vSphere 4.1 Technical Overview

May 2010

Agenda

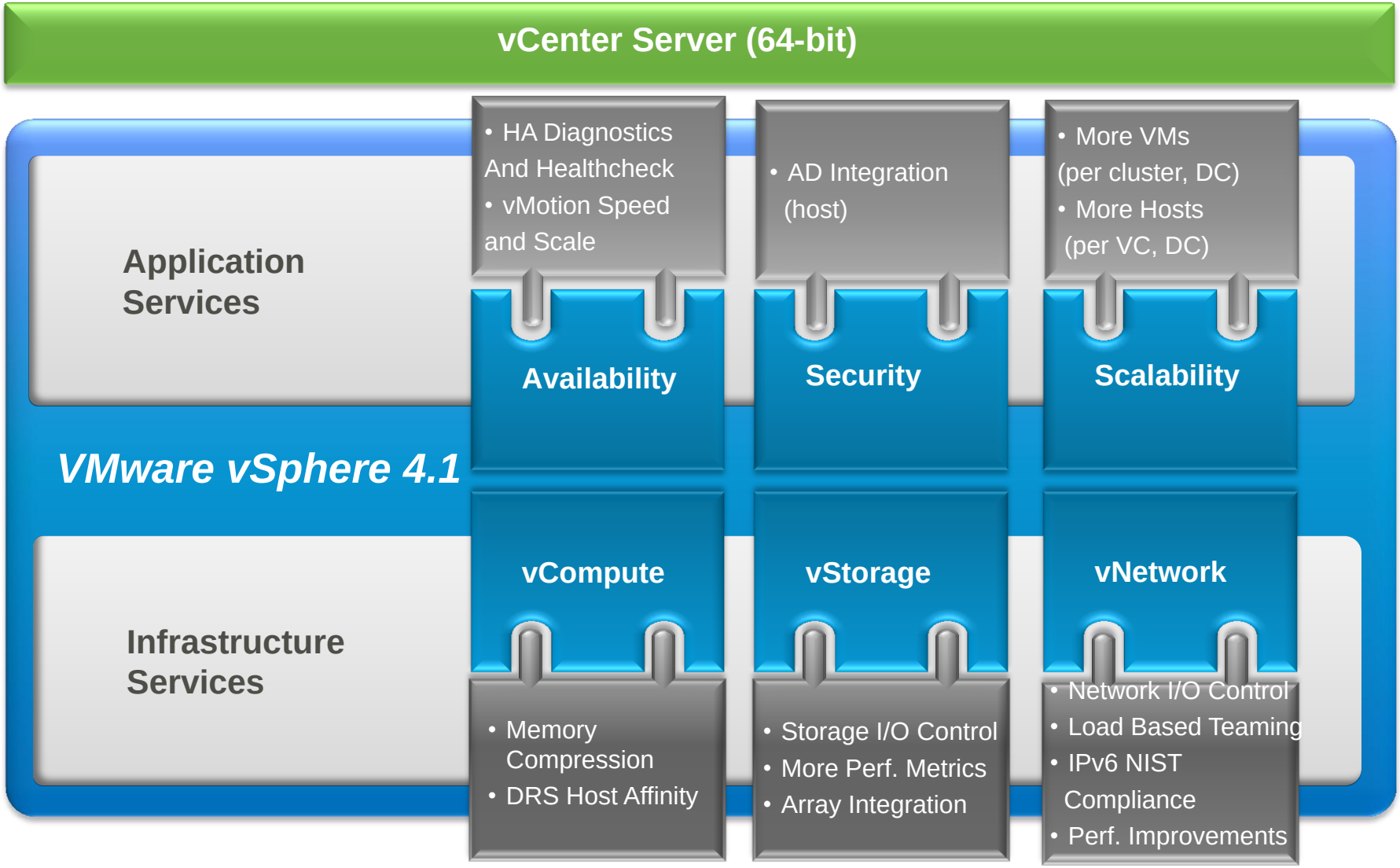
- Introduction – vSphere 4.1 Features and Themes
- Network – Network I/O Control, Load-Based Teaming, IPv6, Performance
- Storage – Storage I/O Control, VAAI, I/O Metrics, iSCSI Offload enhancements
- ESXi – Deployment Methods, Tech Support Mode enhancements
- HA & FT – HA Diagnostics & Reliability, FT enhancements, vMotion enhancements
- DRS & DPM – DRS Host Affinity, DPM enhancements
- Management – vCenter Server & vSphere Platform enhancements

Introducing…

VMware vSphere™ 4.1

The Platform for Cloud Infrastructure

VMware vSphere 4.1: *What's New?*



Network

vSphere 4.1—Network Feature Summary

Network Performance & Scale Improvements

- vmkernel TCP/IP stack—vMotion, NFS, FT logging performance gains
- UDP and intra-host VM to VM performance improvements
- vDS scaling to ~350 hosts/vDS (from current 64 hosts/vDS)—final number is TBD!

Traffic Management (*vDS only* features)

- NetIOC (Network I/O Control)
  - Software scheduler to guarantee service levels for specified traffic types
- LBT (Load Based Teaming)
  - Avoid congestion by dynamic adjustment to NIC team based upon pNIC load

IPv6—NIST Compliance

- Compliance with NIST “Host” Profile

Nexus 1000V Enhancements

- Additional Nexus 1000V features—Nexus 1000V V1.4 or 2.0

Network Performance Improvements

vMotion

- Throughput improved significantly for single vMotion
  - ESX 3.5 – ~1.0Gbps
  - ESX 4.0 – ~2.6Gbps
  - ESX 4.1 – max 8 Gbps
- Elapsed reduced by 50%+ on 10GigE tests.

Tx Worldlet

- VM – VM throughput improved by 2X, to up to 19 Gbps
- VM – Native throughput improved by 10%

LRO (Large Receive Offload)

- Receive tests indicate 5-30% improvement in throughput
- 40 - 60% decrease in CPU cost

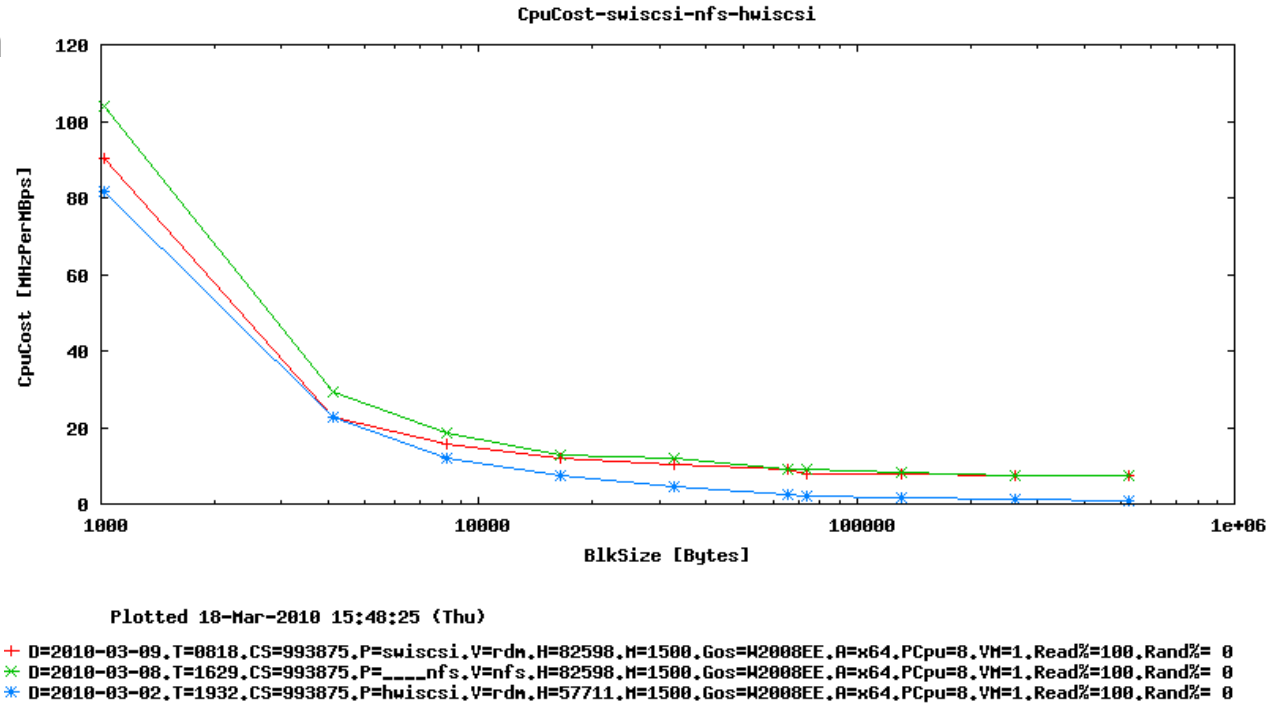
NFS & HW iSCSI Support (Storage) in vSphere 4.1

Improved NFS performance

- Up to 15% reduction in CPU cost for both read & write
- Up to 15% improvement in Throughput cost for both read & write

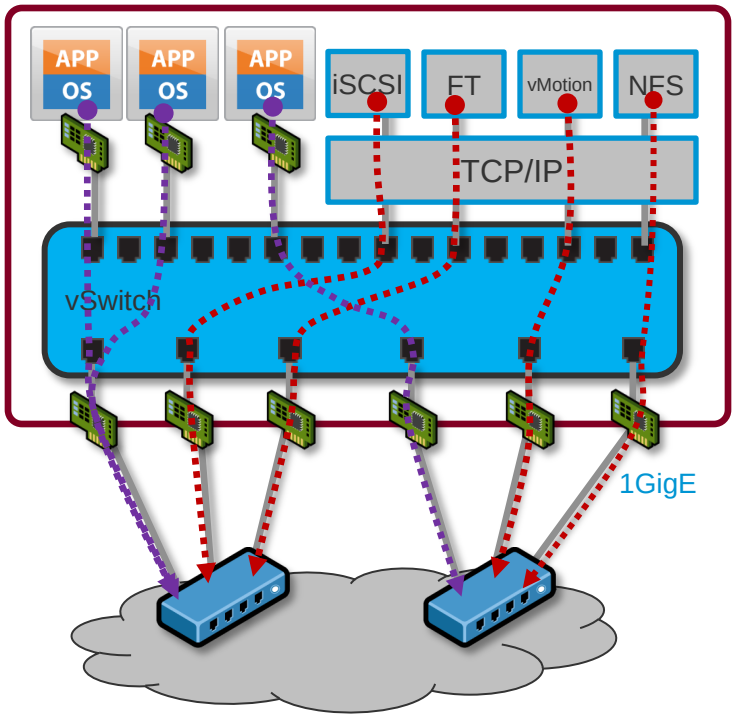
Broadcom iSCSI HW Offload Support

- 89% improvement in CPU read cost !
- 83% improvement in CPU write cost !



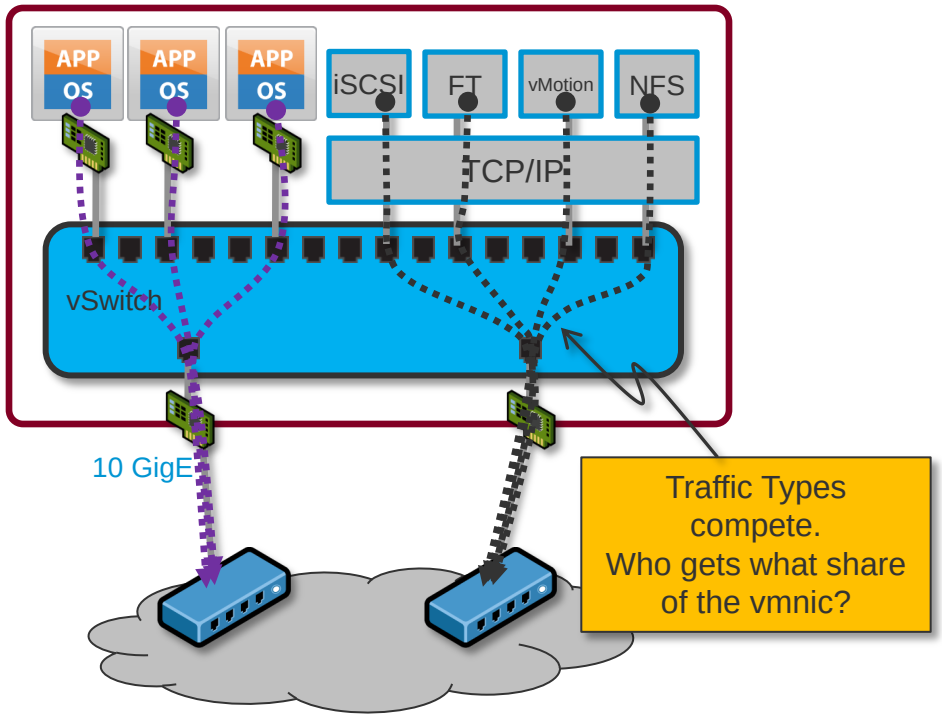
Network Traffic Management—Emergence of 10 GigE

1GigE pNICs



- **NICs dedicated for some traffic types e.g. vMotion, IP Storage**
  - Bandwidth assured by dedicated physical NICs

10 GigE pNICs



- **Traffic typically converged to two 10 GigE NICs**
- **Some traffic types & flows could dominate others through oversubscription**

Network I/O Control (NetIOC)

Network I/O Control Goals

- Isolation
  - One flow should not dominate others
- Flexible Partitioning
  - Allow isolation and over commitment
  - Guarantee Service Levels when flows compete

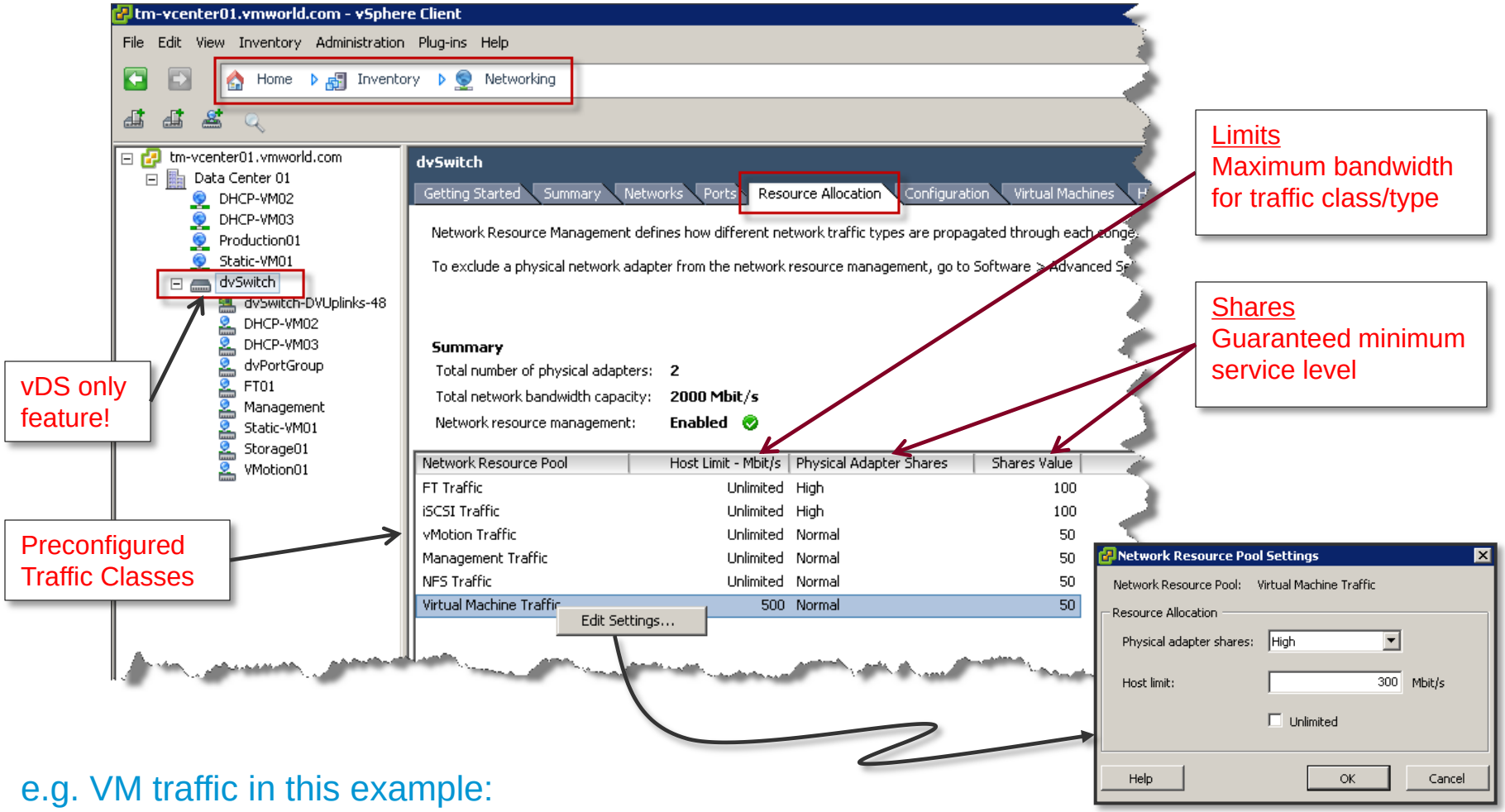
Note: NetIOC feature is only available with vDS (Enterprise Plus)

