

vSphere 6 Webcast Series

Business Continuity

vSphere 6.0 Features and New Enhancements

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Technical Marketing
06/30/2015

vmware®

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Agenda

1 vSphere HA (High Availability)

2 vSphere Fault Tolerance

3 vSphere Replication

4 vSphere Data Protection

Definition

Business continuity encompasses a loosely defined set of planning, preparatory and related activities which are intended to ensure that an organization's critical business functions will either continue to operate despite serious incidents or disasters that might otherwise have interrupted them, or will be recovered to an operational state within a reasonably short period.

Source: Wikipedia

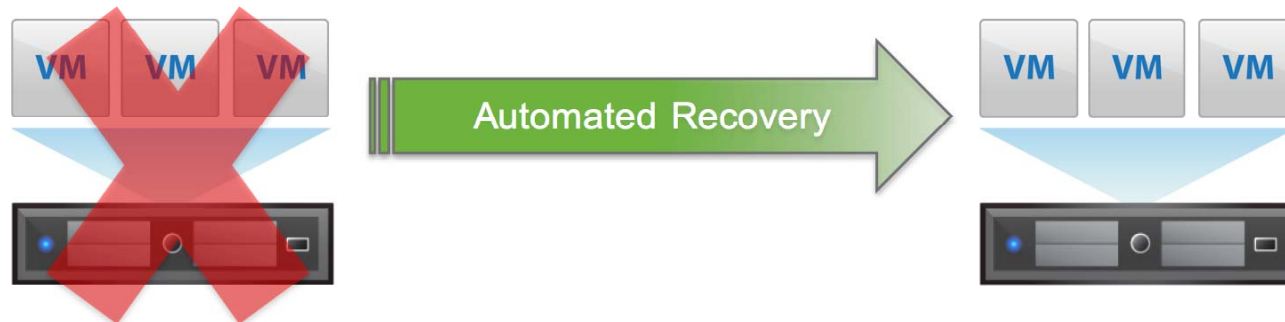
vSphere HA

High Availability

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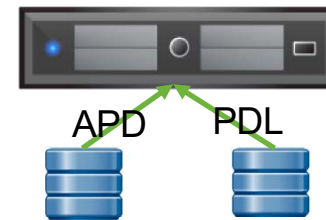
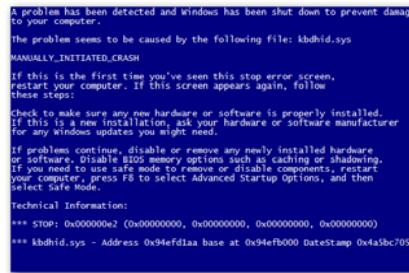
vSphere High Availability Overview

- Minimizes VM downtime – Automatic VM recovery in minutes
- Simple to configure
- Included with vSphere Essentials Plus and higher editions



vSphere HA Overview

- HA provides protection from:
 - Host Failure
 - Mgmt Network Failure
 - OS Failure
 - Storage Connectivity Issues - APD & PDL
 - Application Failure

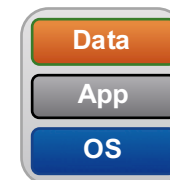
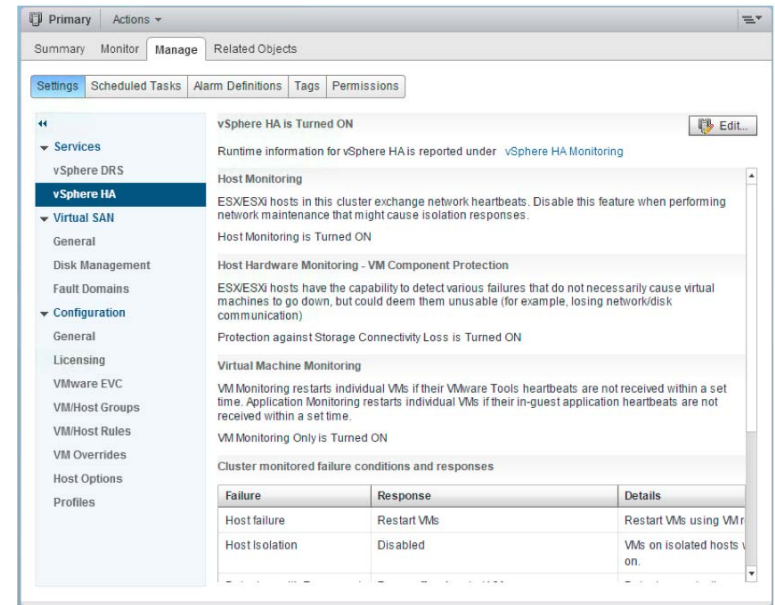


	DNS Client	The DNS Cli...	Running	Automatic (T...	Network S...
	DNS Server	Enables DN...	Automatic	Automatic	Local System...
	DS Role Server	This service ...	Manual	Manual	Local System...

vSphere HA Features and Benefits

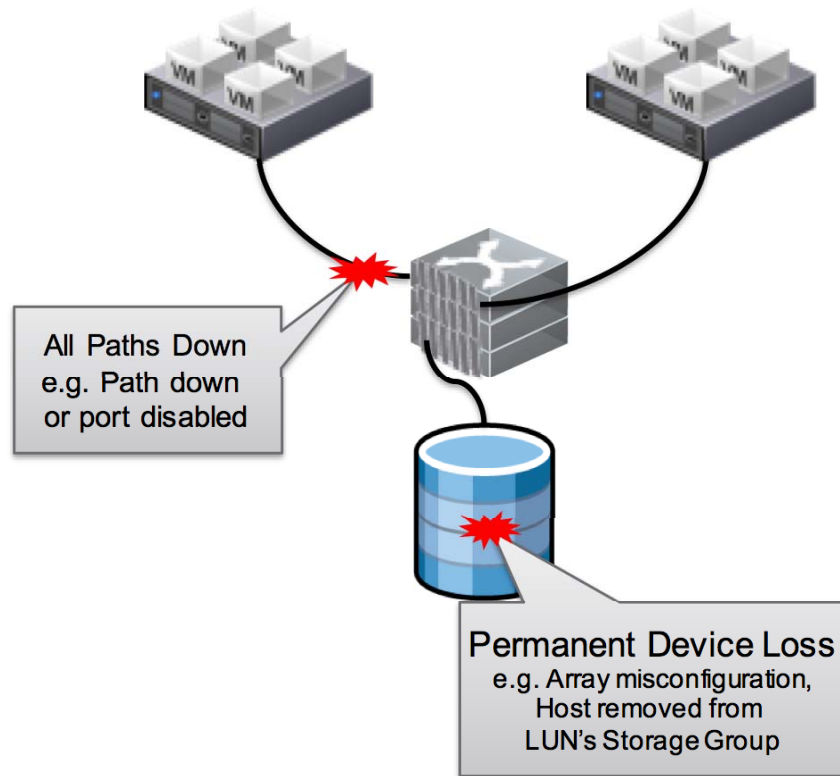
- Extremely simple to configure
 - Just a few clicks in the vSphere Web Client

- Protect any VM regardless of OS and apps
 - One solution reduces complexity and cost



vSphere HA – VM Component Protection

- Problem:
 - Host has a loss of storage connectivity
 - APD: All Paths Down
 - PDL: Permanent Device Loss
 - Difficult to manage VMs running on APD/PDL affected hosts
- Approach:
 - VMs are restarted on healthy hosts

