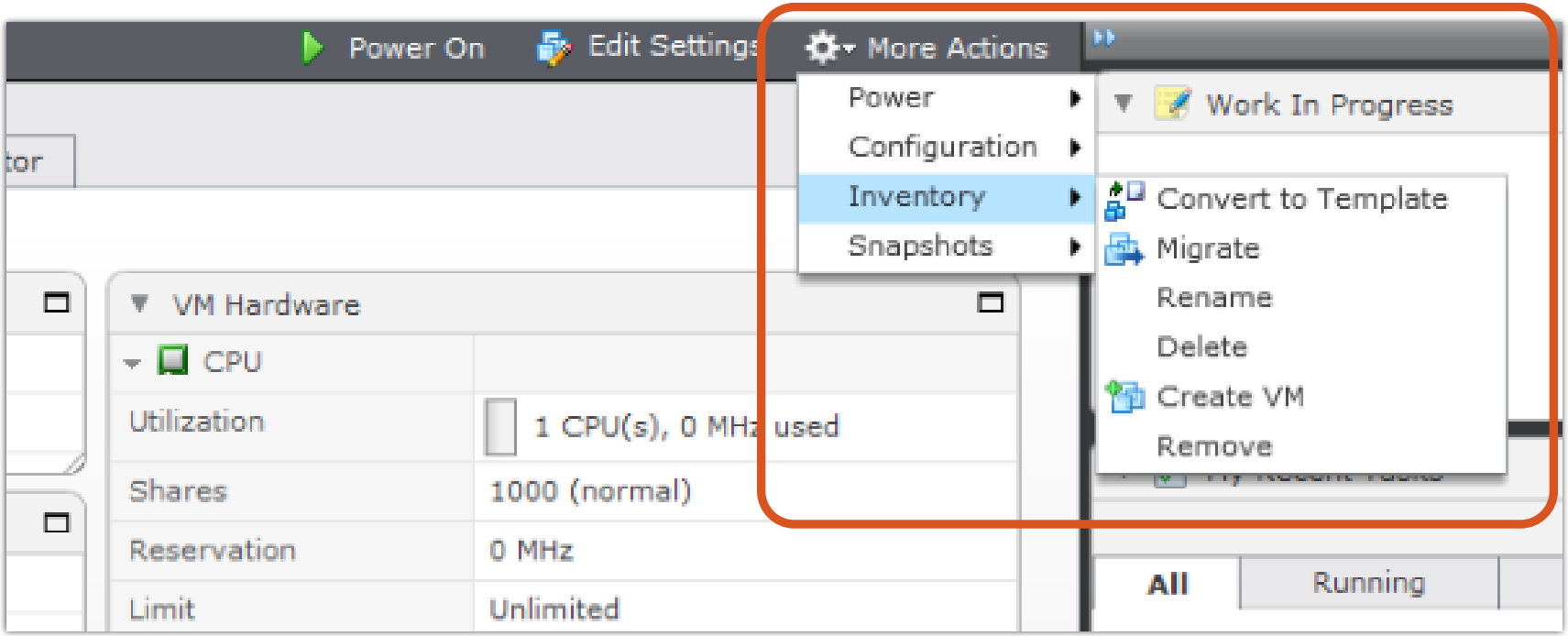
Features of the vSphere Web Client

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



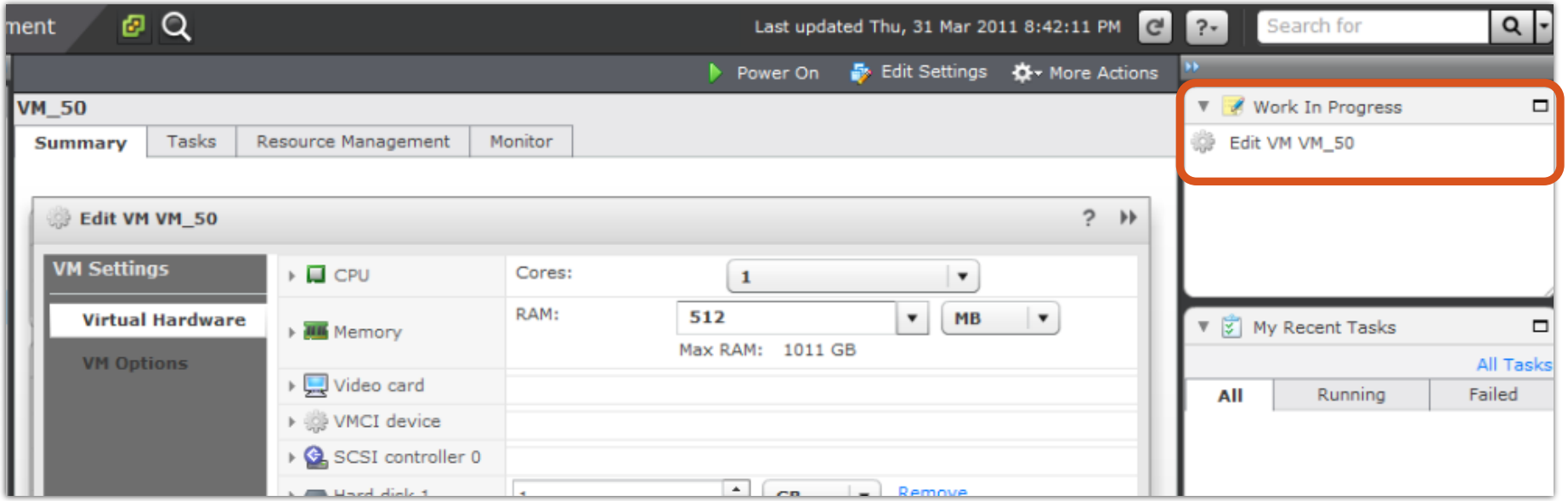
Features of the vSphere Web Client

- **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

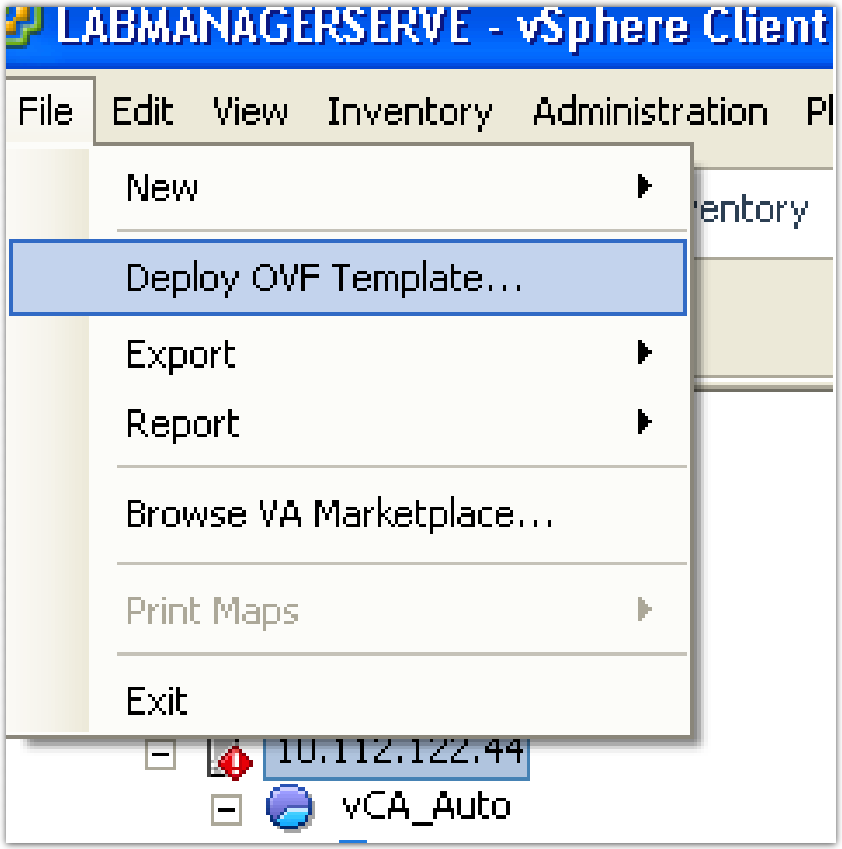
    - Memory Footprint
  - A built in enterprise level database with optional support for a remote Oracle databases.
  - Limits are the same for VC and VCSA
    - Embedded DB
      - 5 hosts/50 VMs
    - External DB
      - <1000 hosts/<10,000 VMs (64 bit)
  - A web-based configuration interface