Network I/O Control—Parameters

Limits and Shares

- **Limits** specify the **absolute maximum** bandwidth for a flow **over a Team**
  - Specified in Mbps
  - Traffic from a given flow will never exceed its specified limit
  - Egress from ESX host
- **Shares** specify the **relative importance** of an egress flow on a **vmnic** i.e. guaranteed minimum
  - Specified in abstract units, from 1-100
  - Presets for *Low* (25 shares), *Normal* (50 shares), *High* (100 shares), plus *Custom*
  - Bandwidth divided between flows based on their relative shares
- Controls apply to output from ESX host
- Shares apply to a given vmnic
- Limits apply across the team

Network I/O Control—Configuration from vSphere Client



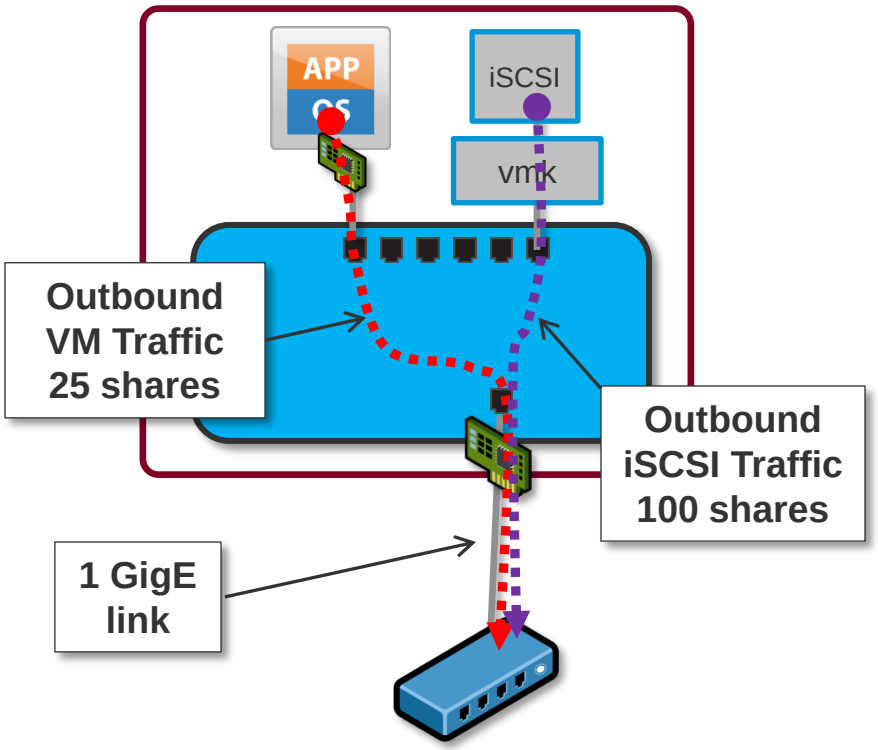
e.g. VM traffic in this example:

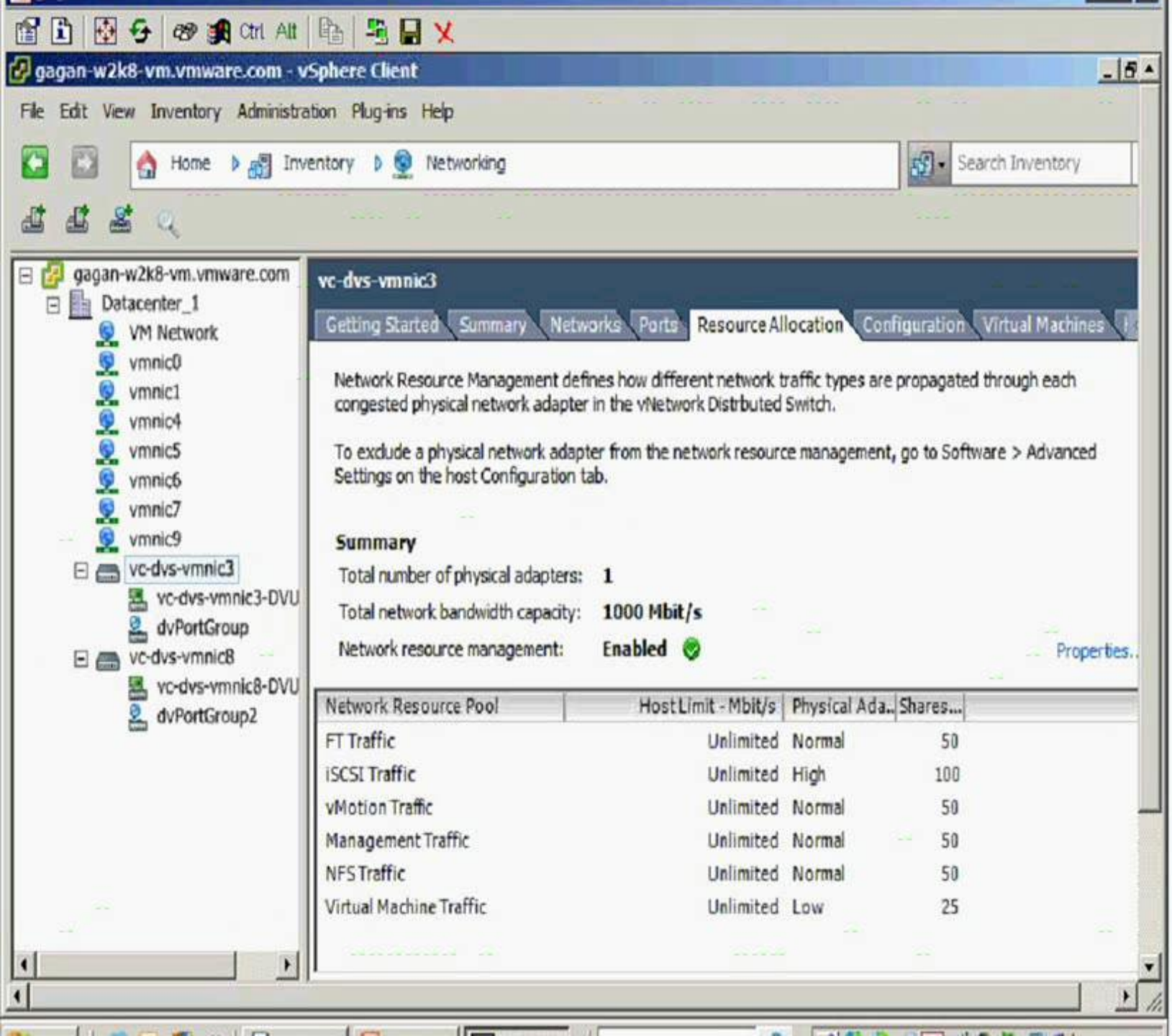
- limited to max of 500 Mbps (aggregate of all VMs)
- with minimum of 50/400 of pNIC bandwidth (50/(100+100+50+50+50+50)

Network I/O Control – Demonstration

Demonstration Scenario

- 1GigE pnics (vmnics)
- Two traffic types competing for link (link oversubscribed)
  - iSCSI set with “100 shares” (generated by iometer)
  - VM traffic set with “25 shares” (generated by iperf)
  - Link capable of ~890 Mbps
    - iSCSI gets 80% → ~710Mbps
    - VM gets 20% → ~180Mbps




gagan-w2k8-vm.vmware.com - vSphere Client
File Edit View Inventory Administration Plug-ins Help
Home Inventory Networking
Search Inventory
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Datacenter_1
VM Network
vmnic0
vmnic1
vmnic4
vmnic5
vmnic6
vmnic7
vmnic9
vc-dvs-vmnic3
vc-dvs-vmnic3-DVU
dvPortGroup
vc-dvs-vmnic8
vc-dvs-vmnic8-DVU
dvPortGroup2
vc-dvs-vmnic3
Getting Started Summary Networks Ports Resource Allocation Configuration Virtual Machines
Network Resource Management defines how different network traffic types are propagated through each congested physical network adapter in the vNetwork Distributed Switch.
To exclude a physical network adapter from the network resource management, go to Software > Advanced Settings on the host Configuration tab.
Summary
Total number of physical adapters: 1
Total network bandwidth capacity: 1000 Mbit/s
Network resource management: Enabled
Properties...
Network Resource Pool | Host Limit - Mbit/s | Physical Ada.. | Shares...
FT Traffic Unlimited Normal 50
iSCSI Traffic Unlimited High 100
vMotion Traffic Unlimited Normal 50
Management Traffic Unlimited Normal 50
NFS Traffic Unlimited Normal 50
Virtual Machine Traffic Unlimited Low 25

Network I/O Control Demonstration

What happens if we turn off IOMETER?

- VM traffic consumes the link up to capacity of ~890Mbps (no competing flows)

Network I/O Control – Demonstration

Now, flip the shares around

- Set iSCSI to 25 Shares → 20% of bandwidth (~180Mbps)
- Set VM Traffic to 100 shares → 80 % of bandwidth (~710 Mbps)

Network I/O Control – Demonstration

Now, Introduce a “Limit” on VM traffic of 500 Mbps

Network I/O Control – Demonstration

Now, disable Network I/O Control

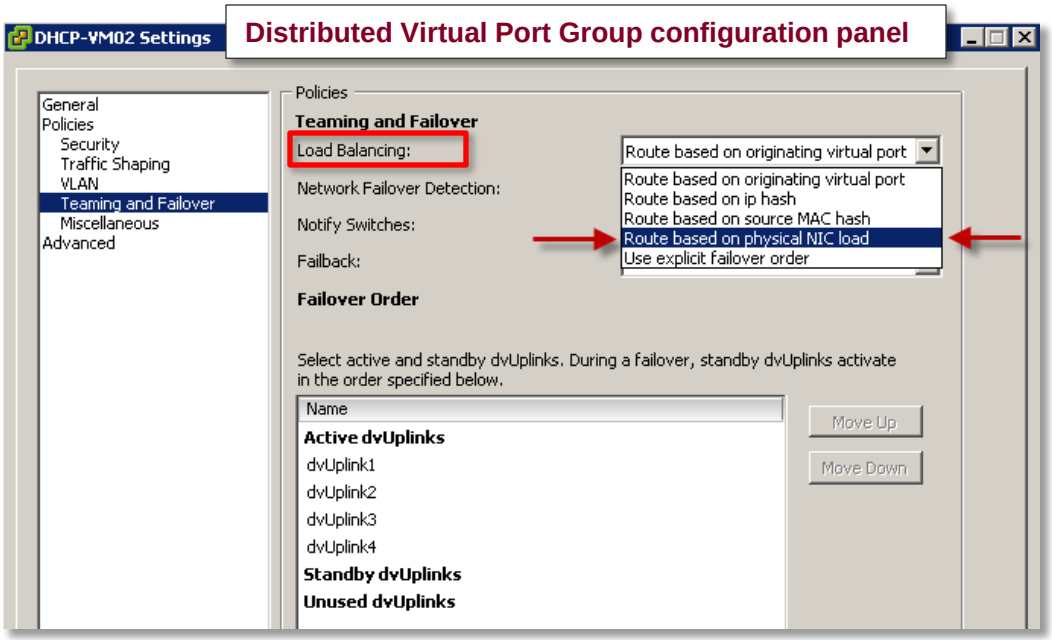
- iSCSI and VM traffic compete for link and become erratic.

Network I/O Control – Use Cases

Most applicable to 2x 10GigE link deployment—converged traffic types (vMotion, FT, VM, iSCSI, etc)

But, … can be used with 1GigE links (per demonstration)

NIC Teaming Enhancements—Load Based Teaming (LBT)



Note: adjacent physical switch configuration is same as other teaming types (except IP-hash). i.e. same L2 domain

Load Based Teaming (LBT) – only available with vDS

- Existing vSphere 4.0 teaming modes use static virtual port to pNIC allocation—teaming algorithms do not account for load
- LBT Goal: avoid congestion by balancing load on the team
- LBT invoked if saturation detected on Tx or Rx (>75% mean utilization over 30s period)
- 30 sec period—long period avoids mac address flapping issues with adjacent physical switches
- Note: Current implementation does not take NetIORM shares into account

IPv6—Progress towards full NIST "Host" Profile Compliance

VI 3 (ESX 3.5)

- IPv6 supported in guests

vSphere 4.0

- IPv6 support for
  - ESX 4
  - vSphere Client
  - vCenter Server
  - vMotion
  - **IP Storage (iSCSI, NFS) — EXPERIMENTAL**
- Not supported for vSphere vCLI, HA, FT, Auto Deploy

vSphere 4.1

- NIST compliance with "Host" Profile (http://www.antd.nist.gov/usgv6/usgv6-v1.pdf)
- Including IPSEC, IKEv2, etc.
- Not supported for vSphere vCLI, HA, FT

Cisco Nexus 1000V—Planned Enhancements

Easier software upgrade

- In Service Software Upgrade (ISSU) for VSM and VEM
- Binary compatibility

Weighted Fair Queuing (s/w scheduler)

Increased Scalability

SPAN to and from Port Profile

VLAN pinning to PNIC

Installer app for VSM HA and L3 VEM/VSM communication

Start of EAL4 Common Criteria certification

4094 active VLANs

Scale Port Profiles > 512

Storage

Storage Feature Summary

Storage I/O Control

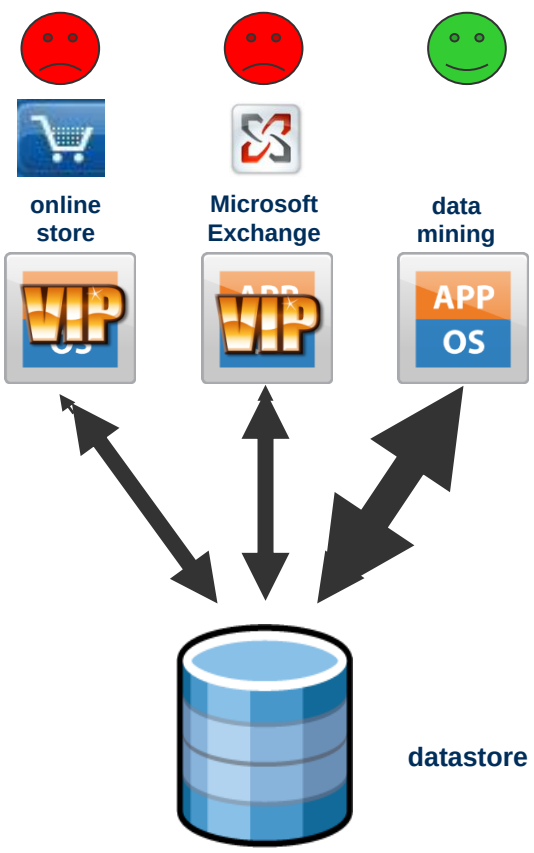
vStorage API for Array Integration (VAAI)

New Performance Monitoring Statistics

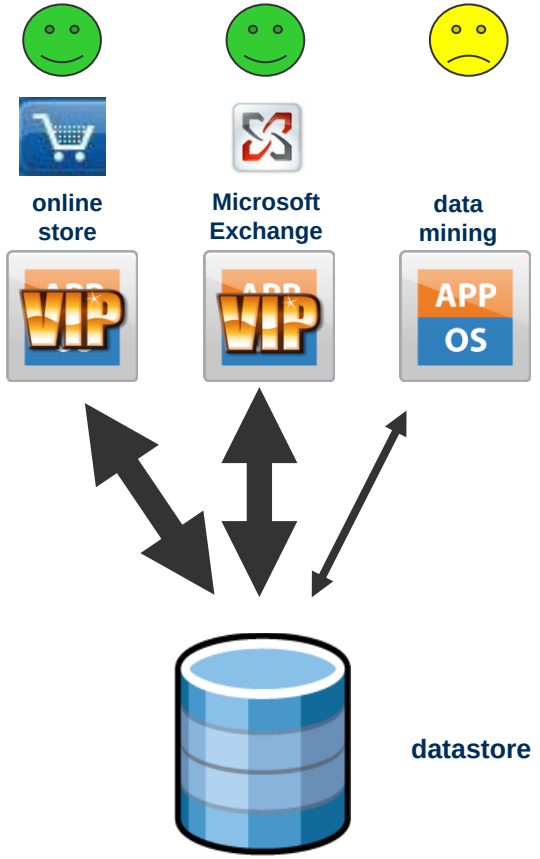
The I/O Sharing Problem

- Low priority VM can limit I/O bandwidth for high priority VMs
- Storage I/O allocation should be in line with VM priorities