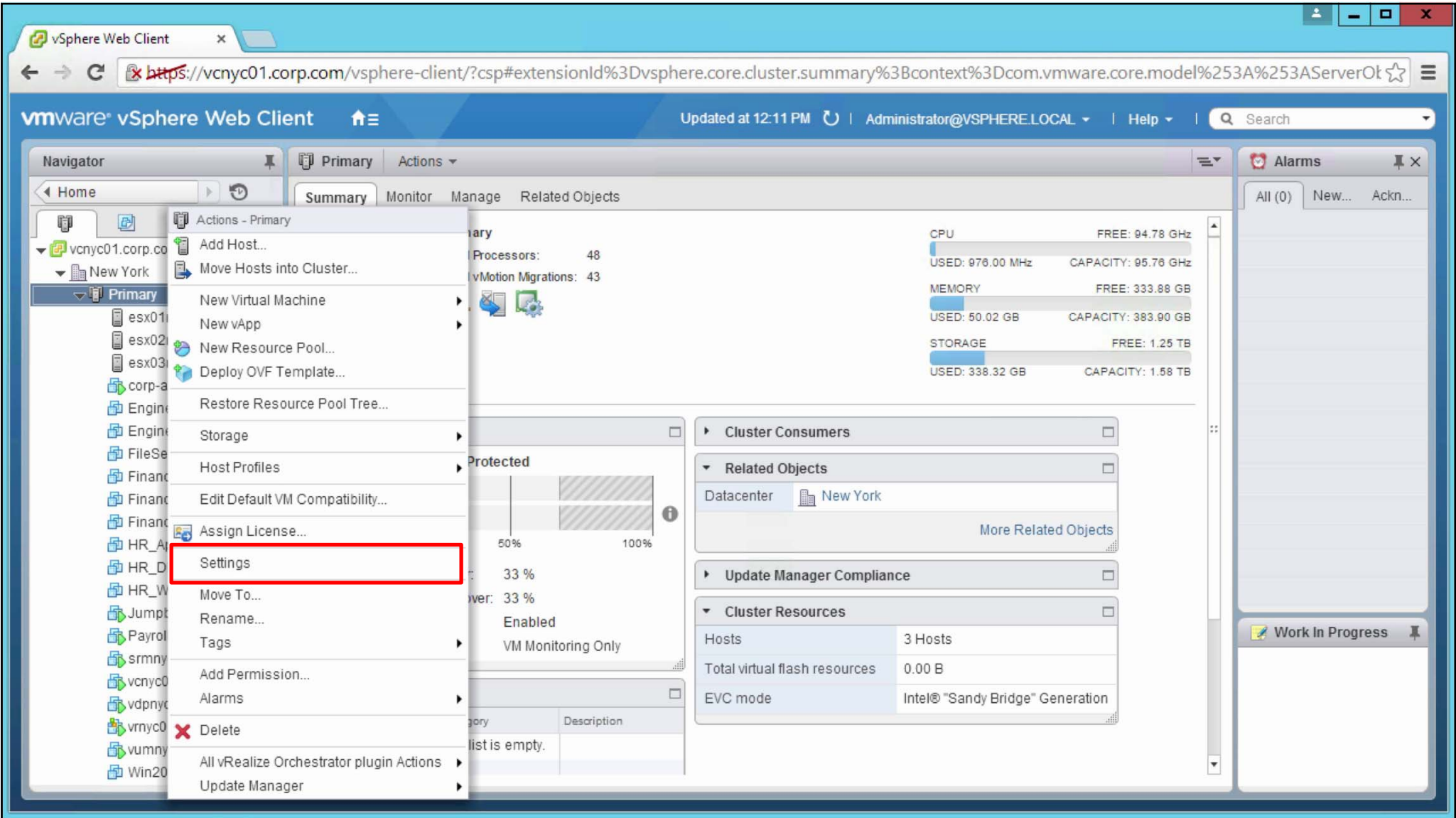


Demo

Configure VMCP

<http://featurewalkthrough.vmware.com>

vmware®



Navigator

- Home
- vcnyc01.corp.com
- New York
- Primary
- esx01
- esx02
- esx03
- corp-a
- Engine
- Engine
- FileSe
- Financ
- Financ
- Financ
- HR_A
- HR_D
- HR_W
- Jump
- Payrol
- srmy
- vcnyc0
- vdpnyc
- vrnyc0
- vumny
- Win20

- Actions - Primary
- Add Host...
- Move Hosts into Cluster...
- New Virtual Machine
- New vApp
- New Resource Pool...
- Deploy OVF Template...
- Restore Resource Pool Tree...
- Storage
- Host Profiles
- Edit Default VM Compatibility...
- Assign License...
- Settings**
- Move To...
- Rename...
- Tags
- Add Permission...
- Alarms
- Delete
- All vRealize Orchestrator plugin Actions
- Update Manager

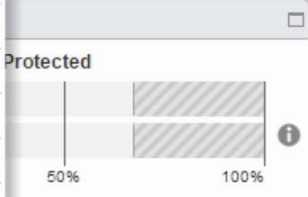
Summary Monitor Manage Related Objects

Primary

Processors: 48

vMotion Migrations: 43

CPU	FREE: 94.78 GHz
USED: 976.00 MHz	CAPACITY: 95.76 GHz
MEMORY	FREE: 333.88 GB
USED: 50.02 GB	CAPACITY: 383.90 GB
STORAGE	FREE: 1.25 TB
USED: 338.32 GB	CAPACITY: 1.58 TB