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

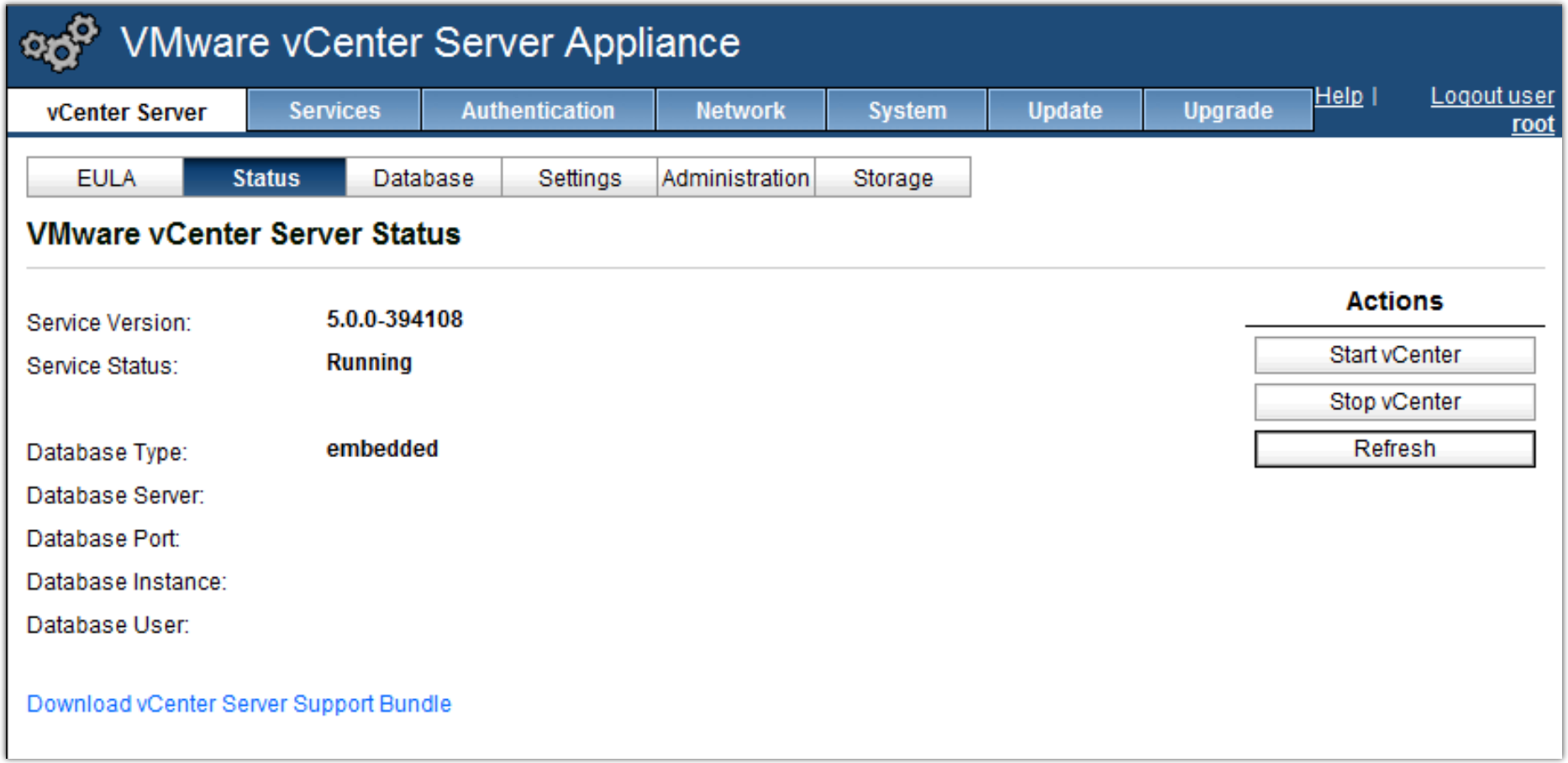
vCenter Server Appliance Deployment

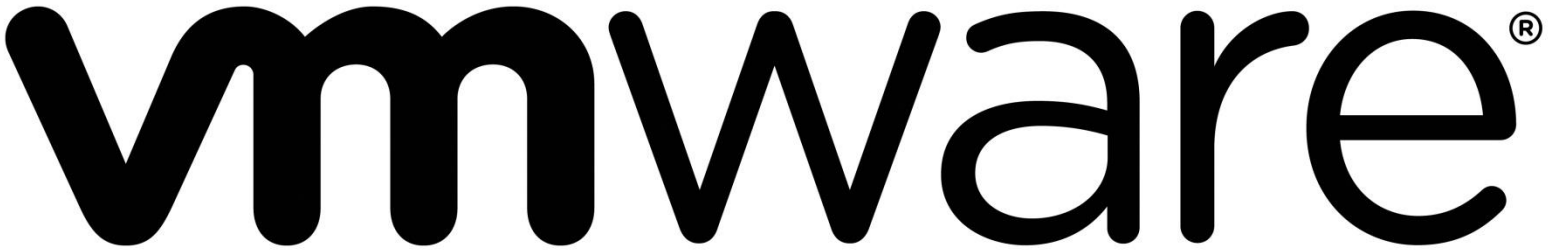
- **Simply deploy from a OVF template!**
  - Install takes ~5 minutes



Configuration

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

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