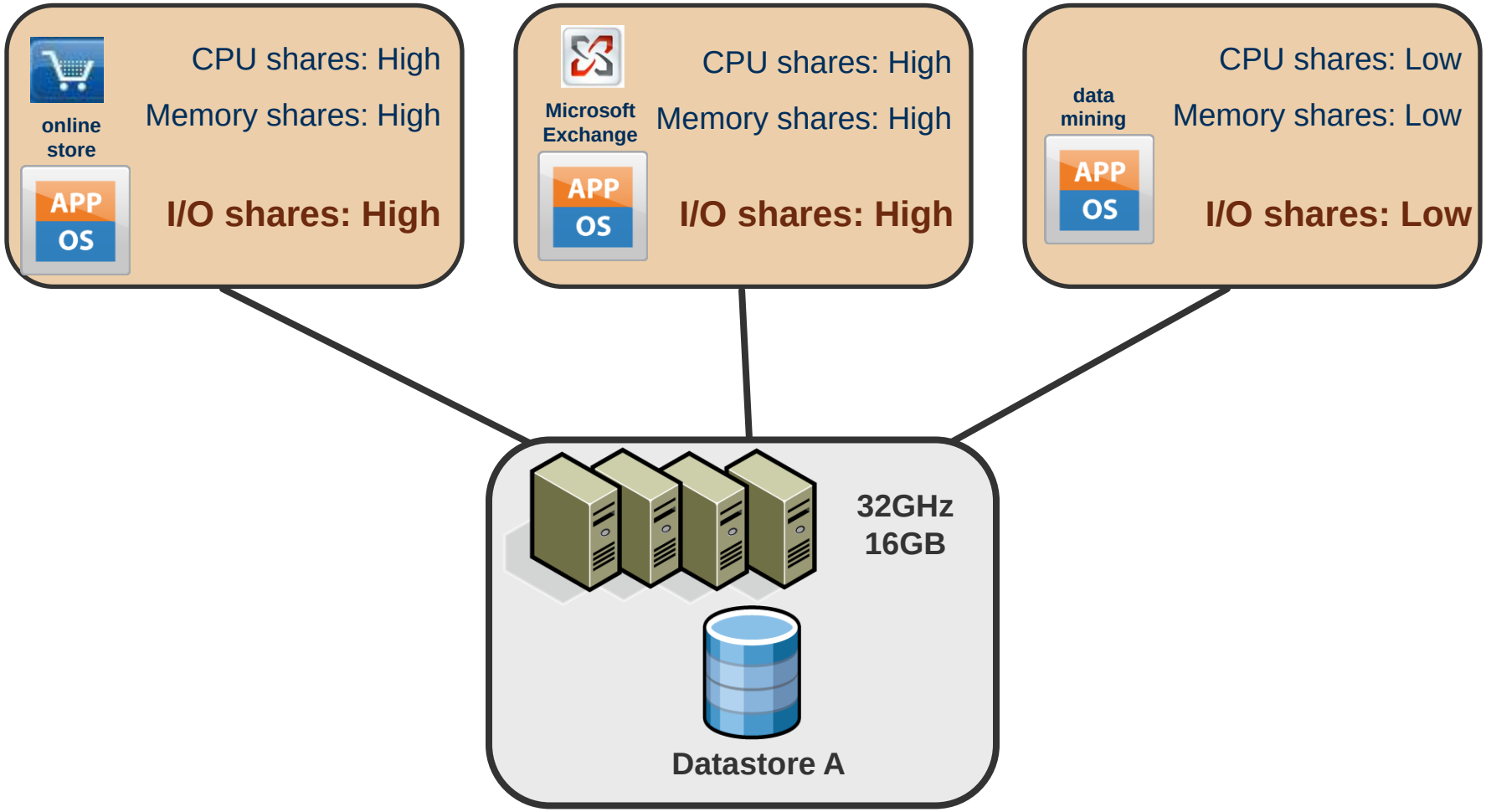
What you see



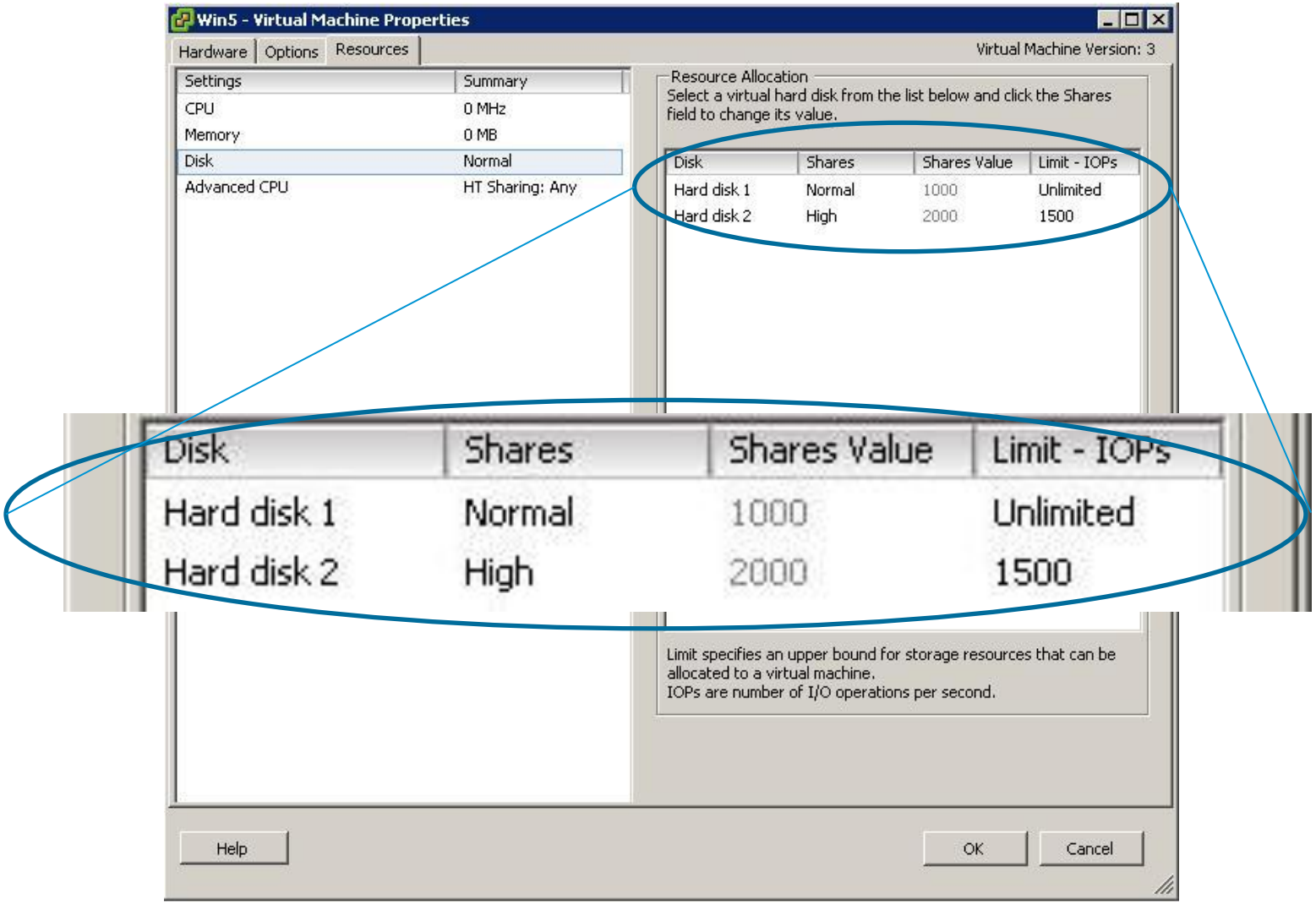
What you want to see



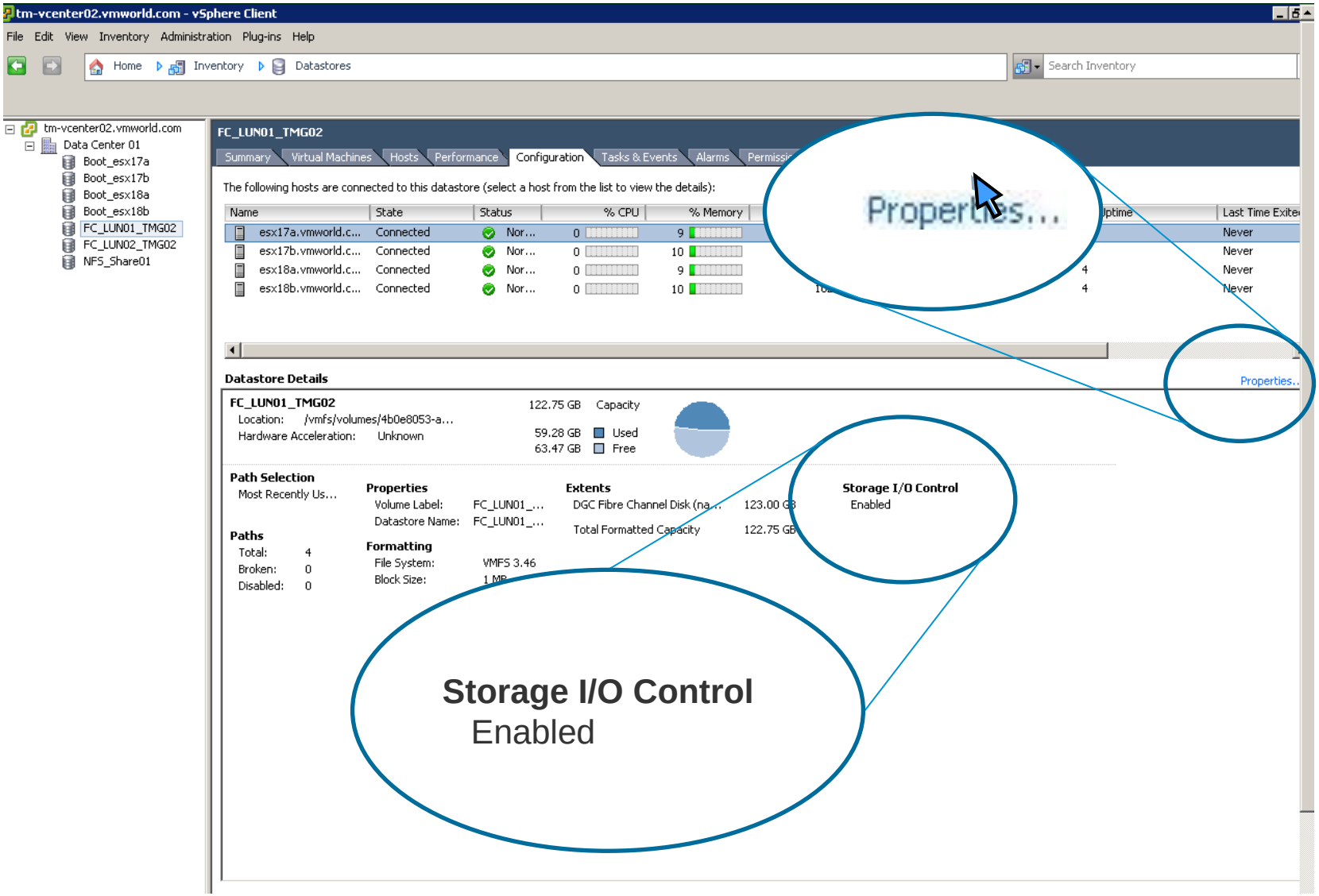
Solution: Storage I/O Control (SIOC)



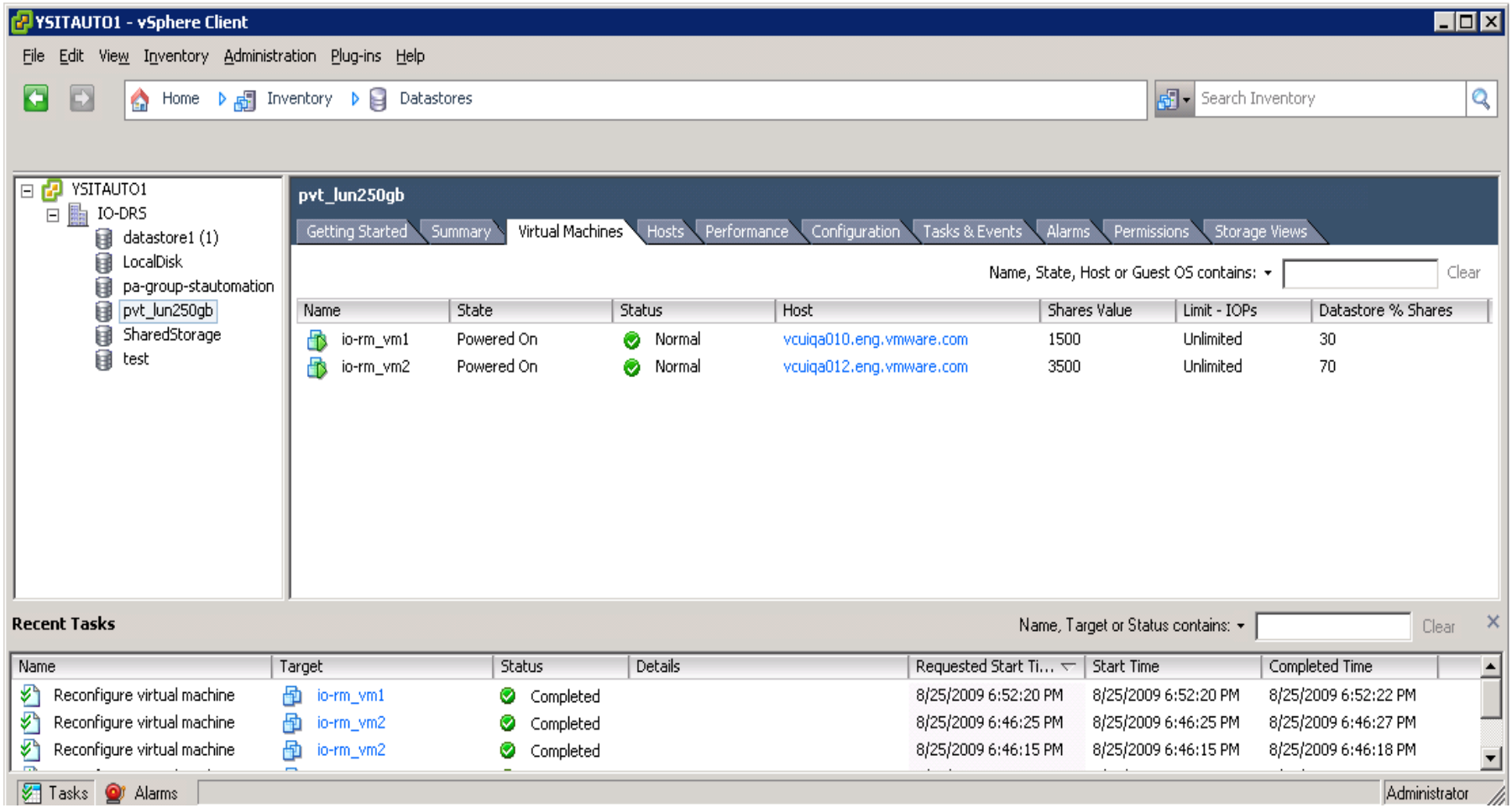
Setting I/O Controls



Enabling Storage I/O Control



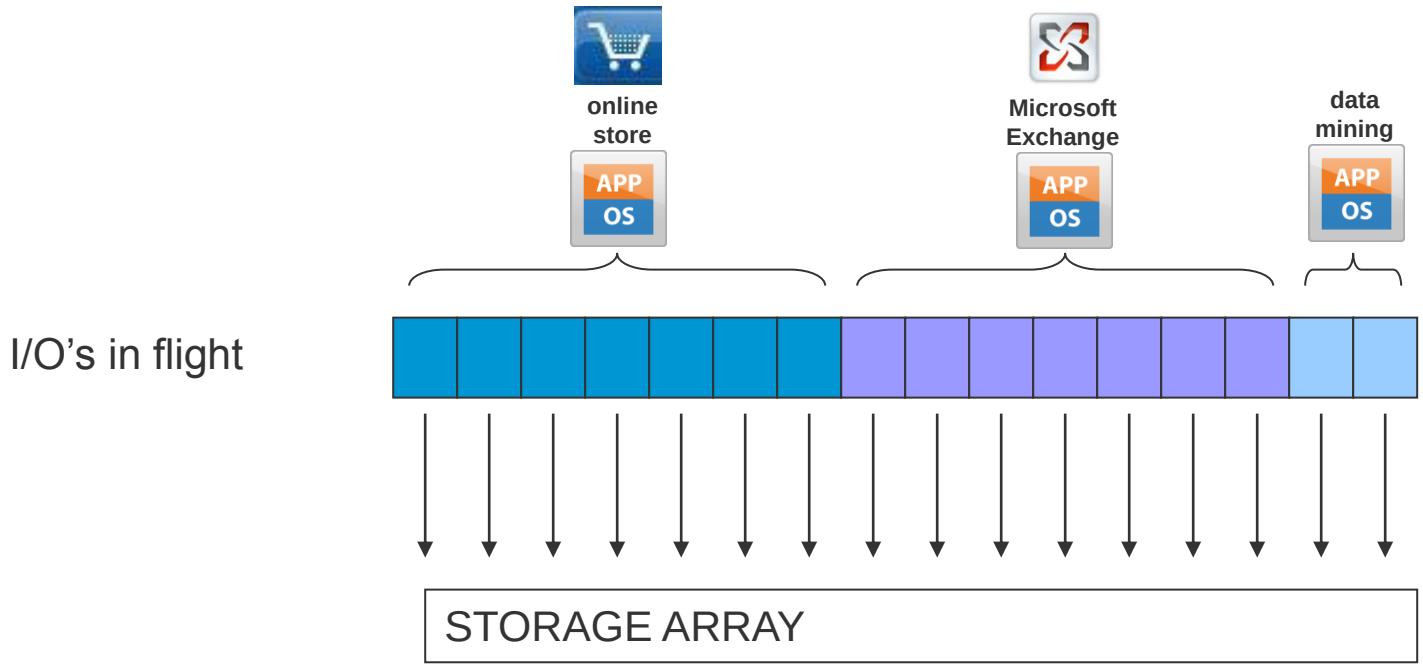
Viewing Configuration Settings



Allocate I/O Resources

Shares translate into ESX I/O queue slots

- VMs with more shares are allowed to send more I/O's at a time
- Slot assignment is dynamic, based on VM shares and current load
- Total # of slots available is dynamic, based on level of congestion



Storage I/O Control in Action: Example #1

Two VMs running IOmeter* on two hosts

- 16 KB random reads

VM1 : 1000 shares

VM2 : 2000 shares

Result: VMs get IOPS in ratio 1:2

	Without Storage I/O Control		With Storage I/O Control	
	IOPS	IOmeter Latency (ms)	IOPS	IOmeter Latency (ms)
VM1	1500	20	1080	31
VM2	1500	21	1900	16

* http://www.iometer.org

Storage I/O Control in Action: Example #2

Two Windows VMs running SQL Server on two hosts

- 250 GB data disk, 50 GB log disk

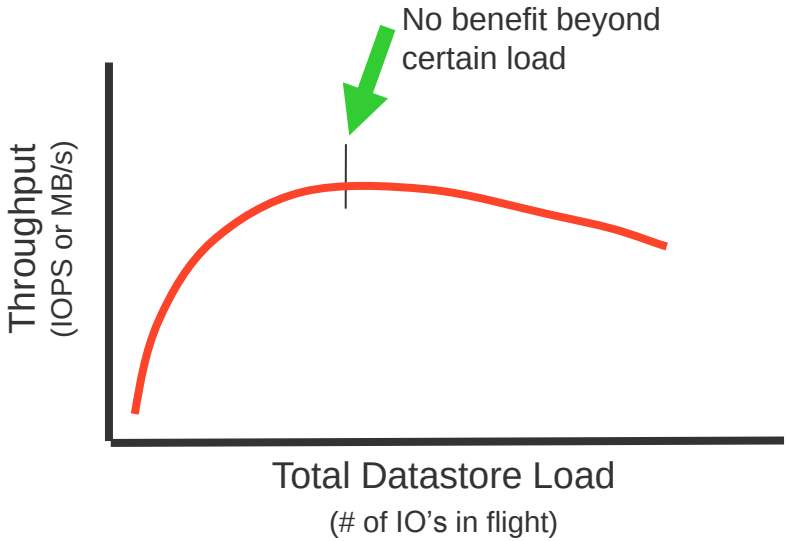
VM1: 500 shares

VM2: 2000 shares

Result: VM2 with higher shares gets more orders/min & lower latency!