33 %

Enabled

VM Monitoring Only

Cluster Consumers

Related Objects

Datacenter New York

More Related Objects

Update Manager Compliance

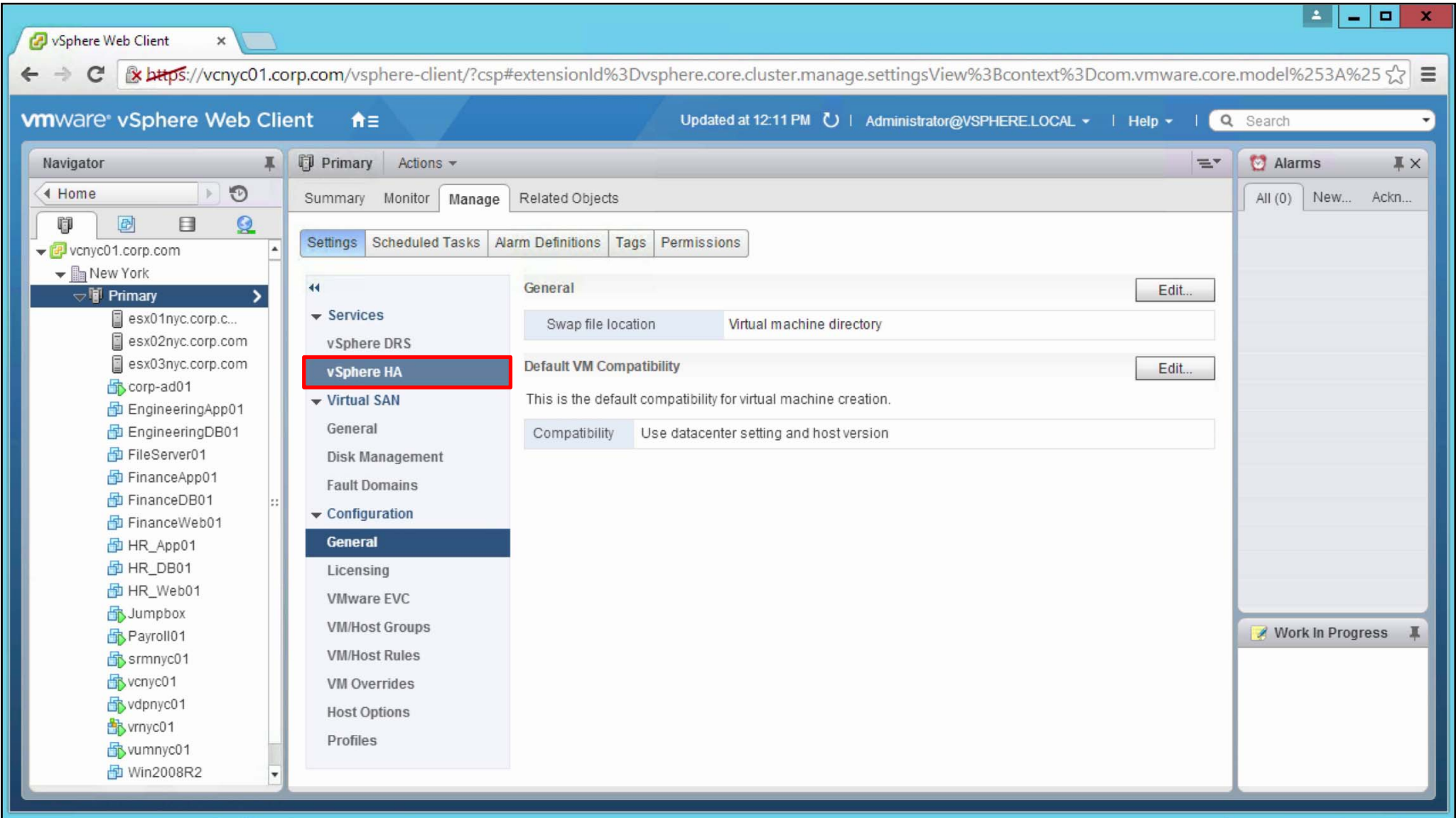
Cluster Resources

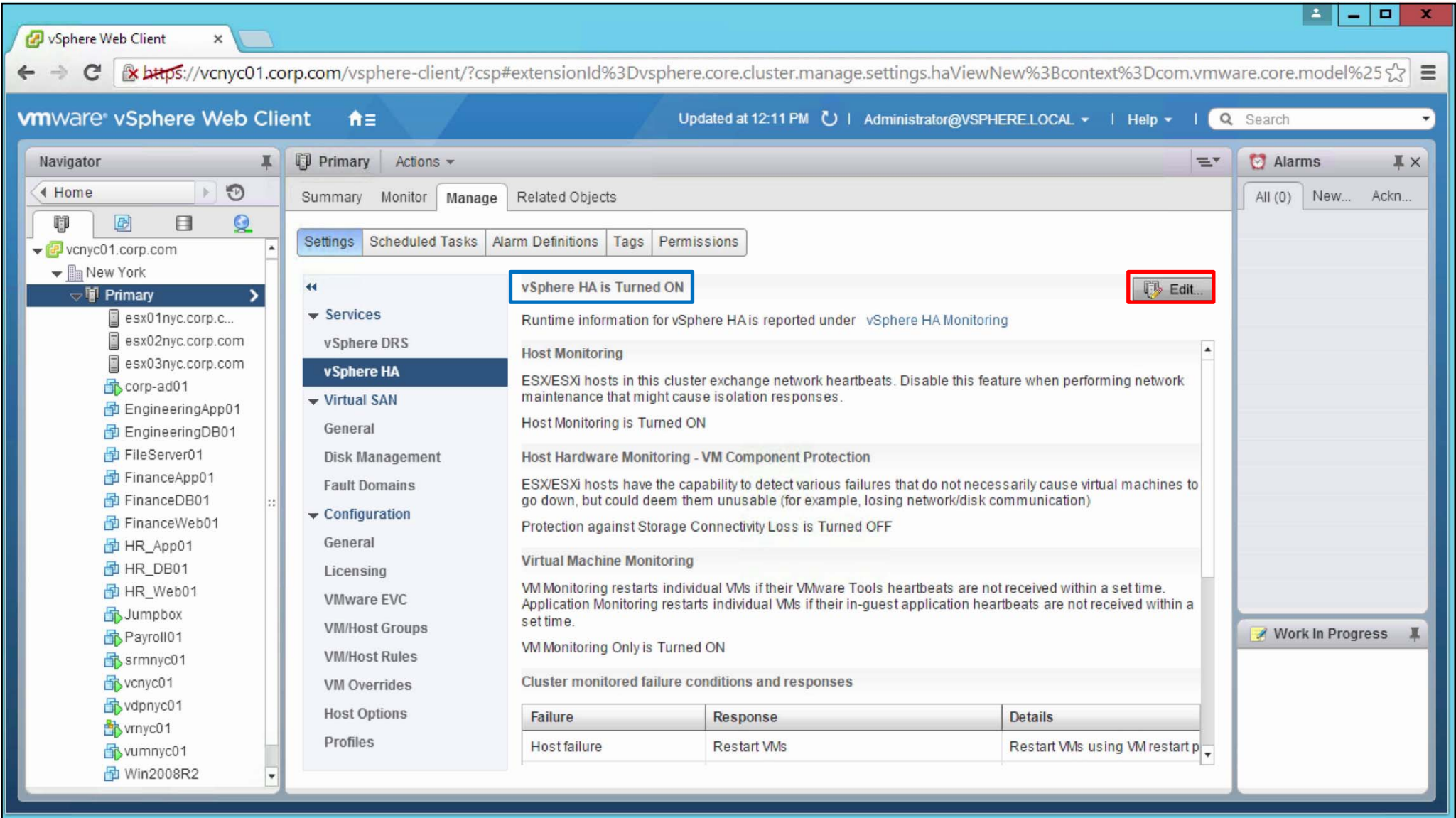
Hosts	3 Hosts
Total virtual flash resources	0.00 B
EVC mode	Intel® "Sandy Bridge" Generation

Alarms

All (0) New... Ackn...

Work In Progress





- Navigator
- Home
 - vcnyc01.corp.com
 - New York
 - Primary
 - esx01nyc.corp.c...
 - esx02nyc.corp.com
 - esx03nyc.corp.com
 - corp-ad01
 - EngineeringApp01
 - EngineeringDB01
 - FileServer01
 - FinanceApp01
 - FinanceDB01
 - FinanceWeb01
 - HR_App01
 - HR_DB01
 - HR_Web01
 - Jumpbox
 - Payroll01
 - srmnyc01
 - vcnyc01
 - vdpnyc01
 - vmnyc01
 - vumnyc01
 - Win2008R2

Primary Actions

Summary Monitor **Manage** Related Objects

Settings Scheduled Tasks Alarm Definitions Tags Permissions

vSphere HA is Turned ON Edit...

Services
vSphere DRS
vSphere HA
Virtual SAN
General
Disk Management
Fault Domains
Configuration
General
Licensing
VMware EVC
VM/Host Groups
VM/Host Rules
VM Overrides
Host Options
Profiles

Runtime information for vSphere HA is reported under [vSphere HA Monitoring](#)

Host Monitoring
ESX/ESXi hosts in this cluster exchange network heartbeats. Disable this feature when performing network maintenance that might cause isolation responses.
Host Monitoring is Turned ON

Host Hardware Monitoring - VM Component Protection
ESX/ESXi hosts have the capability to detect various failures that do not necessarily cause virtual machines to go down, but could deem them unusable (for example, losing network/disk communication)
Protection against Storage Connectivity Loss is Turned OFF

Virtual Machine Monitoring
VM Monitoring restarts individual VMs if their VMware Tools heartbeats are not received within a set time. Application Monitoring restarts individual VMs if their in-guest application heartbeats are not received within a set time.
VM Monitoring Only is Turned ON

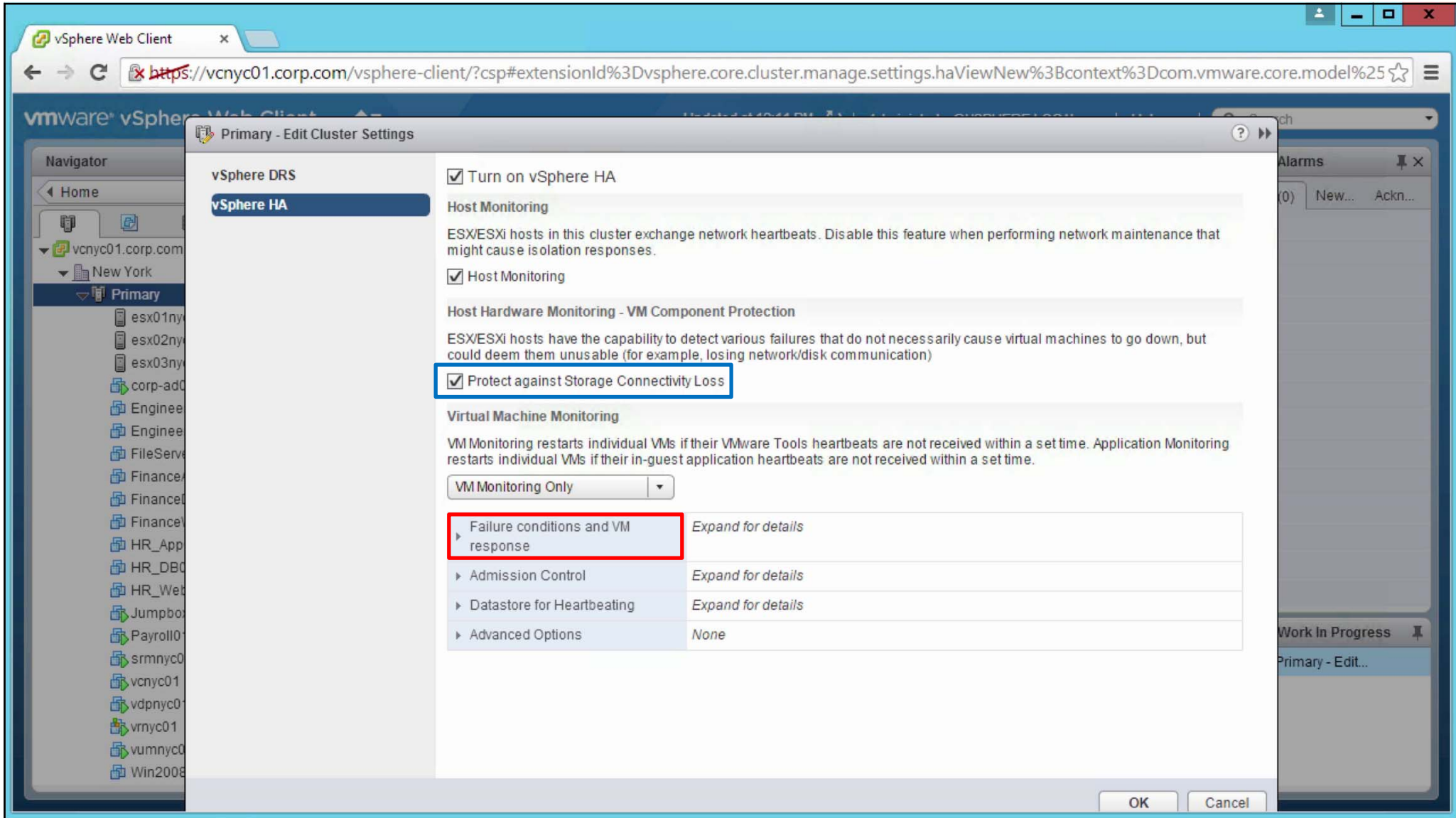
Cluster monitored failure conditions and responses

Failure	Response	Details
Host failure	Restart VMs	Restart VMs using VM restart p

Alarms

All (0) New... Ackn...

Work In Progress



vSphere DRS

vSphere HA

Turn on vSphere HA

Host Monitoring

ESX/ESXi hosts in this cluster exchange network heartbeats. Disable this feature when performing network maintenance that might cause isolation responses.

Host Monitoring

Host Hardware Monitoring - VM Component Protection

ESX/ESXi hosts have the capability to detect various failures that do not necessarily cause virtual machines to go down, but could deem them unusable (for example, losing network/disk communication)

Protect against Storage Connectivity Loss

Virtual Machine Monitoring

VM Monitoring restarts individual VMs if their VMware Tools heartbeats are not received within a set time. Application Monitoring restarts individual VMs if their in-guest application heartbeats are not received within a set time.

VM Monitoring Only

Failure conditions and VM response *Expand for details*

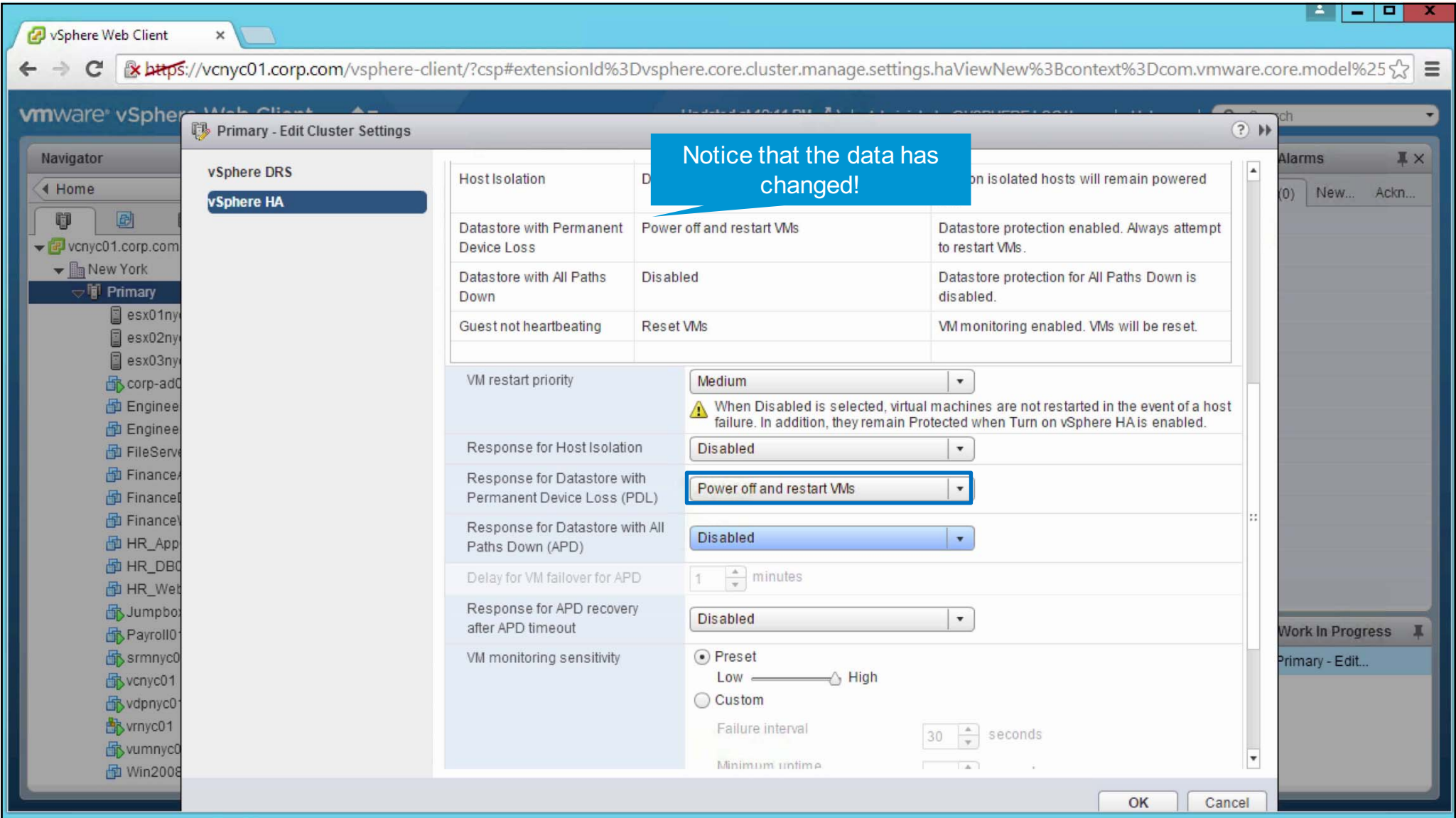
▶ Admission Control *Expand for details*

▶ Datastore for Heartbeating *Expand for details*

▶ Advanced Options *None*

OK

Cancel



Notice that the data has changed!

Host Isolation	Disabled	When a host is isolated, hosts will remain powered on.
Datastore with Permanent Device Loss	Power off and restart VMs	Datastore protection enabled. Always attempt to restart VMs.
Datastore with All Paths Down	Disabled	Datastore protection for All Paths Down is disabled.
Guest not heartbeating	Reset VMs	VM monitoring enabled. VMs will be reset.

VM restart priority:

⚠ When Disabled is selected, virtual machines are not restarted in the event of a host failure. In addition, they remain Protected when Turn on vSphere HA is enabled.

Response for Host Isolation:

Response for Datastore with Permanent Device Loss (PDL):

Response for Datastore with All Paths Down (APD):

Delay for VM failover for APD: minutes

Response for APD recovery after APD timeout:

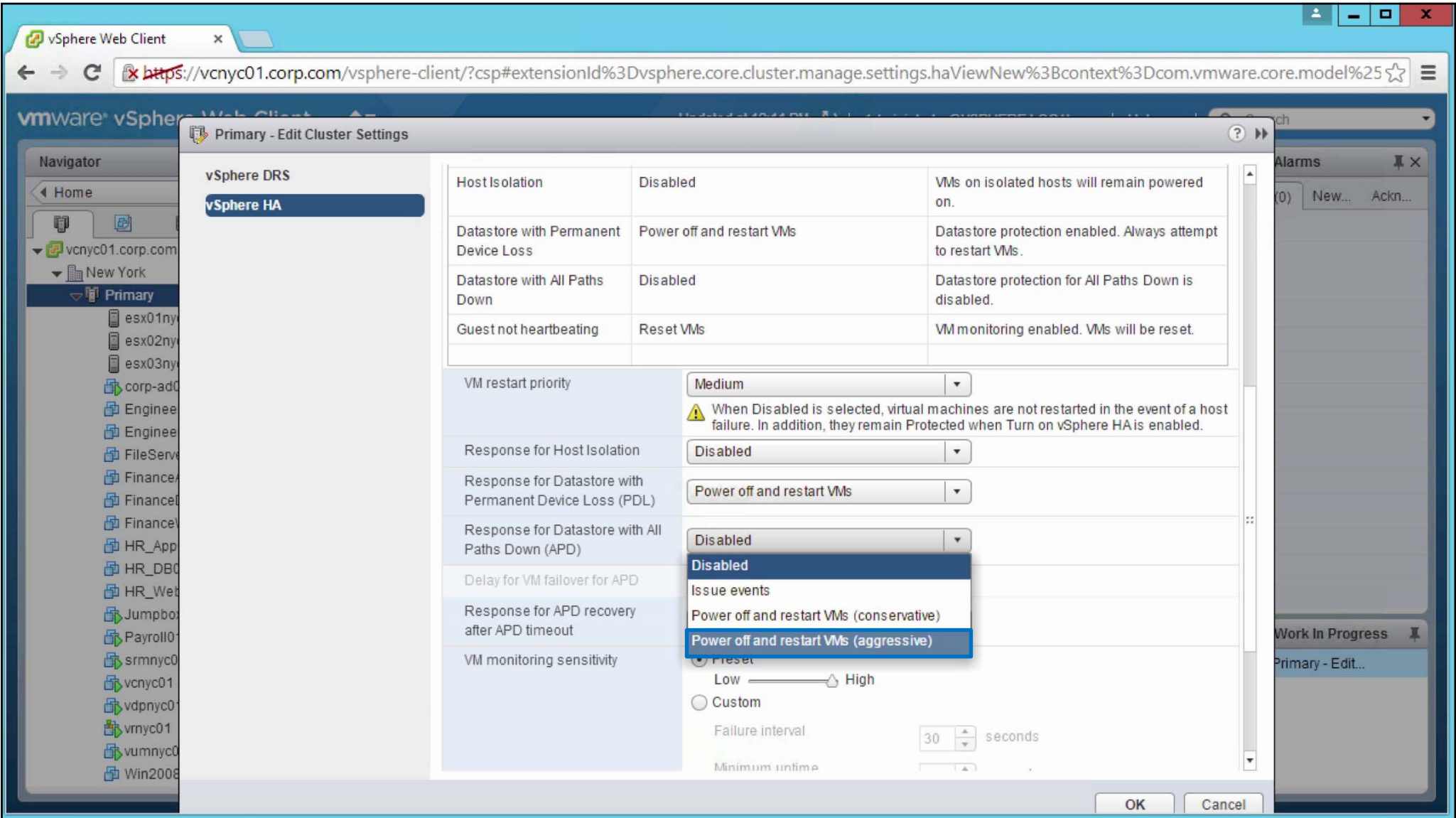
VM monitoring sensitivity: Preset Custom

Low

Failure interval: seconds

Minimum uptime:

OK Cancel



Primary - Edit Cluster Settings

vSphere DRS

vSphere HA

Host Isolation	Disabled	VMs on isolated hosts will remain powered on.
Datastore with Permanent Device Loss	Power off and restart VMs	Datastore protection enabled. Always attempt to restart VMs.
Datastore with All Paths Down	Disabled	Datastore protection for All Paths Down is disabled.
Guest not heartbeating	Reset VMs	VM monitoring enabled. VMs will be reset.

VM restart priority: Medium

⚠ When Disabled is selected, virtual machines are not restarted in the event of a host failure. In addition, they remain Protected when Turn on vSphere HA is enabled.