	Without Storage I/O Control		With Storage I/O Control	
	Orders/ Minute	Processing Time (ms)	Orders/ Minute	Processing Time (ms)
VM1 (500 Shares)	8800	213	7000	275
VM2 (2000 Shares)	8500	220	12400	150
Aggregate	**17300**		**19400**	

Step 1: Detect Congestion



Congestion signal: ESX-array response time > threshold

- Default threshold: 35ms
- We will likely recommend different defaults for SSD and SATA
- Automated tiered storage arrays are NOT SUPPORTED with 4.1

Changing default threshold (not usually recommended)

- Low latency goal: set lower if latency is critical for some VMs
- High throughput goal: set close to IOPS maximization point

What are Automated Tiered Storage

LUNs/blocks migrated between tiers automatically & transparently

- Tiers: SSD, FC, SAS, SATA
- Examples: Compellent, EMC FAST, Dell Equallogic

Static latency threshold may not work well for such systems

- Threshold too low unnecessary throttling
- Threshold too high congestion not detected

Certification program to assess compatibility

- Targeted at automated tiered systems only – tell us who you are!
- Systems supporting only manual migration between tiers do not need certification
- Cert program to be launched on or after vSphere 4.1 GA
  - May initially be limited to a subset of automated tiered storage partners

Achieve compatibility by dynamically changing threshold via vSphere API

For more details on Storage I/O Control

vSphere 4.1 Documentation also describes use of this features in the Resource Management Guide Chapter 4 (pages 37-39)

Also check out the VMWorld 2009 presentation video:

http://vmworld.com/docs/DOC-3855

Additional Collateral planned for release at GA

- Technical White paper on Concepts and Deployment Considerations for SIOC
- Frequently Asked Questions
- Datasheet or webpage content

vStorage APIs for Array Integration (VAAI)

Improves performance by leveraging efficient array-based operations as an alternative to VMware host-based solutions

Three Primitives include :

1. Full Copy – Xcopy like function to offload work to the array
2. Write Same -Speeds up zeroing out of blocks or writing repeated content
3. Atomic Test and Set – Alternate means to locking the entire LUN

Helping function such as:

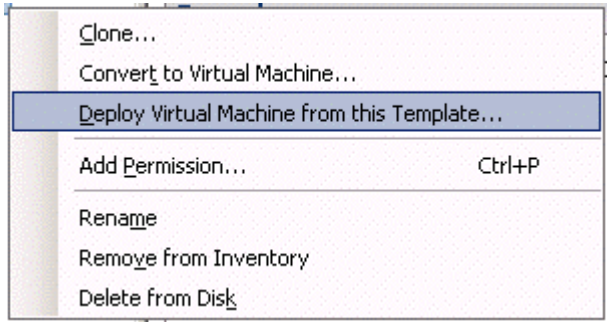
- Storage vMotion
- Provisioning virtual machines from Template
- Improves thin provisioning disk performance
- VMFS share storage pool scalability

- Requires firmware from Storage Vendors (6 participating, see later slides)
- Supports block based storage only in the 4.1 release

VM Provisioning from Template with Full Copy

Benefits

- Reduce installation time
- Standardize to ensure efficient management, protection & control



Challenges

- Requires a full data copy
- 100 GB template (10 GB to copy): 5-20 minutes
- FT requires additional zeroing of blocks

Improved Solution

- Use array's native copy/clone & zeroing functions
- Up to 10-20x speedup in provisioning time

Storage vMotion with Array Full Copy Function

Benefits

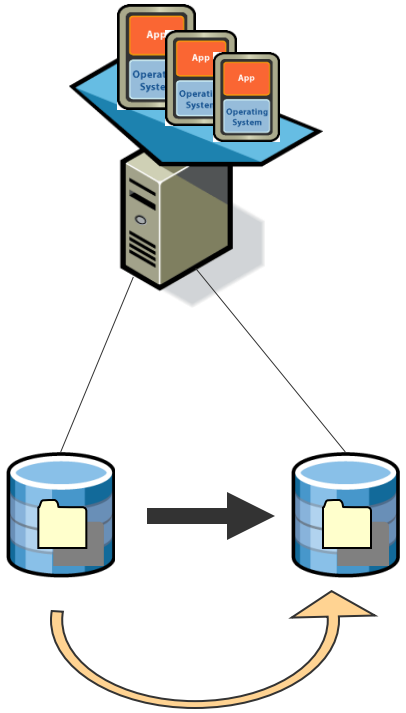
- Zero-downtime migration
- Eases array maintenance, tiering, load balancing, upgrades, space mgmt

Challenges

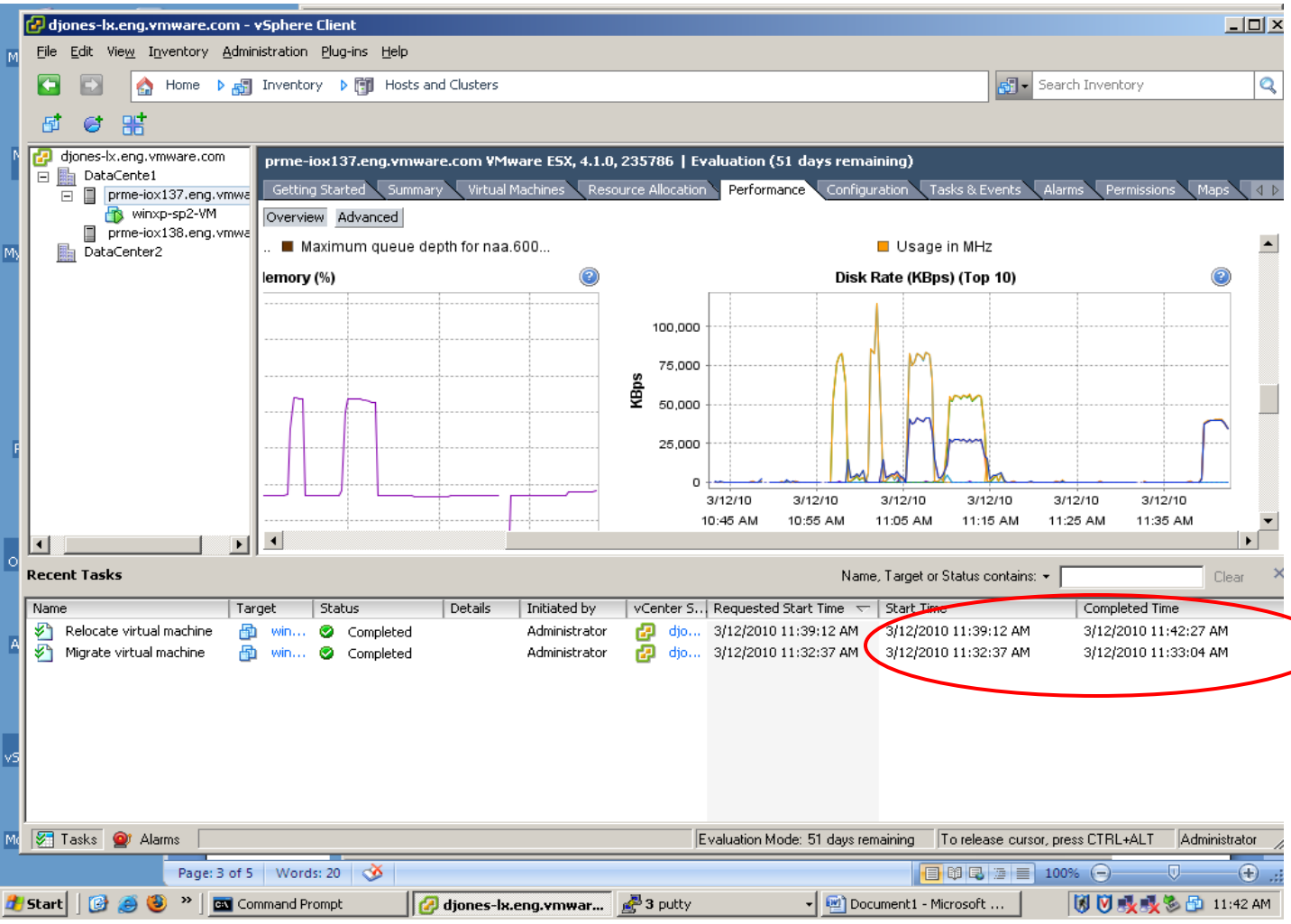
- Performance impact on host, array, network
- Long migration time (0.5 - 2.5 hrs for 100GB VM)
- Best practice: use infrequently

Improved solution

- Use array's native copy/clone functionality



VAAI Speeds Up Storage vMotion - Example

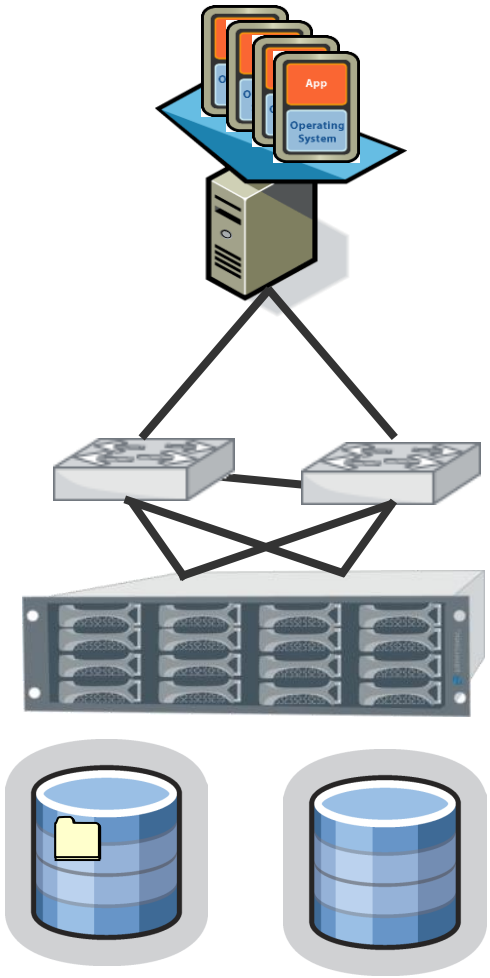


42:27 - 39:12 =
2 Min 21 sec w/out
(141 seconds)

33:04 - 32:37 =
27 Sec with VAAI

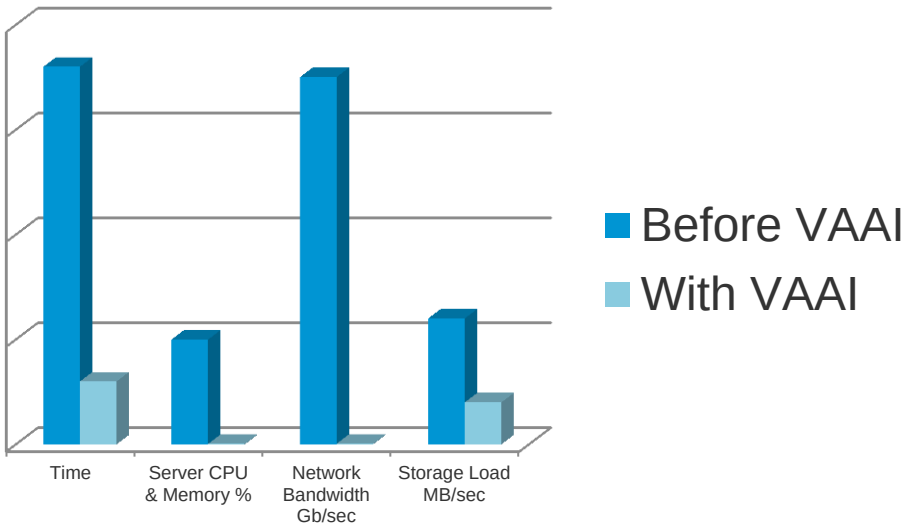
141 sec vs. 27 sec

Copying Data – Optimized Cloning with VAAI



VMFS directs storage to move data directly

- Much less time!
  - Up to 95% reduction
- Dramatic reduction in load on:
  - Servers
  - Network
  - Storage



Scalable Lock Management

- A number of VMFS operations cause the LUN to temporarily become locked for exclusive write use by one of the ESX nodes, including:
  - Moving a VM with vMotion
  - Creating a new VM or deploying a VM from a template
  - Powering a VM on or off
  - Creating a template
  - Creating or deleting a file, including snapshots
- A new VAAI feature, atomic_test_and_set allows the ESX Server to offload the management of the required locks to the storage and avoids locking the entire VMFS file system.

VMFS Scalability with Atomic Test and Set (ATS)

Makes VMFS more scalable overall, by offloading block locking mechanism

Using Atomic Test and Set (ATS) capability provides an alternate option to use of SCSI reservations to protect the VMFS metadata from being written to by two separate ESX Servers at one time.

Normal VMware Locking (No ATS)

Enhanced VMware Locking (With ATS)

For more details on VAAI

vSphere 4.1 Documentation also describes use of this features in the ESX Configuration Guide Chapter 9 (pages 124 - 125)

Listed in TOC as “Storage Hardware Acceleration”

Three setting under advanced settings:

- DataMover.HardwareAcceratedMove - Full Copy
- DataMover.HardwareAcceratedInit - Write Same
- VMFS3.HarwareAccerated Locking - Atomic Test Set

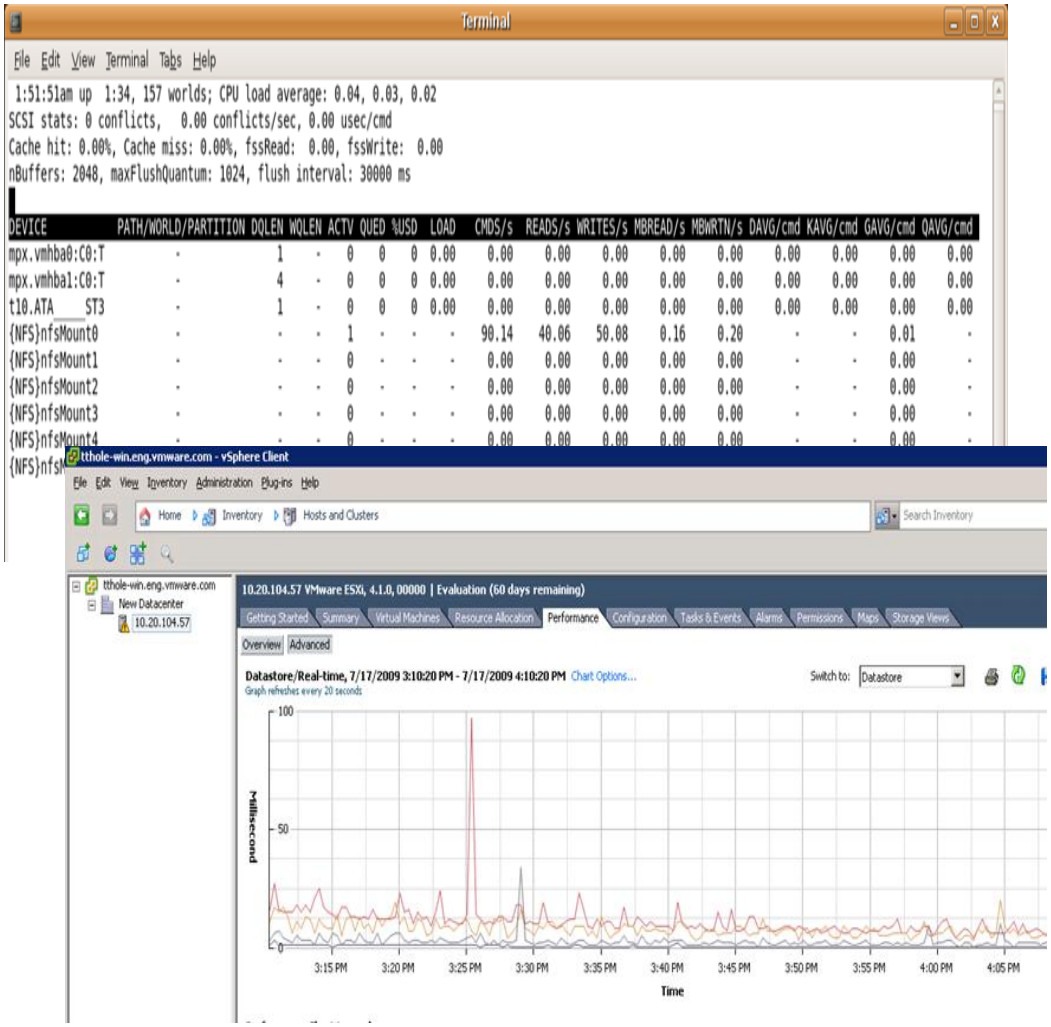
Additional Collateral planned for release at GA