Response for Host Isolation: Disabled

Response for Datastore with Permanent Device Loss (PDL): Power off and restart VMs

Response for Datastore with All Paths Down (APD): Disabled

Delay for VM failover for APD: Disabled

Response for APD recovery after APD timeout: Power off and restart VMs (aggressive)

VM monitoring sensitivity: Preset

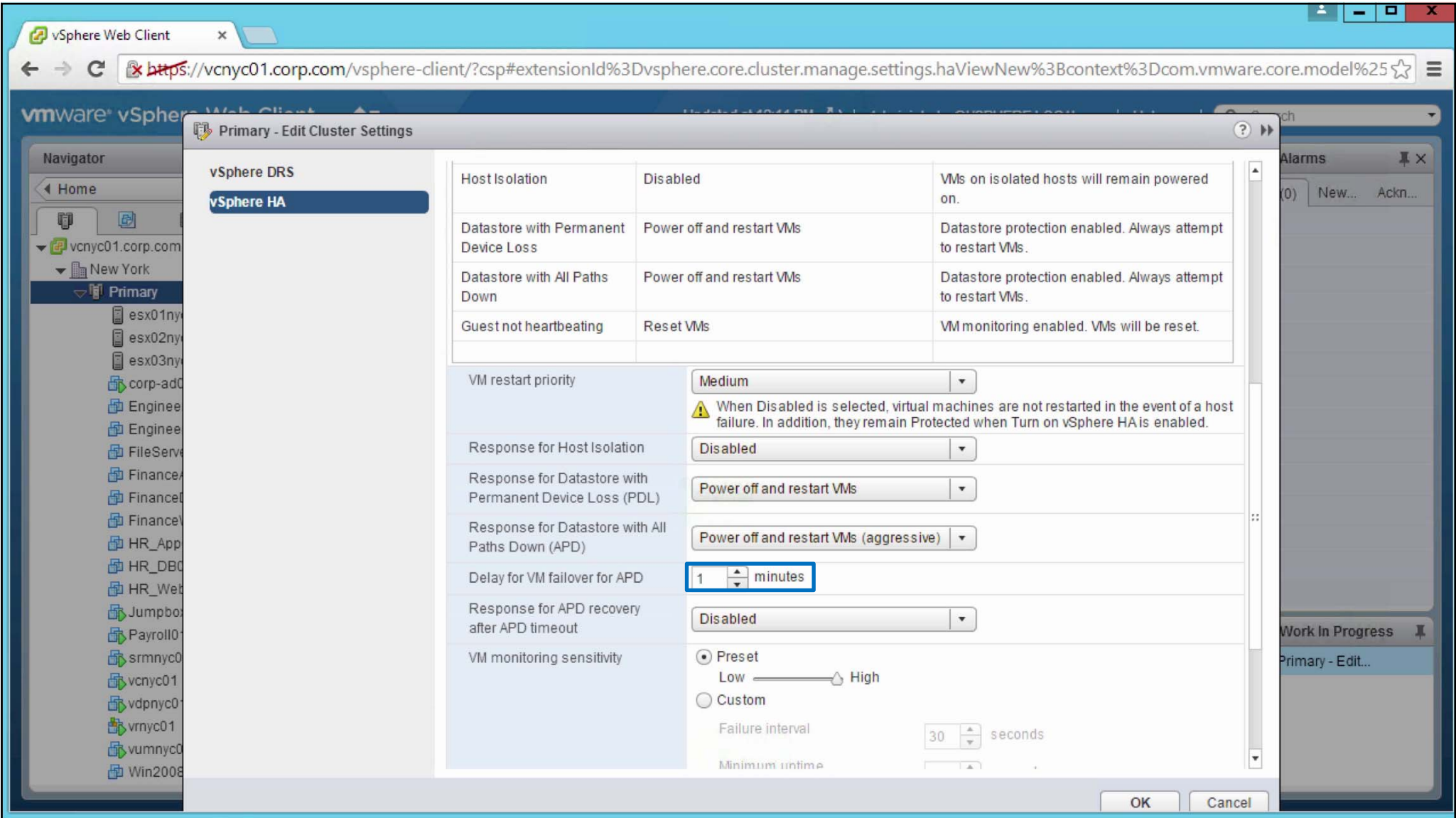
Low ————— High

Custom

Failure interval: 30 seconds

Minimum uptime: []

OK Cancel



Primary - Edit Cluster Settings

- vSphere DRS
- vSphere HA**

Host Isolation	Disabled	VMs on isolated hosts will remain powered on.
Datastore with Permanent Device Loss	Power off and restart VMs	Datastore protection enabled. Always attempt to restart VMs.
Datastore with All Paths Down	Power off and restart VMs	Datastore protection enabled. Always attempt to restart VMs.
Guest not heartbeating	Reset VMs	VM monitoring enabled. VMs will be reset.

VM restart priority:

⚠ When Disabled is selected, virtual machines are not restarted in the event of a host failure. In addition, they remain Protected when Turn on vSphere HA is enabled.

Response for Host Isolation:

Response for Datastore with Permanent Device Loss (PDL):

Response for Datastore with All Paths Down (APD):

Delay for VM failover for APD:

Response for APD recovery after APD timeout:

VM monitoring sensitivity: Preset

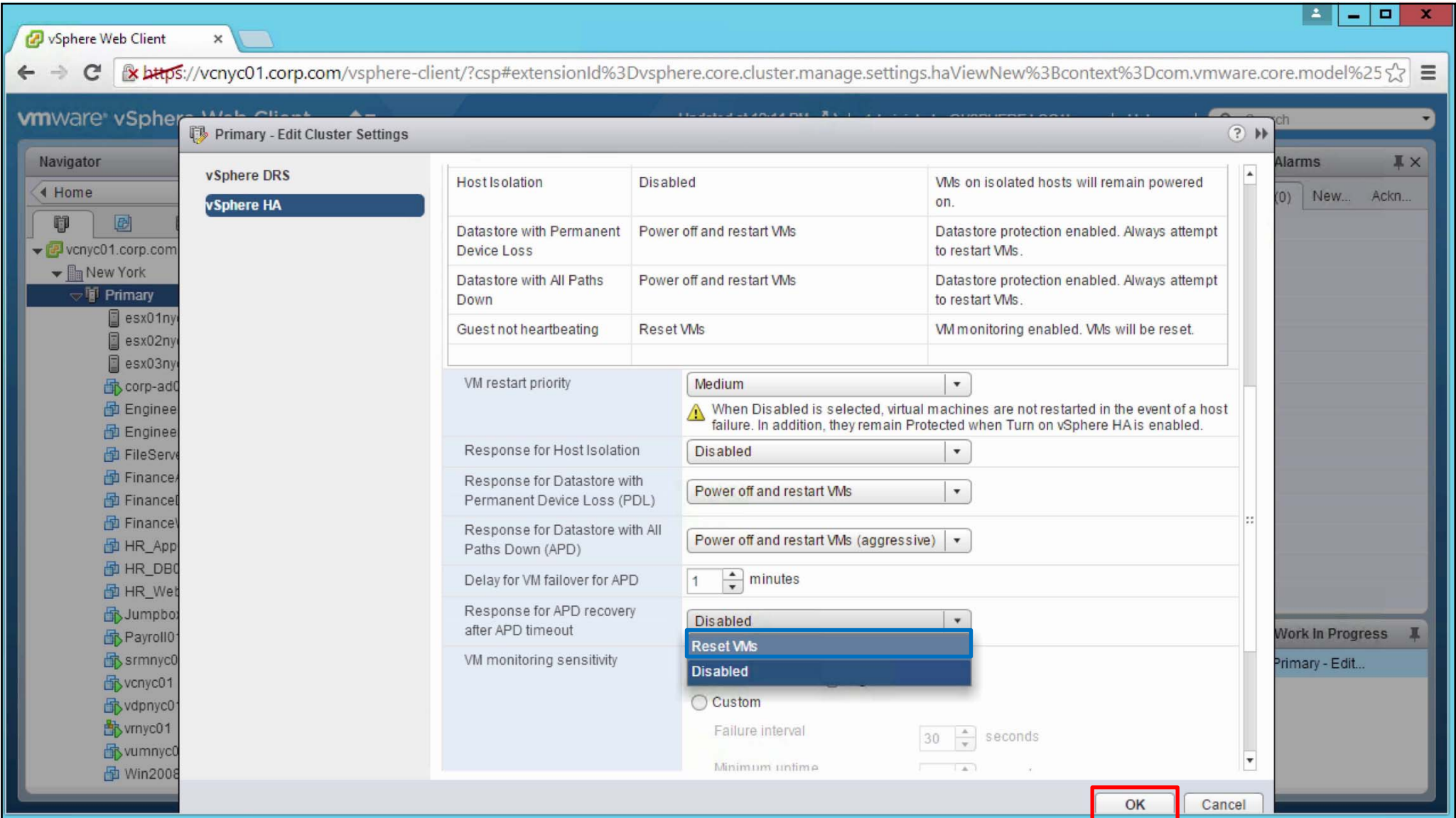
Low High

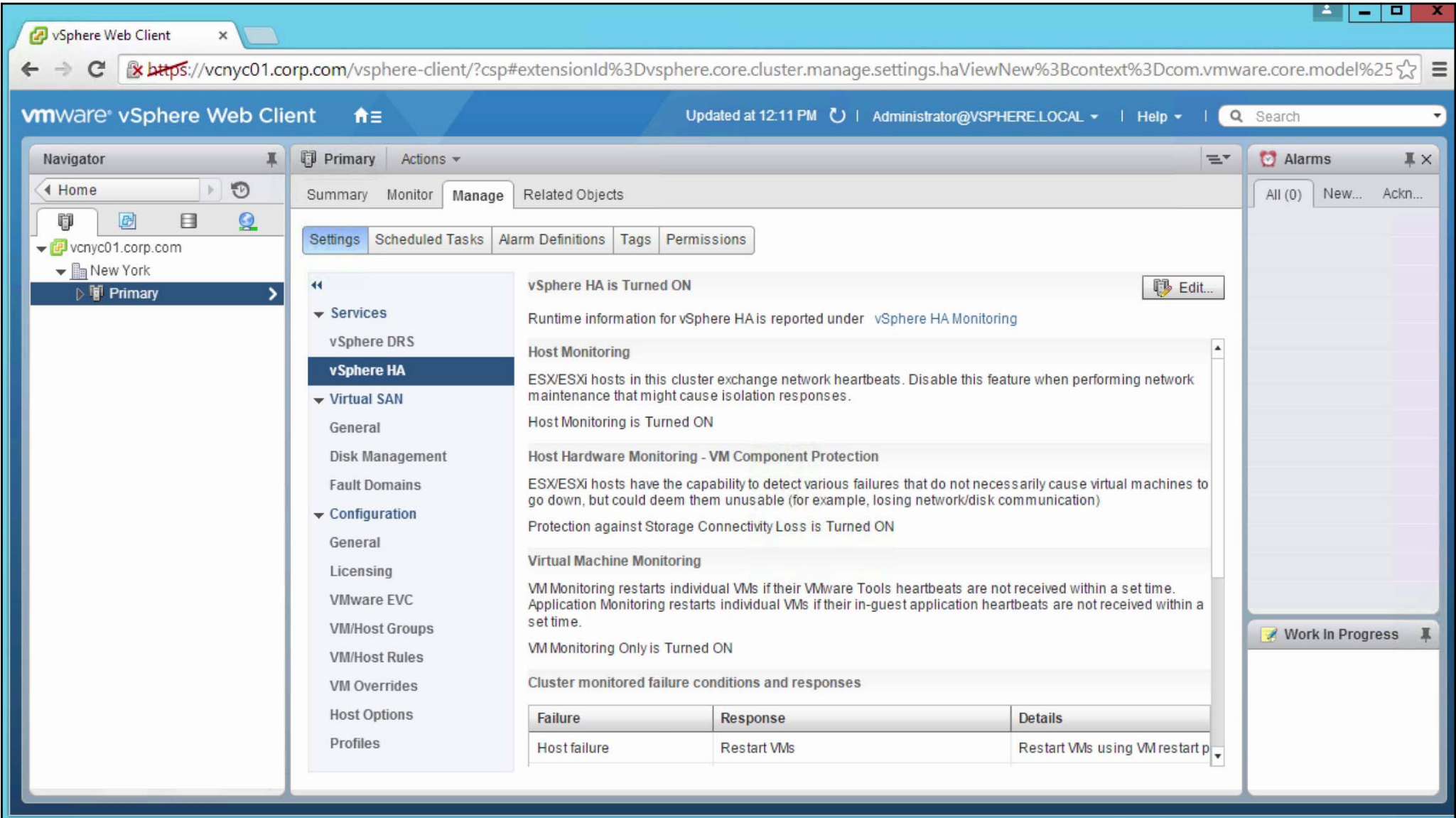
Custom

Failure interval:

Minimum uptime:

OK Cancel





vRAS

Admission Control Fling - vRAS

Upload file

1. Upload DRS Dump File:
(where are the DRS dump files)

Cluster Uploaded
upload different cluster

2. Select Hosts to simulate failure

Any Hosts Specific Hosts

Select hosts to simulate failure:

- DrmMidCpu2
- DrmMidCpu3
- DrmMidCpu4
- DrmMidCpu5

Start Simulation

➔

Estimate performance Impact

Predicted Impact on Virtual Machines

30 VMs total in cluster
6 VMs will fail to restart
18 VMs will have resource reduction
6 VMs will be minimally affected

Cluster Overview

15 hosts in cluster
13 simulated host failures
15 avg. # of compatible hosts @
15 avg. # of compatible hosts (no rules) @

30 VMs in cluster
6 total VMs failed to restart
6 non-agent VMs failed to restart @
0 agent VMs failed to restart @

Virtual Machine Resource Reduction Distribution

VM Group Details

Predicted Impact on Virtual Machines

30 VMs total in cluster
6 VMs will fail to restart
18 VMs will have resource reduction
6 VMs will be minimally affected

Virtual Machine Details

Name	Resource Allocation @	CPU Change	CPU Before	MEM Change	MEM Before
<input type="checkbox"/> PowerSlow219	30%	-1.8 GHz	2.0 GHz	-0.18 GB	0.35 GB
<input type="checkbox"/> PowerSlow214	30%	-1.8 GHz	2.0 GHz	-0.18 GB	0.35 GB
<input type="checkbox"/> PowerSlow216	31%	-1.6 GHz	1.8 GHz	-0.18 GB	0.35 GB
<input type="checkbox"/> PowerSlow26	31%	-1.5 GHz	1.7 GHz	-0.18 GB	0.35 GB
<input type="checkbox"/> PowerSlow215	31%	-1.5 GHz	1.7 GHz	-0.18 GB	0.35 GB
<input type="checkbox"/> PowerSlow222	32%	-1.1 GHz	1.3 GHz	-0.18 GB	0.35 GB
<input type="checkbox"/> PowerSlow22	32%	-1.1 GHz	1.4 GHz	-0.18 GB	0.35 GB
<input type="checkbox"/> PowerSlow229	33%	-1.1 GHz	1.3 GHz	-0.18 GB	0.35 GB
<input type="checkbox"/> PowerSlow217	33%	-1.1 GHz	1.4 GHz	-0.18 GB	0.35 GB
<input type="checkbox"/> PowerSlow228	35%	-0.8 GHz	1.0 GHz	-0.18 GB	0.35 GB
<input type="checkbox"/> PowerSlow213	35%	-0.8 GHz	1.0 GHz	-0.18 GB	0.35 GB



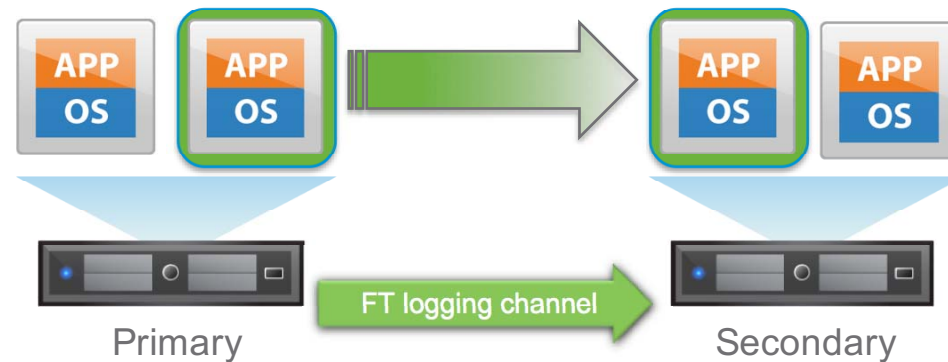
vSphere FT

Fault Tolerance

vmware®

Fault Tolerance Introduction

- Continuous Availability
 - Protect mission critical applications from a vSphere host failure
 - RPO=0 • RTO=0 • No loss of TCP connections
- Any OS • Any Application
 - No application-specific modification or configuration
 - Support for 90% of customer workloads
- Simple Configuration
 - Point-and-click or API

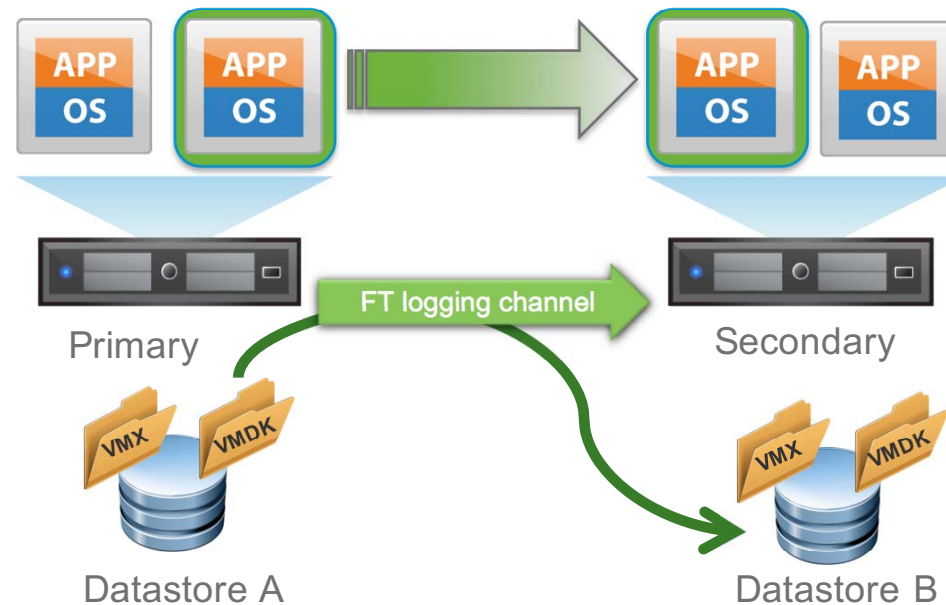


Two Technologies

- Legacy FT (deprecated)
 - Released with vSphere 4.0
 - Built on deterministic record/replay technology
 - Limited to only 1-vCPU
 - Shared VMDK files
- “New” FT
 - Released with vSphere 6.0
 - Built on a Fast Checkpointing technology
 - Support for up to 4 vCPUs and 64 GB Memory per VM
 - Maximum of either 8 vCPUs or 4 FT protected VMs per host
 - Redundant VMDKs

Redundant Storage

- Separate VMX and VMDK
- FT creates a second copy of VMDKs
 - Can be located on separate datastores for further fault domain isolation

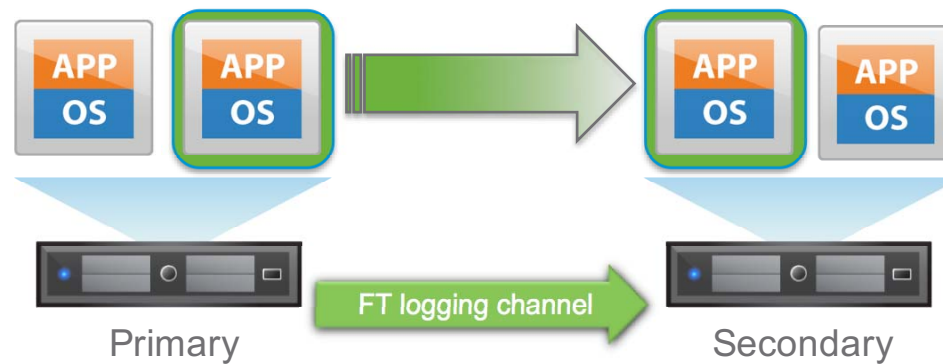


vSphere Fault Tolerance – Additional New Features

- Enhanced virtual disk format
 - Thin
 - Lazy Thick
 - Eager Zero Thick
- Ability to hot configure FT
- FT host compatibility
 - EVC Mode
 - vMotion compatibility = FT compatibility

Upgrading FT

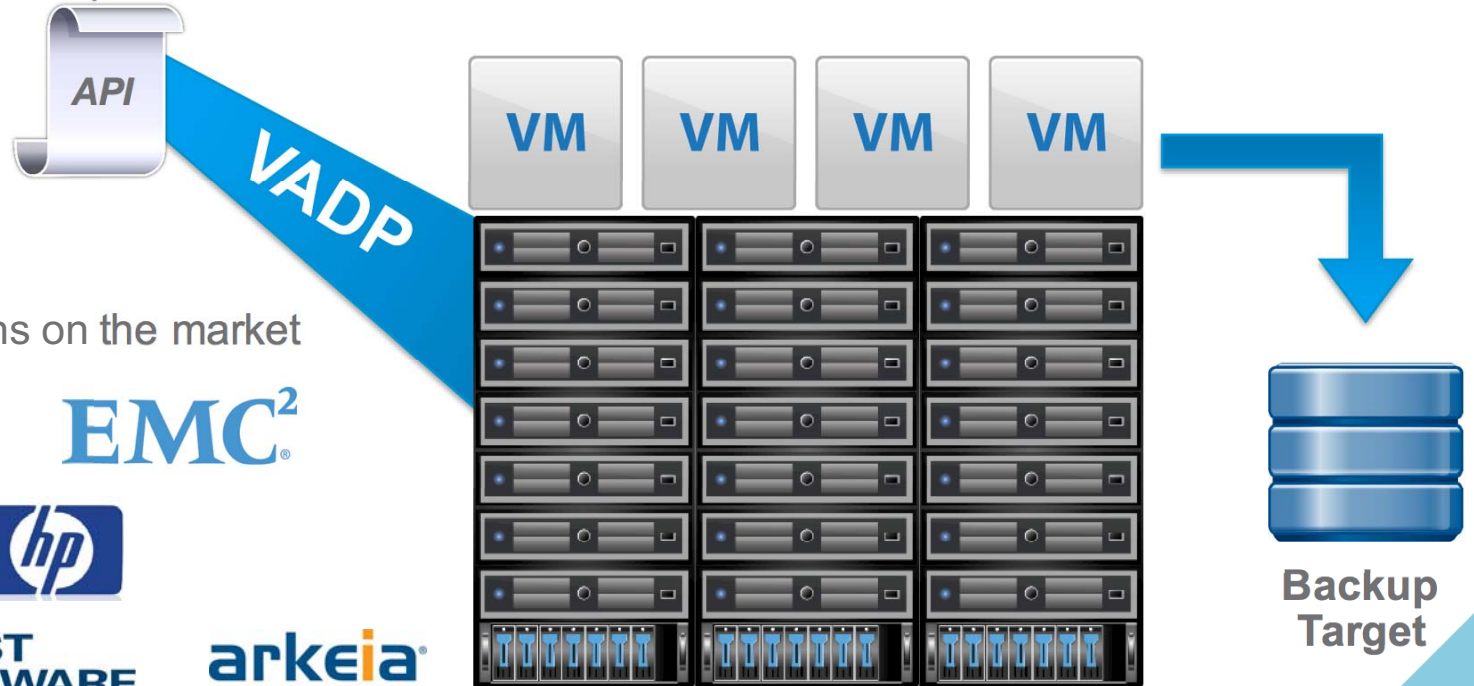
- Legacy FT still supported
 - Deprecated in vSphere 6.0
 - Can be forced using `vm.useLegacyFt=true` advanced setting (*UP VMs only*)
- Upgrade process
 - Upgrade primary and secondary to vSphere 6.0
 - Turn FT off | Turn FT on



NEW

Backing up FT VMs

- Support for vStorage APIs for Data Protection (VADP)
 - API for non-disruptive snapshots



- Many VADP solutions on the market



FT Capabilities by vSphere Version

Feature	Legacy FT (vSphere 5.5)	FT (vSphere 6.0)
vCPUs	1	4
Cluster Interoperability	Homogeneous	EVC Compatible
Hot Configure FT	×	✓
H/W Assisted MMU Virtualization	×	✓
VADP Backup (Snapshot)	×	✓
Paravirtual Devices	×	✓
Storage Redundancy	×	✓
Virtual Disks	EZT	Any
FT Logging Network	1 Gbps	10 Gbps

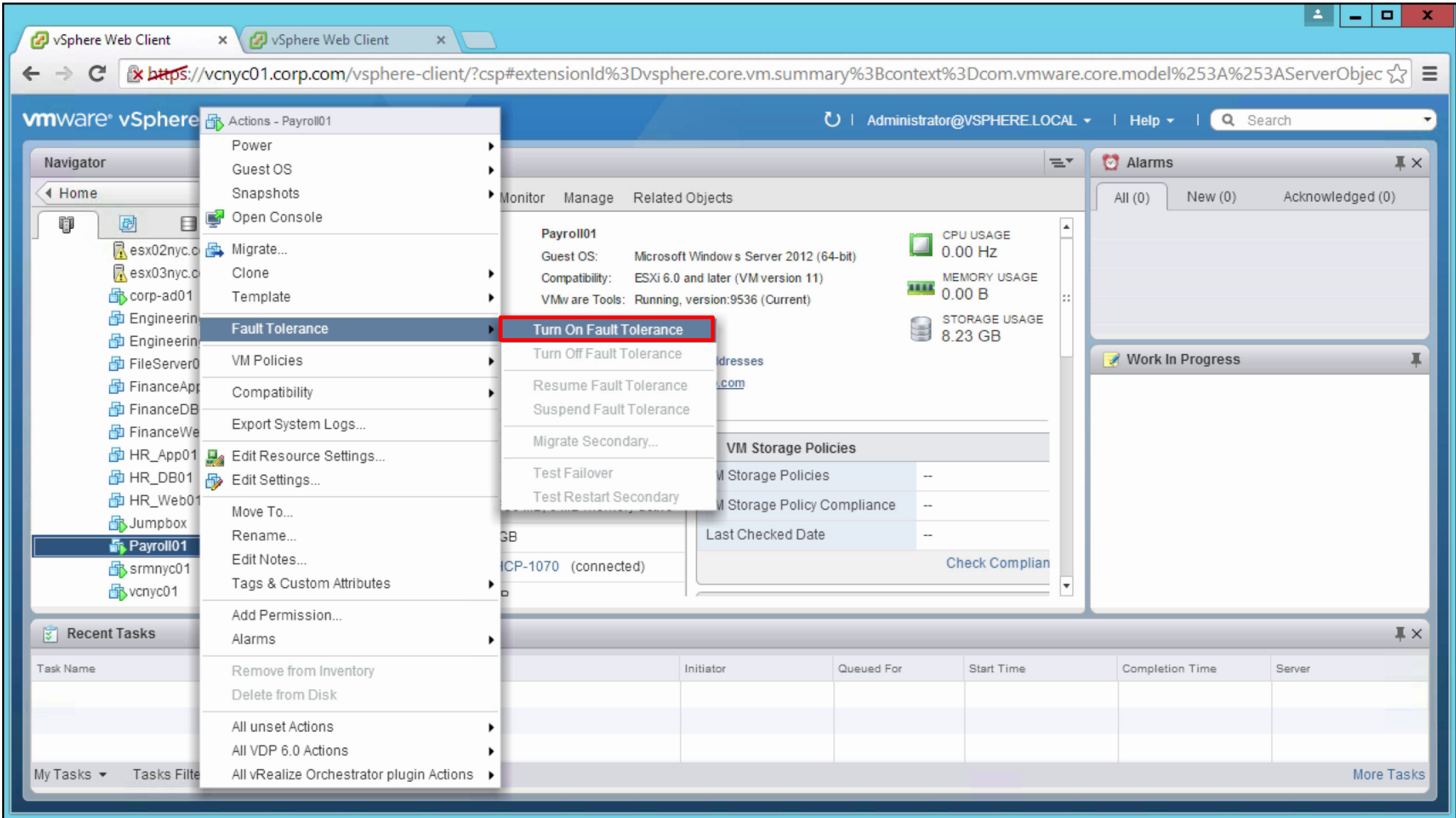
Feature	Legacy FT (vSphere 5.5)	FT (vSphere 6.0)
HA	✓	✓
DRS	Full	Partial
DPM	✓	✓
SRM	✓	×
VDS	✓	✓
Storage DRS	×	×
VCD	×	×
vSphere Replication	×	×
VSAN/VVols	×	×