- Frequently Asked Questions
- Datasheet or webpage content

Partners include : Dell/EQL, EMC, HDS, HP, IBM and NetApp

*** Will only support block based storage in 4.1**

New Performance Monitoring Statistics



- Comprehensive host & VM storage performance statistics enable proactive monitoring to simplify troubleshooting
- Heterogeneous customer storage environments supported (FC, iSCSI, NFS)
- Tools support varied usage scenarios
  - GUI for trending and user-friendly comparative analysis
  - Command-line for scripting/ drill-down at host

Features:

- Throughput and latency statistics for:
  - Datastore per host
  - Storage adapter & path per Host
  - Datastore per VM
  - VMDK per VM
- Realtime and historical trending (vCenter)
- Esxtop (for ESX) and resxtop (for ESXi)

Statistics targeted in solution: vCenter & esxtop

Inventory object	Per Component	Statistic	FC/NFS/ iSCSI	vCenter?	Esxtop?
Host	datastore	Throughput, latency	All		
	Storage adapter	Throughput, latency	FC*		Available today
	Storage path	Throughput, latency	FC*		Available today
	LUN	Throughput, latency	FC, iSCSI**	Available today	Available today
VM	Datastore	Throughput, latency	All		
	VMDK	Throughput, latency	All		

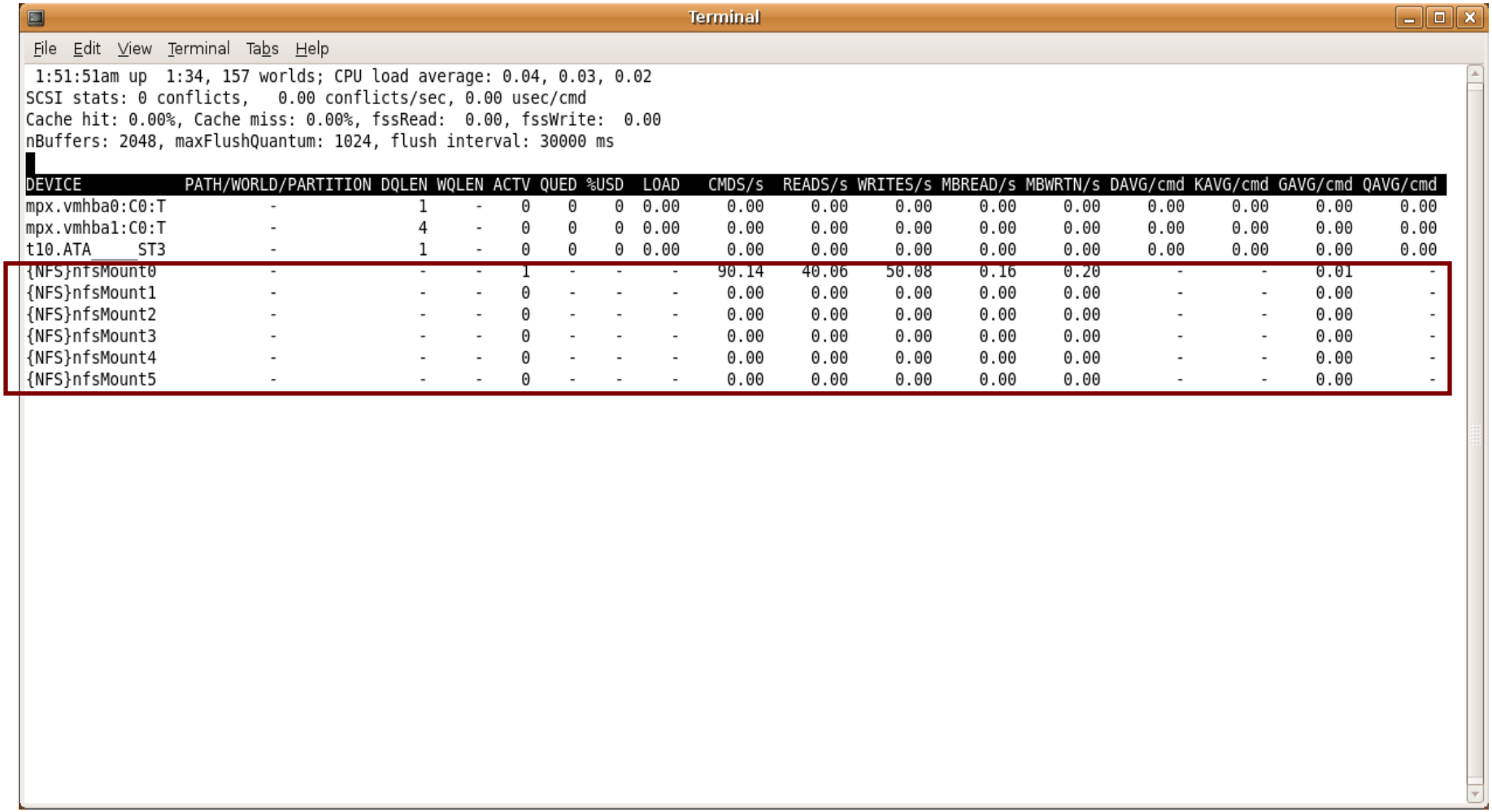
Not available in this timeframe: Aggregation at cluster level in vCenter (possible through APIs)

*Network-based storage (NFS, iSCSI) I/O breakdown still being researched

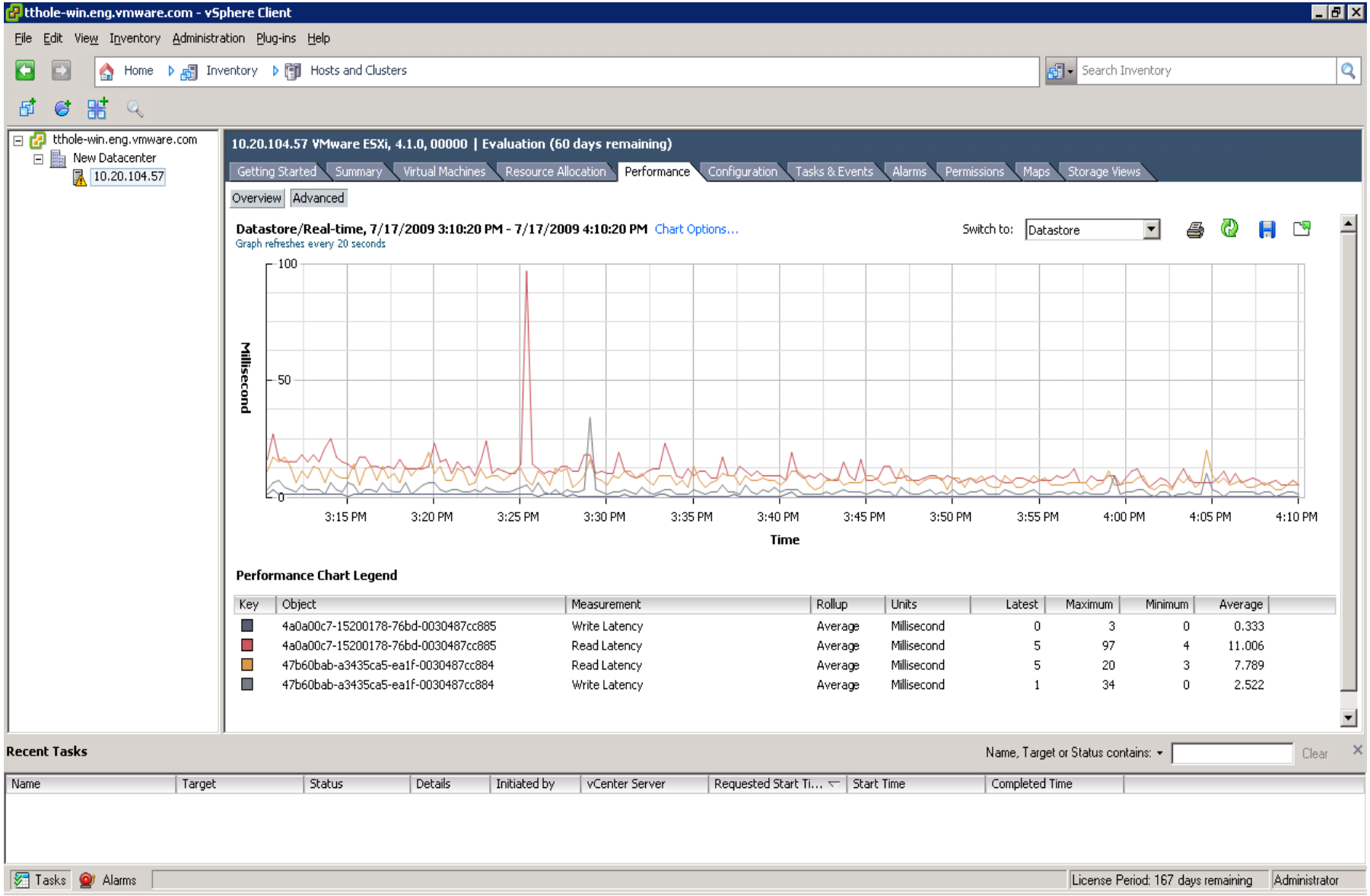
** Not applicable to NFS; datastore is the equivalent

 ESXTOP publishes throughput and latency for LUN, if datastore has only one LUN then LUN will be equal datastore

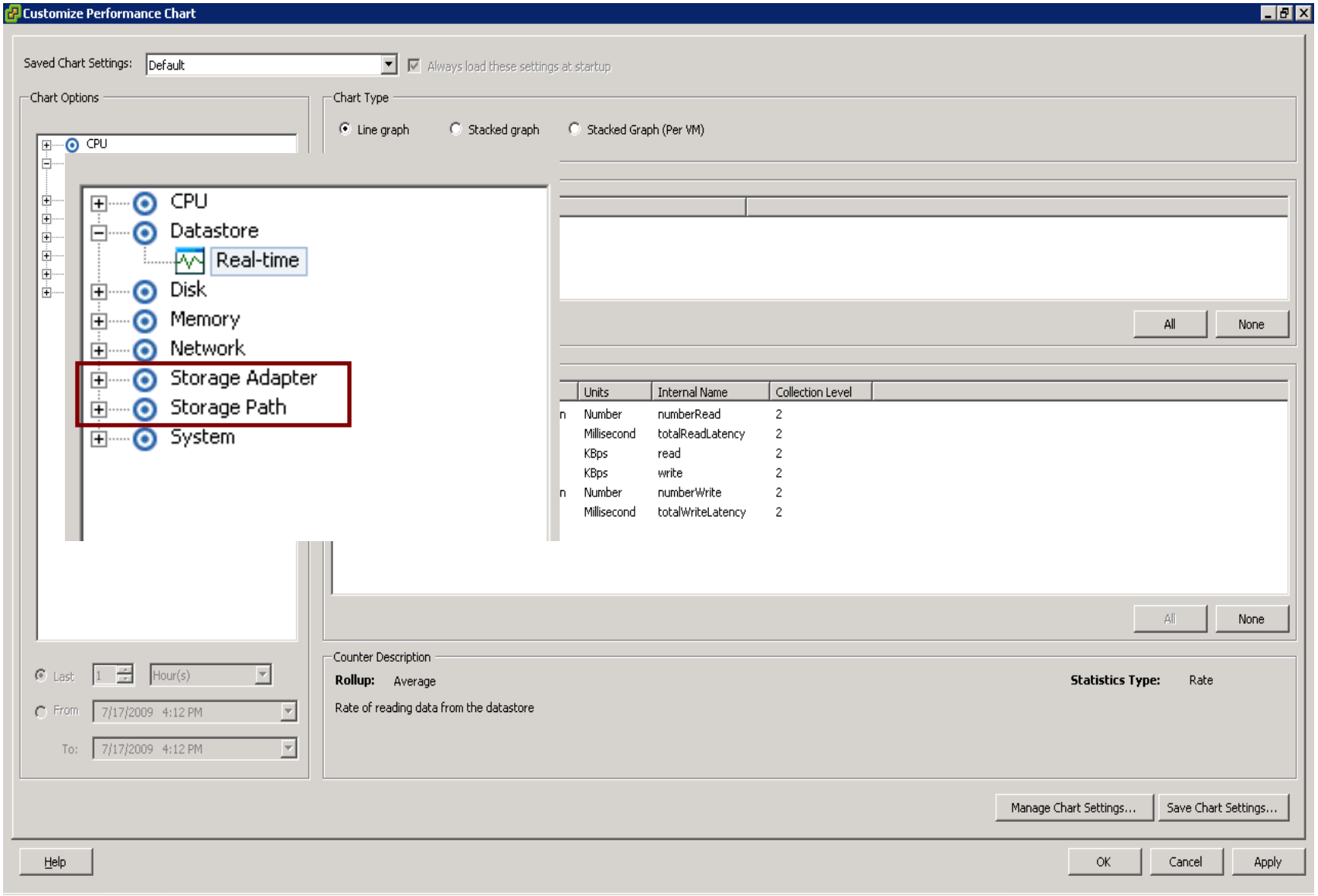
Volume Stats for NFS Device



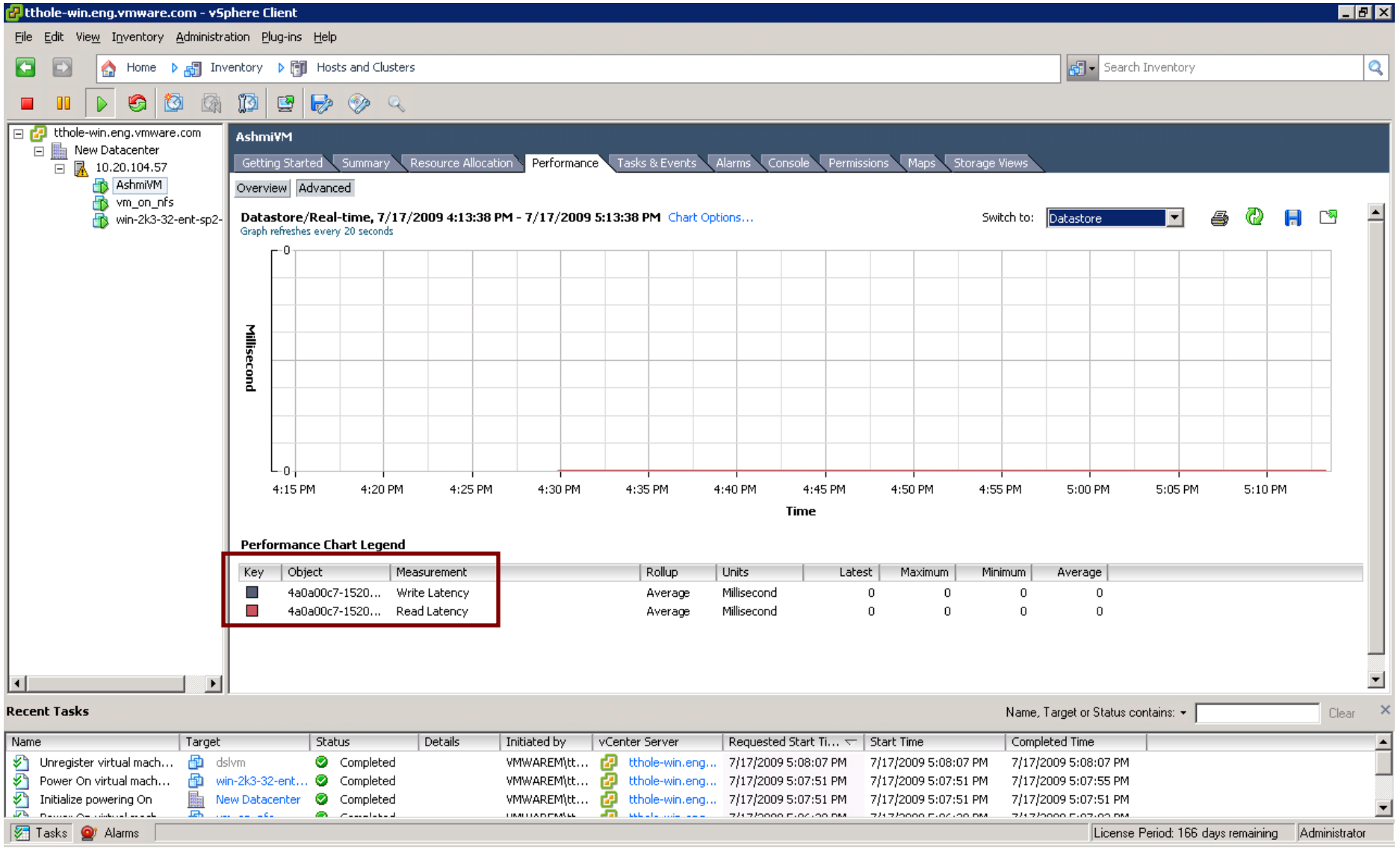
Datastore Activity Per Host



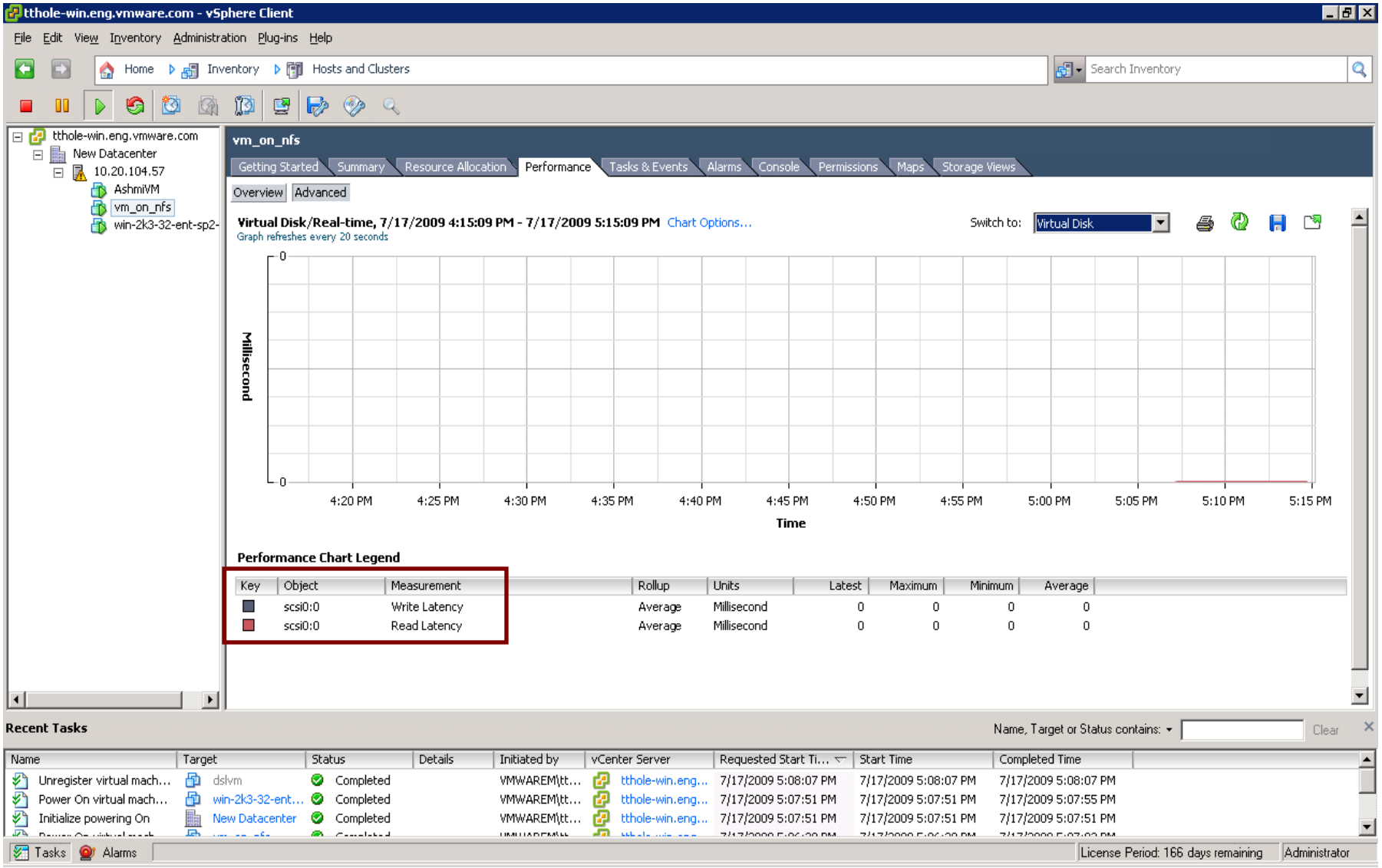
Other Host Stats



Datastore Activity per VM



Virtual Disk Activity per VM



ESXi

New Feature: Additional Deployment Option

Boot From SAN

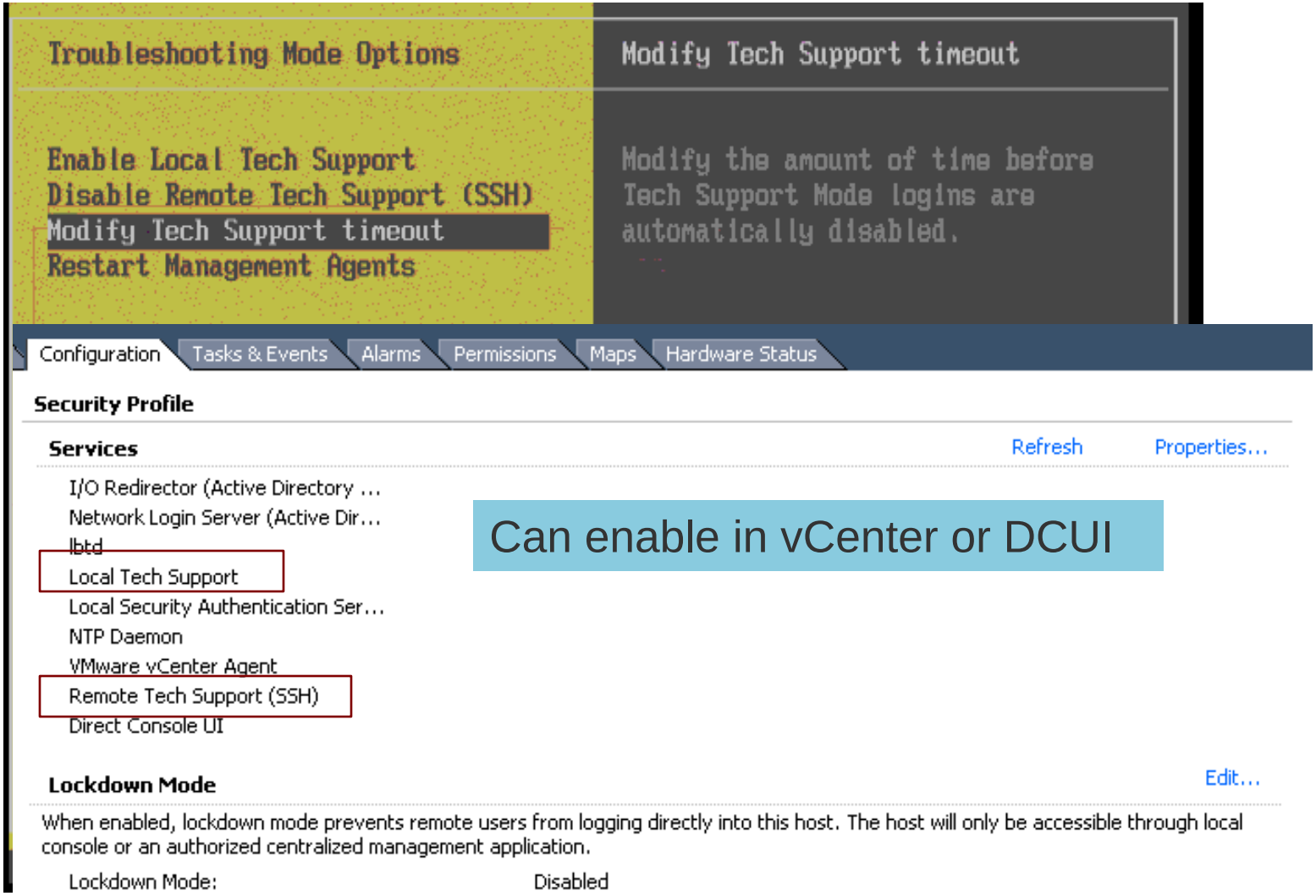
- Fully supported in ESXi 4.1
- Was only experimentally supported in ESXi 4.0
- Boot from SAN supported for FC, iSCSI, and FCoE

New Feature: Additional Deployment Option

Scripted Installation

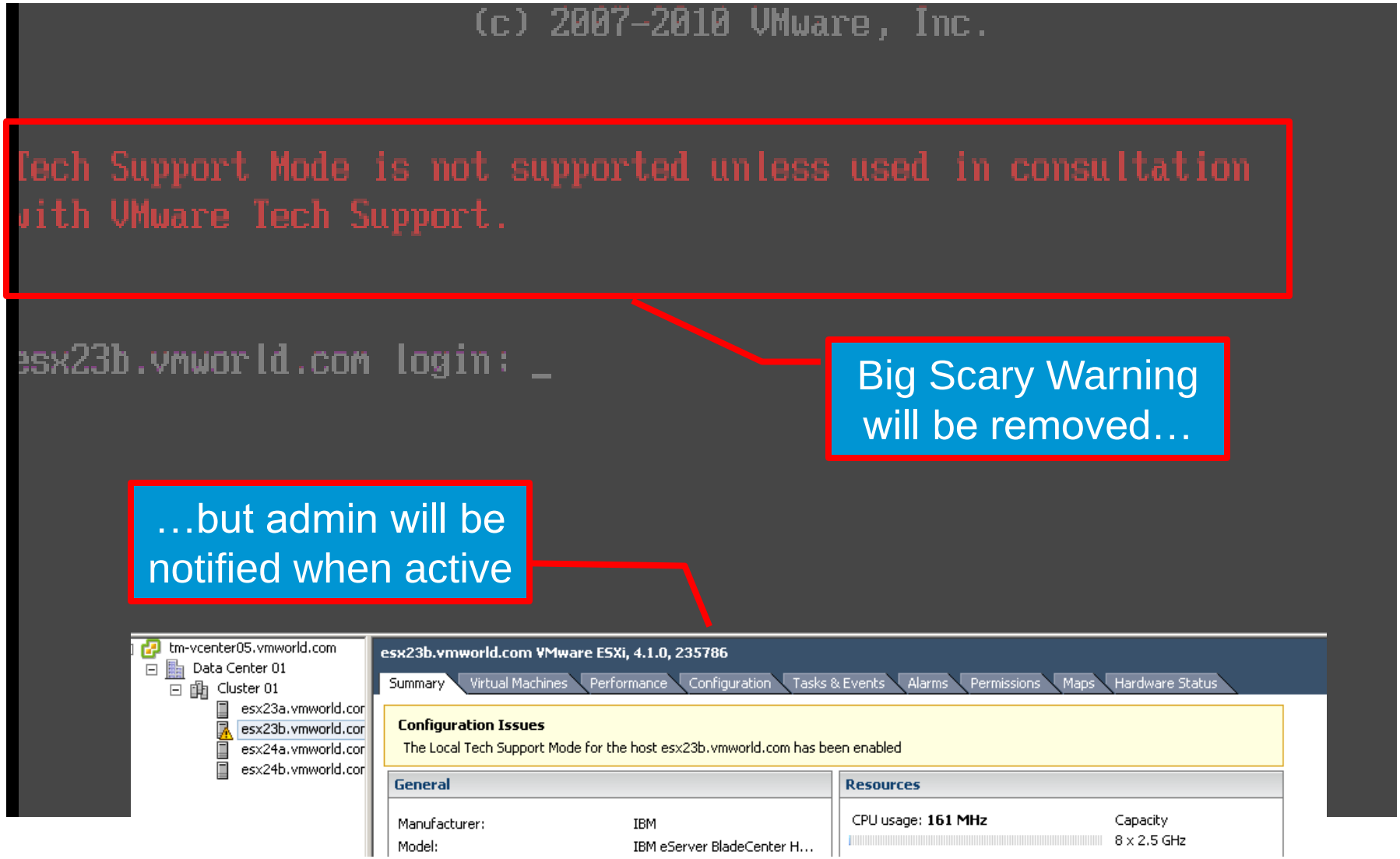
- Numerous choices for installation
  - Installer booted from
    - CD-ROM (default)
    - Preboot Execution Environment (PXE)
  - ESXi Installation image on
    - CD-ROM (default), HTTP / HTTPS, FTP, NFS
  - Script can be stored and accessed
    - Within the ESXi Installer ramdisk (default)
    - On the installation CD-ROM
    - HTTP / HTTPS, FTP, NFS
  - Configuration script (“ks.cfg”) can include other scripts
    - Preinstall
    - Postinstall
    - First boot

New Feature: Full Support of Tech Support Mode



Can enable in vCenter or DCUI

New Feature: Full Support of Tech Support Mode



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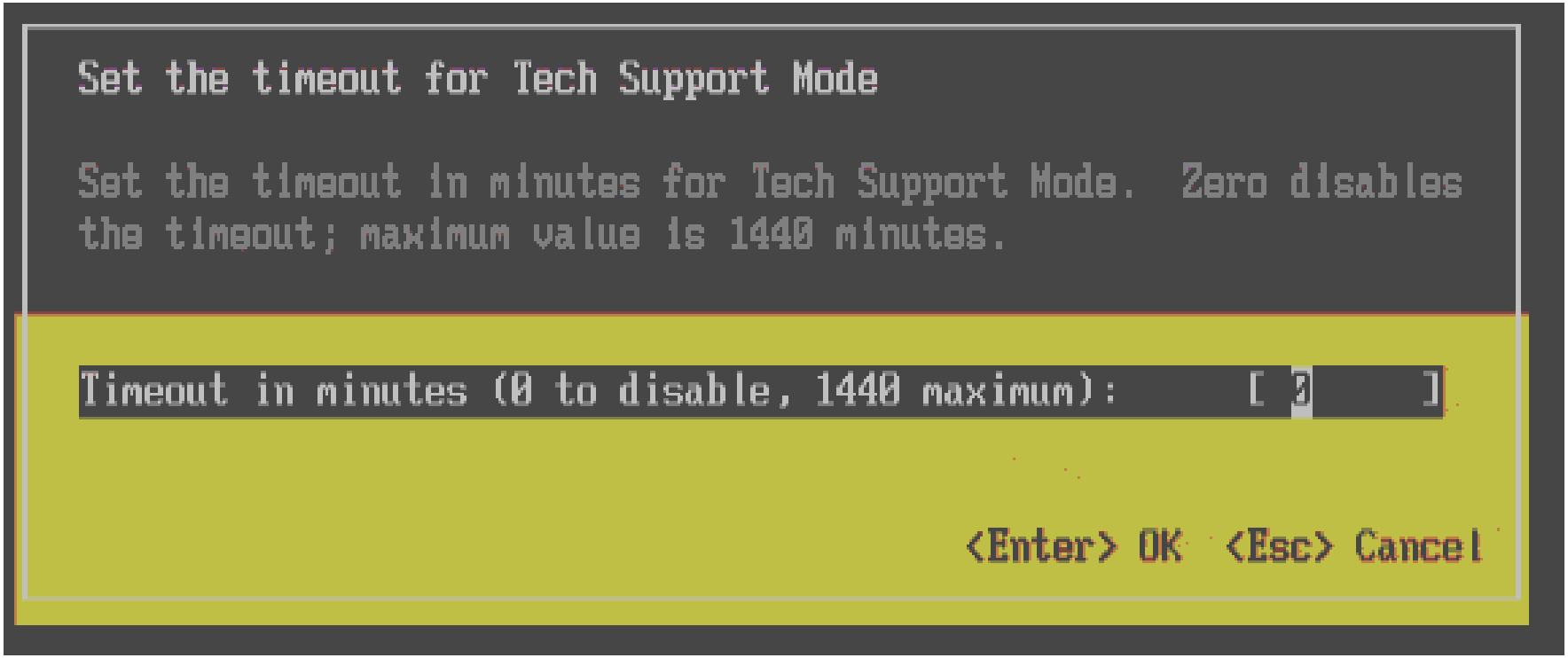


- Timeout automatically disables Tech Support Mode (local and remote)
- Running sessions are not terminated
- All commands issued in Tech Support Mode are sent to syslog

New Feature: Full Support of Tech Support Mode

Recommended uses

- Support, troubleshooting, and break-fix
- Scripted deployment preinstall, postinstall, and first boot scripts

Discouraged uses

- Any other scripts
- Running commands/scripts periodically (cron jobs)
- Leaving open for routine access or permanent SSH connection

New Feature: Active Directory Service

Provides authentication for all local services

- vSphere Client
- Other access based on vSphere API
- DCUI
- Tech Support Mode (local and remote)

Has nominal Active Directory groups functionality

- Members of “ESX Admins” AD group have Administrative privilege
- Administrative privilege includes:
  - Full Administrative role in vSphere Client and vSphere API clients
  - DCUI access
  - Tech Support Mode access (local and remote)

New Feature: Additional vCLI configuration commands

Storage

- esxcli swiscsi session: Manage iSCSI sessions
- esxcli swiscsi nic: Manage iSCSI NICs
- esxcli swiscsi vmknic: List VMkernel NICs available for binding to particular iSCSI adapter
- esxcli swiscsi vmnic: List available uplink adapters for use with a specified iSCSI adapter
- esxcli vaai device: Display information about devices claimed by the VMware VAAI (vStorage APIs for Array Integration) Filter Plugin.
- esxcli corestorage device: List devices or plugins. Used in conjunction with hardware acceleration.

New Feature: Additional vCLI troubleshooting commands

Network

- esxcli network: List active connections or list active ARP table entries.

Storage

- NFS statistics available in resxtop

Virtual Machine

- esxcli vms: Forcibly stop virtual machines that do not respond to normal stop operations, by using kill commands.
- NOTE: designed to kill VMs in a reliable way (not dependent upon well-behaving system)

New Feature: Additional commands in Tech Support Mode

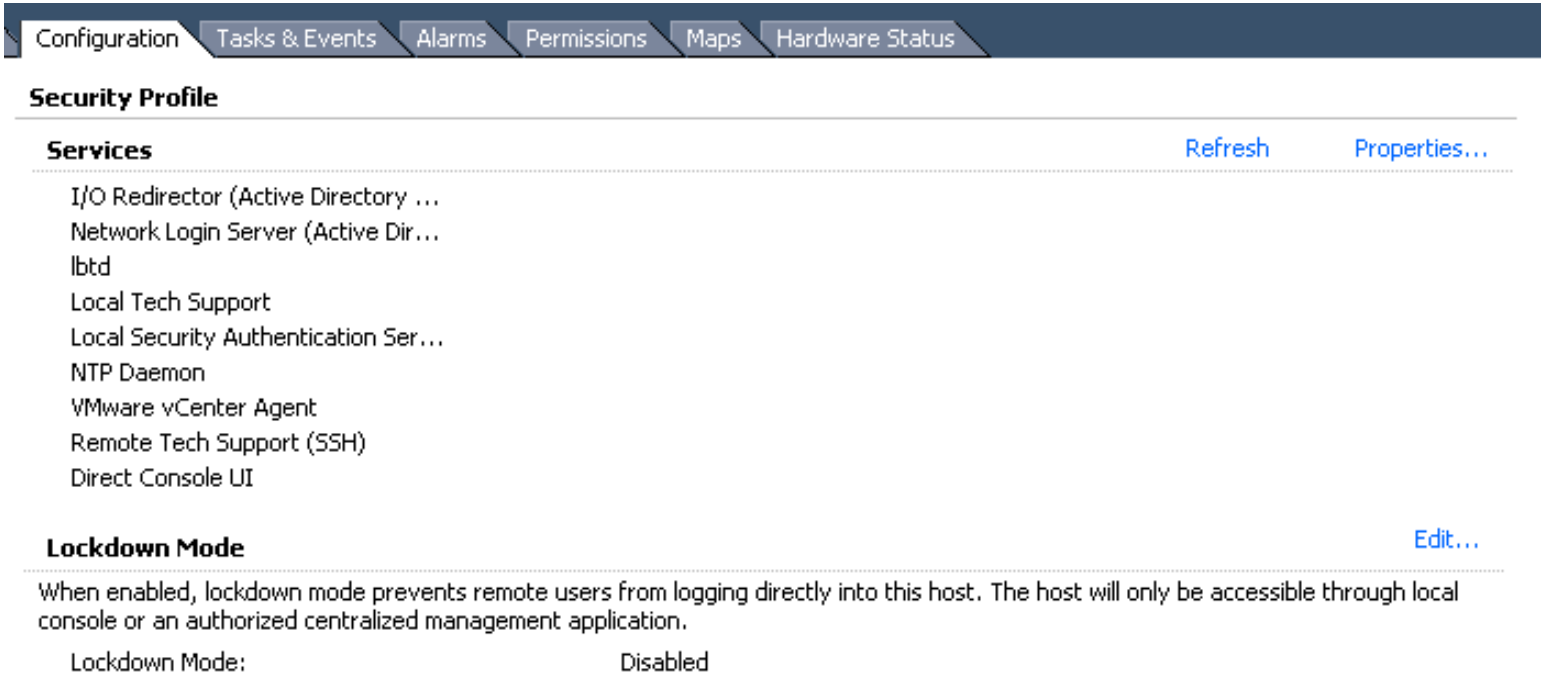
Additional commands for troubleshooting

- vscsiStats
- nc (netcat)
- tcpdump-uw

New Feature: Total Lockdown

Ability to totally control local access via vCenter Server

- DCUI
- Lockdown Mode (disallows all access except root on DCUI)
- Tech Support Mode (local and remote)
- If all configured, then **no local activity possible** (except pull the plugs)



Summary of new features in ESXi 4.1

Deployment Options

- Boot from SAN
- Scripted Installation (a la “Kickstart”)

Centralized updating of 3rd party code

- VMware Update Manager can deploy drivers, CIM providers, other modules

Improved Local Authentication

- Built-in Active Directory Service
- DCUI and Tech Support Mode access by any authorized user (not just root)

Easier CLI options for troubleshooting

- Full support of Tech Support Mode – both local and remote (via SSH)
- Additional commands in Tech Support Mode: vscsiStats, nc, tcpdump-uw, etc.
- Additional management options in vCLI: SCSI, VAAI, Network, VM

Better control over local activity

- DCUI and Tech Support Mode is configurable in vCenter Server
- Total host lockdown possible
- Activity in Tech Support Mode is sent to syslog

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Availability – HA & FT
DRS & DPM

Availability Feature Summary

HA and DRS Cluster Limitations

High Availability (HA) Diagnostic and Reliability Improvements

Fault Tolerance (FT) Enhancements

vMotion Enhancements

- Performance
- Usability
- Enhanced Feature Compatibility

DRS Host Affinity

DPM Enhancements

Data Recovery Enhancements

HA and DRS Cluster Limitations

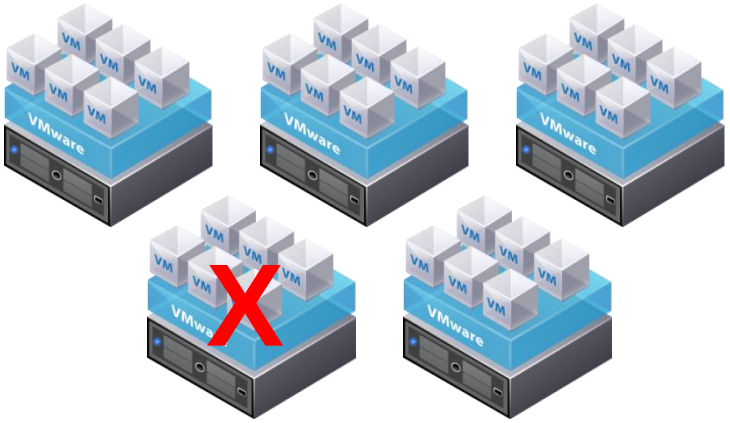
Increased cluster limitations

- Cluster limits are now unified for HA and DRS clusters
- Increased limits for VMs/host and VMs/cluster

- Cluster limits for HA and DRS:
  - 32 hosts/cluster
  - 320 VMs/host (regardless of # of hosts/cluster)
  - 3000 VMs/cluster

- Note that these limits also apply to post-failover scenarios. Please be sure that these limits will not be violated even after the maximum configured number of host failovers.

HA and DRS Cluster Limitations

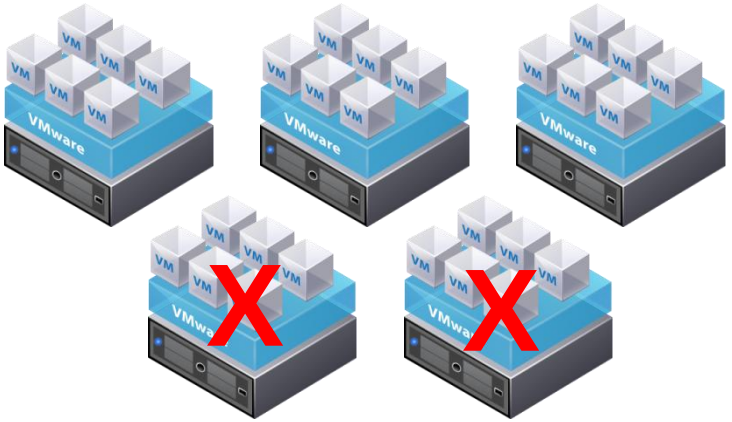


5-host cluster, tolerate 1 host failure

- vSphere 4.1 supports 320 VMs/host
- Supports 320x5 VMs/cluster? NO
- Cluster can only support 320x4 VMs

5-host cluster, tolerate 2 host failures

- Supports 320x5 VMs/cluster? NO
- Cluster can only support 320x3 VMs



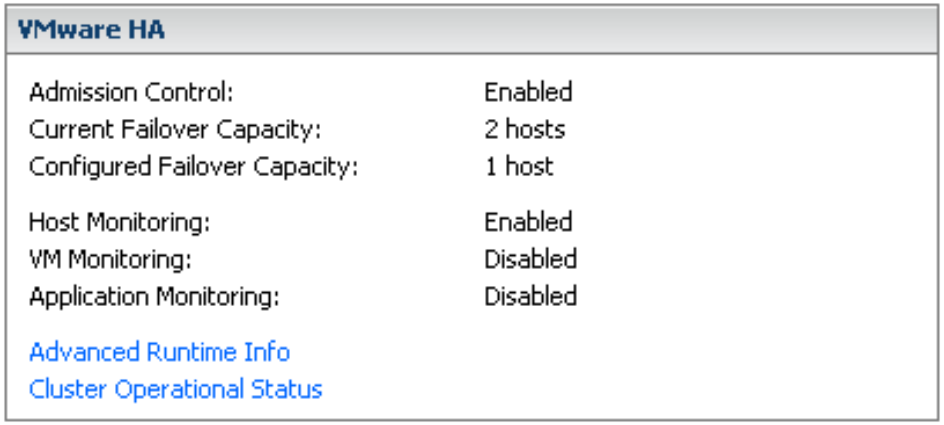
HA Diagnostic and Reliability Improvements

HA Healthcheck Status

- HA provides an ongoing healthcheck facility to ensure that the required cluster configuration is met at all times. Deviations result in an event or alarm on the cluster.

HA Operational Status

- A new Cluster Operational Status window displays more information about the current HA operational status, including the specific status and errors for each host in the HA cluster.

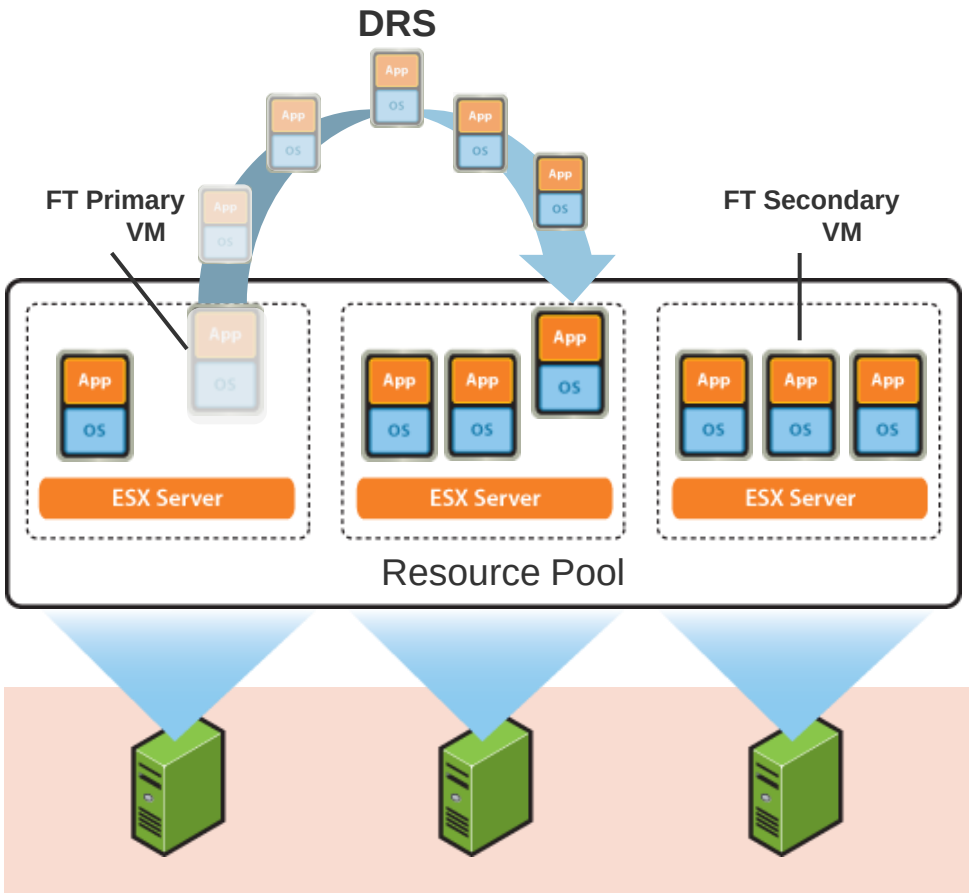


Improved HA-DRS interoperability during HA failover

- DRS will perform vMotion to free up contiguous resources (i.e. on one host) so that HA can place a VM that needs to be restarted

HA app awareness – expose APIs for 3rd party app developers

Fault Tolerance (FT) Enhancements



FT fully integrated with DRS

- DRS load balances FT Primary and Secondary VMs. EVC required.

Versioning control lifts requirement on ESX build consistency

- Primary VM can run on host with a different build # as Secondary VM.

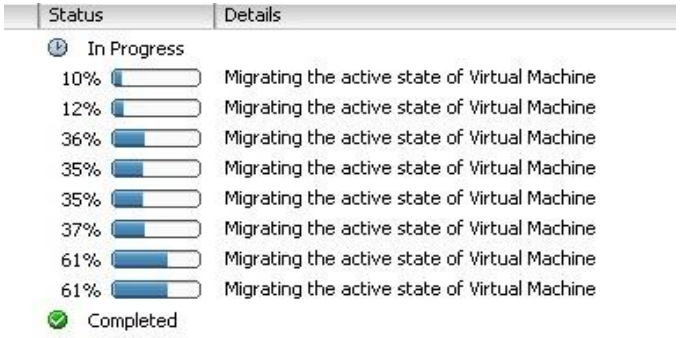
Events for Primary VM vs. Secondary VM differentiated

- Events logged/stored differently.

vMotion Enhancements

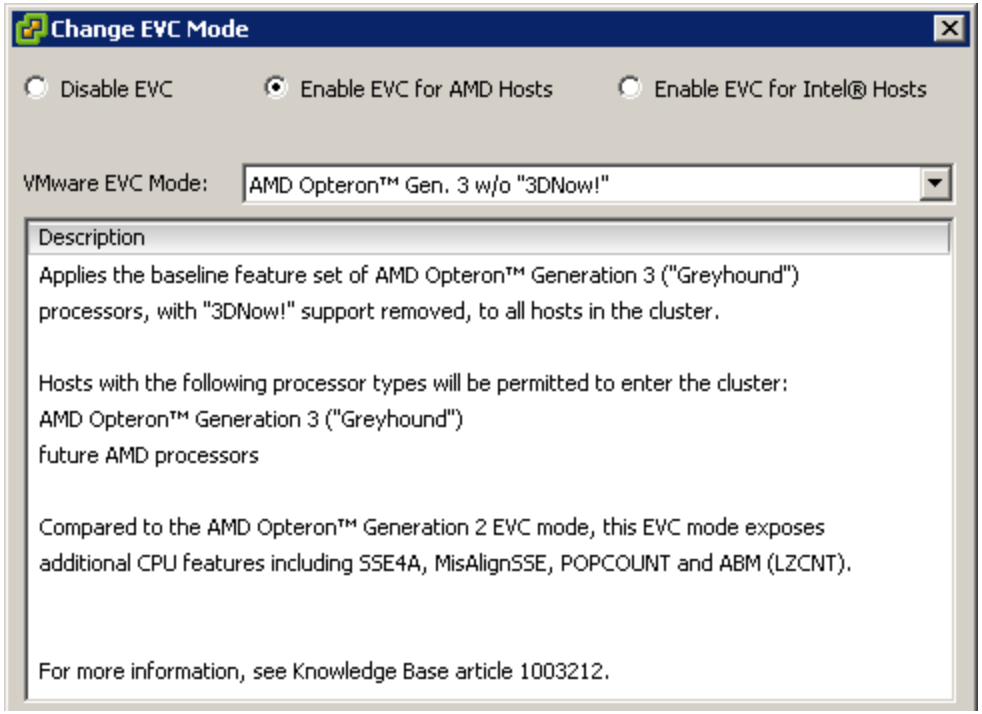
- Significantly decreased the overall migration time (time will vary depending on workload)

- Increased number of concurrent vMotions:
  - ESX host: **4** on a 1 Gbps network and **8** on a 10 Gbps network
  - Datastore: **128** (both VMFS and NFS)



- Maintenance mode evacuation time is greatly decreased due to above improvements

Enhanced vMotion Compatibility Improvements



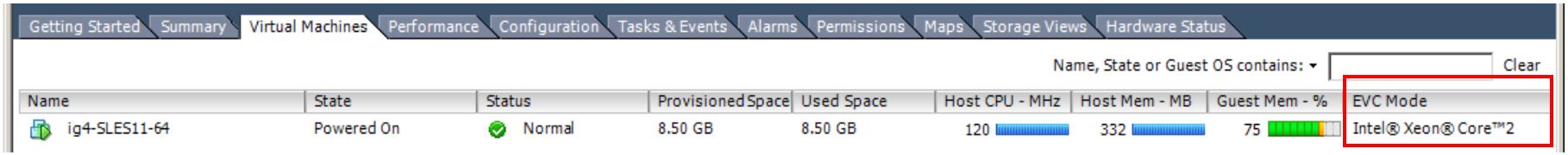
Usability Improvements

- **Preparation for AMD Next Generation w/o 3DNow!**: Future AMD CPUs may not support 3DNow!. To prevent vMotion incompatibilities, a new EVC mode is introduced.
- **Better handling of powered-on VMs**: vCenter Server now uses a live VM's CPU feature set (instead of host's CPU features) to determine migration into an EVC cluster. This will provide better granularity in error detection.

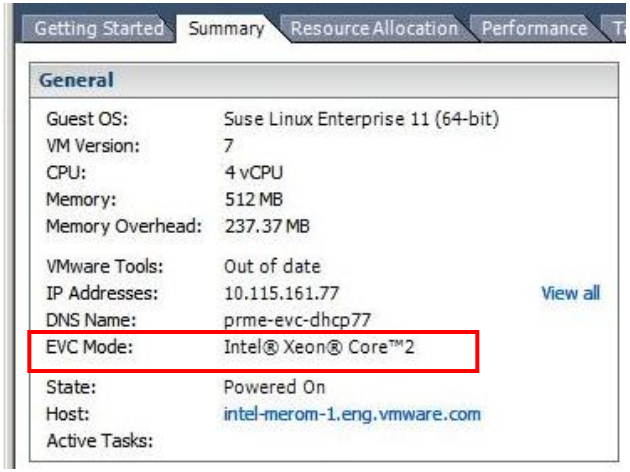
Enhanced vMotion Compatibility Improvements

Usability Improvements

- **VM's EVC capability**: The Virtual Machines tab for hosts and clusters now displays the EVC mode corresponding to the features used by VMs.

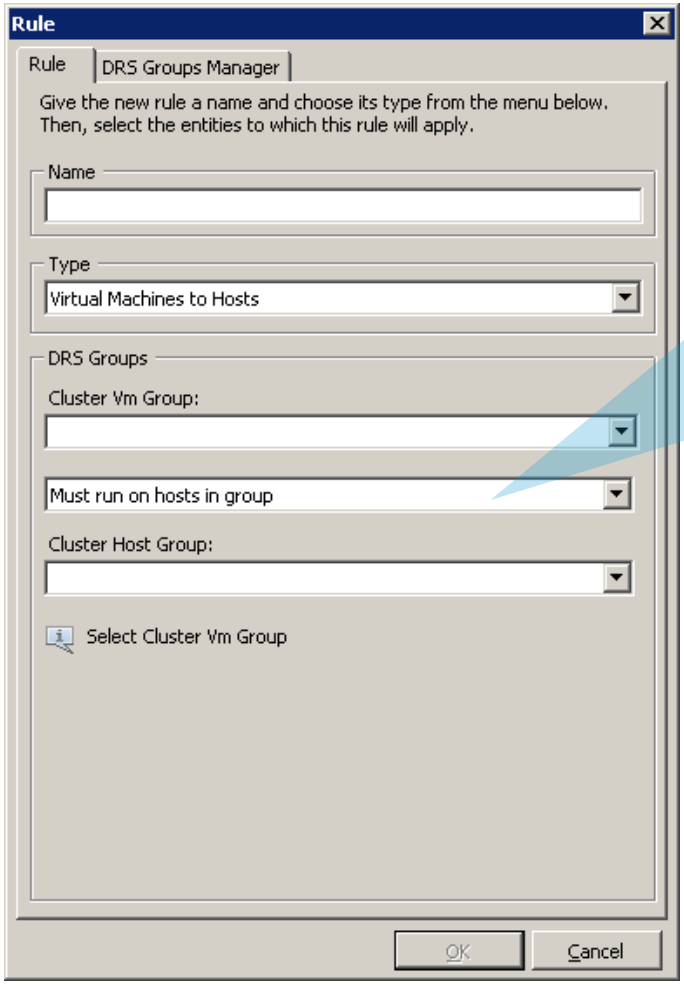


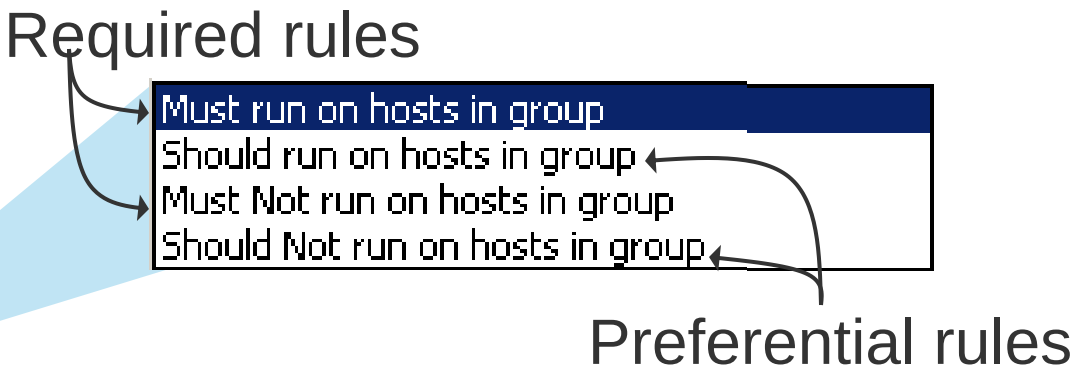
- **VM Summary**: The Summary tab for a VM lists the EVC mode corresponding to the features used by the VM.



- **Earlier *Add-Host* Error detection**: Host-specific incompatibilities are now displayed prior to the Add-Host work-flow when adding a host into an EVC cluster.

DRS Host Affinity

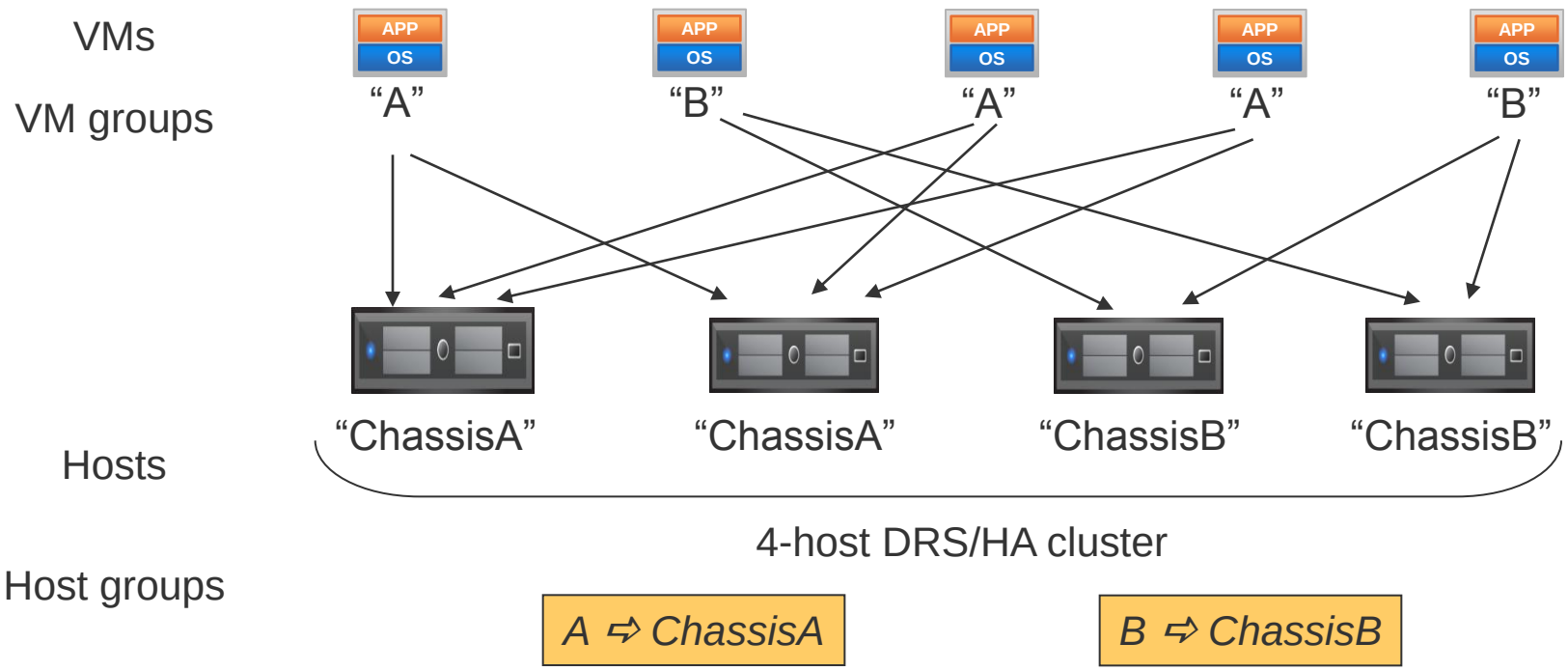




Rule enforcement: 2 options

- Required: DRS/HA will never violate the rule; event generated if violated manually. Only advised for enforcing host-based licensing of ISV apps.
- Preferential: DRS/HA will violate the rule if necessary for failover or for maintaining availability

DRS Host Affinity



Rules

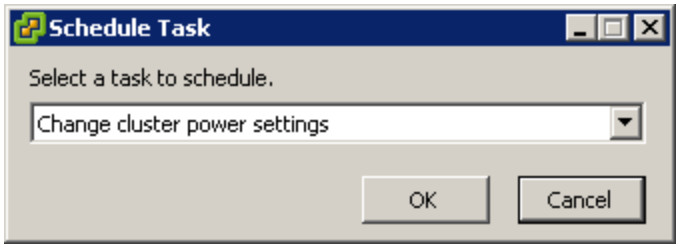
VM-VM anti-affinity rule enhancement

- VM-VM anti-affinity rules can now incorporate more than 2 VMs

DPM Enhancements

Scheduling Distributed Power Management

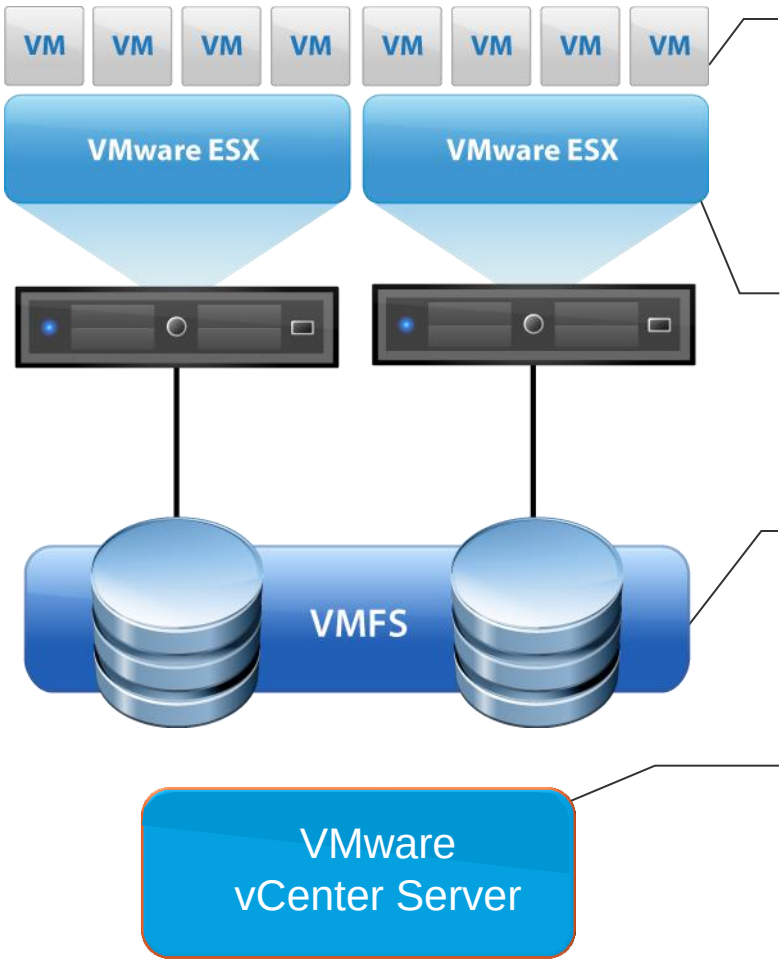
- Turning on/off DPM is now a scheduled task
- DPM can be turned off prior to business hours in anticipation for higher resource demands



Disabling DPM brings hosts out of standby

- Eliminates risk of ESX hosts being stuck in standby mode while DPM is disabled. Ensures that when DPM is disabled, all hosts are powered on and ready to accommodate load increases.

VMware Data Recovery: New Capabilities



Backup and Recovery Appliance

- Support for up to 10 appliances per vCenter Server instance to allow protection of up to 1000 virtual machines
- File Level Restore client for Linux VMs

VMware vSphere 4.1

- Improved VSS support for Windows 2008 and Windows 7: application level quiescing

Destination Storage

- Expanded support for DAS, NFS, iSCSI or Fibre Channel storage plus CIFS shares as destination
- Improved deduplication performance

vSphere Client Plug-In

- Ability for seamless switch between multiple backup appliances
- Improved usability and user experience

Management

Management – New Features Summary

vCenter Server

- 32-bit to 64-bit data migration
- Enhanced Scalability

Update Manager

Host Profile Enhancements

Orchestrator

Active Directory Support (Host and vMA)

Management Assistant (vMA)

- Scale and readiness

Converter

- Hyper-V Import

Virtual Serial Port Concentrator (VSPC)

vCenter Server – Migration to 64-bit

vCenter Server MUST be hosted on 64-bit Windows OS

- 32-bit OS NOT supported as a host OS with vCenter vSphere 4.1

Why the change?

- Scalability is restricted by the x86 32 bit virtual address space and moving to 64 bit will eliminate this problem
- Reduces dev and QA cycles and resources (faster time to market)

Two Options

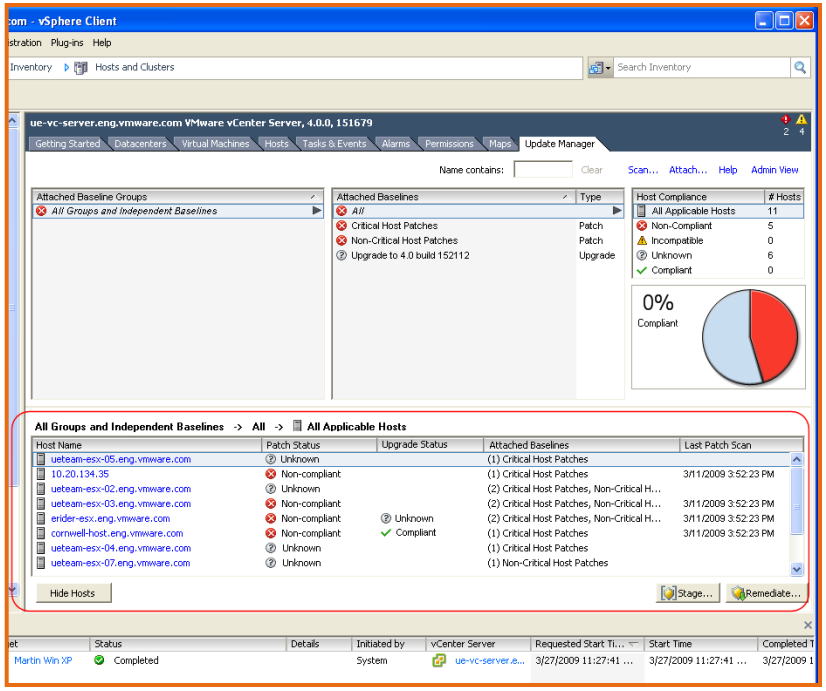
1. vCenter Server in a virtual machine running 64-bit Windows OS
2. vCenter Server install on a 64-bit Windows OS

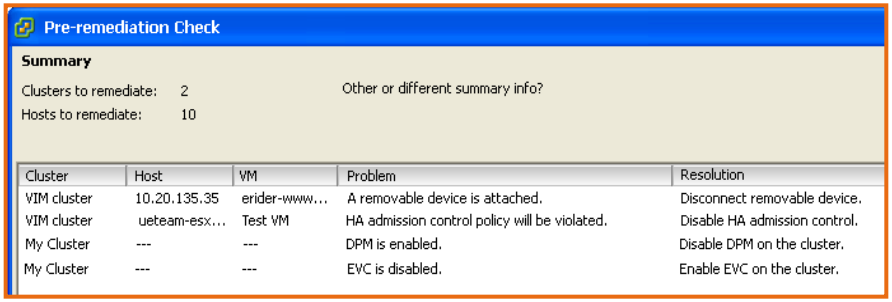
Best Practice – Use Option 1

Enhanced vCenter Scalability – “Cloud Scale”

	vSphere 4	vSphere 4.1	Ratio
VMs per host	320	320	1x
Hosts per cluster	32	32	1x
VMs per cluster	1280	3000	**3x**
Hosts per VC	300	1000	**3x**
Registered VMs per VC	4500	15000	**3x+**
Powered-On VMs per VC	3000	10000	**3x**
Concurrent VI Clients	30	120	**4x**
Hosts per DC	100	500	**5x**
VMs per DC	2500	5000	**2x**

Update Manager





- Central automated, actionable VI patch compliance management solution
- Define, track, and enforce software update compliance for ESX hosts/clusters, 3rd party ESX extensions, Virtual Appliances, VMTools/VM Hardware, online*/offline VMs, templates

- Patch notification and recall
- Cluster level pre-remediation check analysis and report
- Framework to support 3rd party IHV/ISV updates, customizations: mass install, /update of EMC's PowerPath module
- Enhanced compatibility with DPM for cluster level patch operations
- Performance and scalability enhancements to match vCenter

Host Profiles and Orchestrator Enhancements

Host Profiles

- Cisco support
- PCI device ordering (support for selecting NICs)
- iSCSI support
- Admin password (setting root password)
- PSA configuration

Orchestrator

- provides a client and server for 64-bit installations, with an optional 32-bit client.
- performance enhancements due to 64-bit installation

Management - Other New Features (Continued)

Active Directory Support (Host and vMA)

- No need to manage user accounts on ESX or ESXi – “stateless”
- Match Hyper-V capability (it can do this today)

Management Assistant

- Improved authentication capability – Active Directory support
- Transition from RHEL to CentOS

Converter

- Allows import of VMs from Hyper-V host

Virtual Serial Port Concentrator

- Traditional low-bandwidth, secure remote console approach for managing servers

Thank You