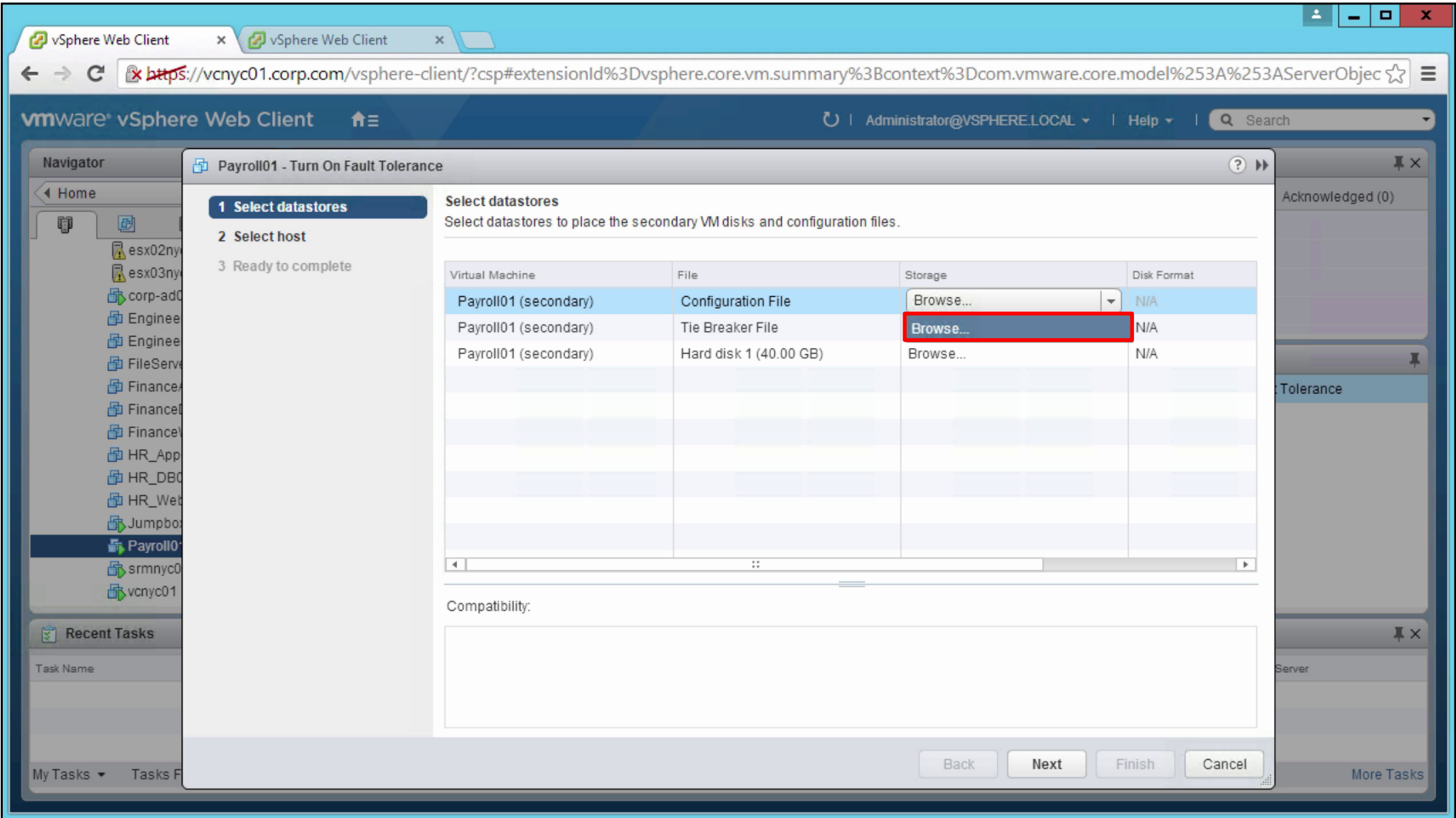
Demo

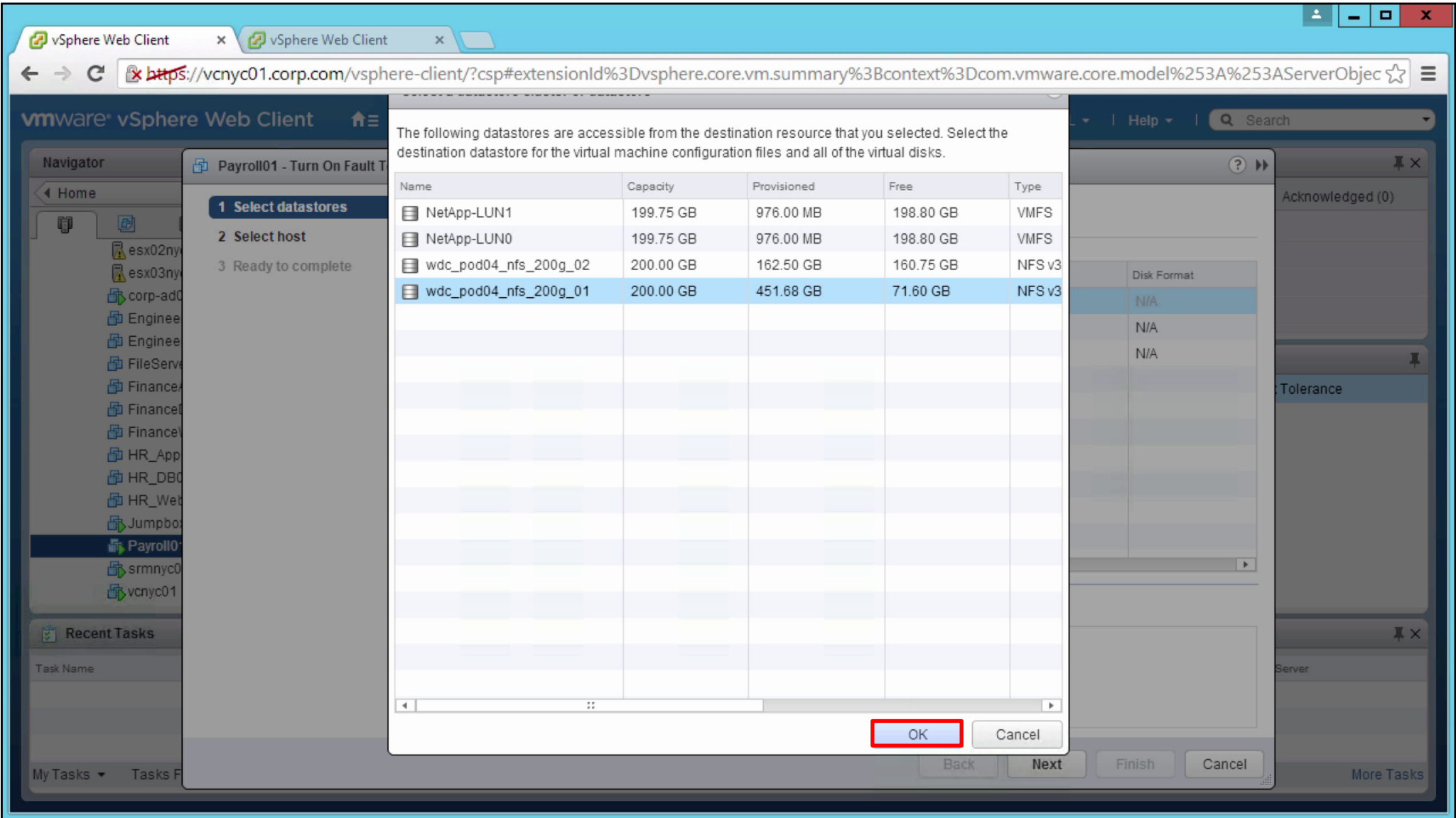
Configure FT

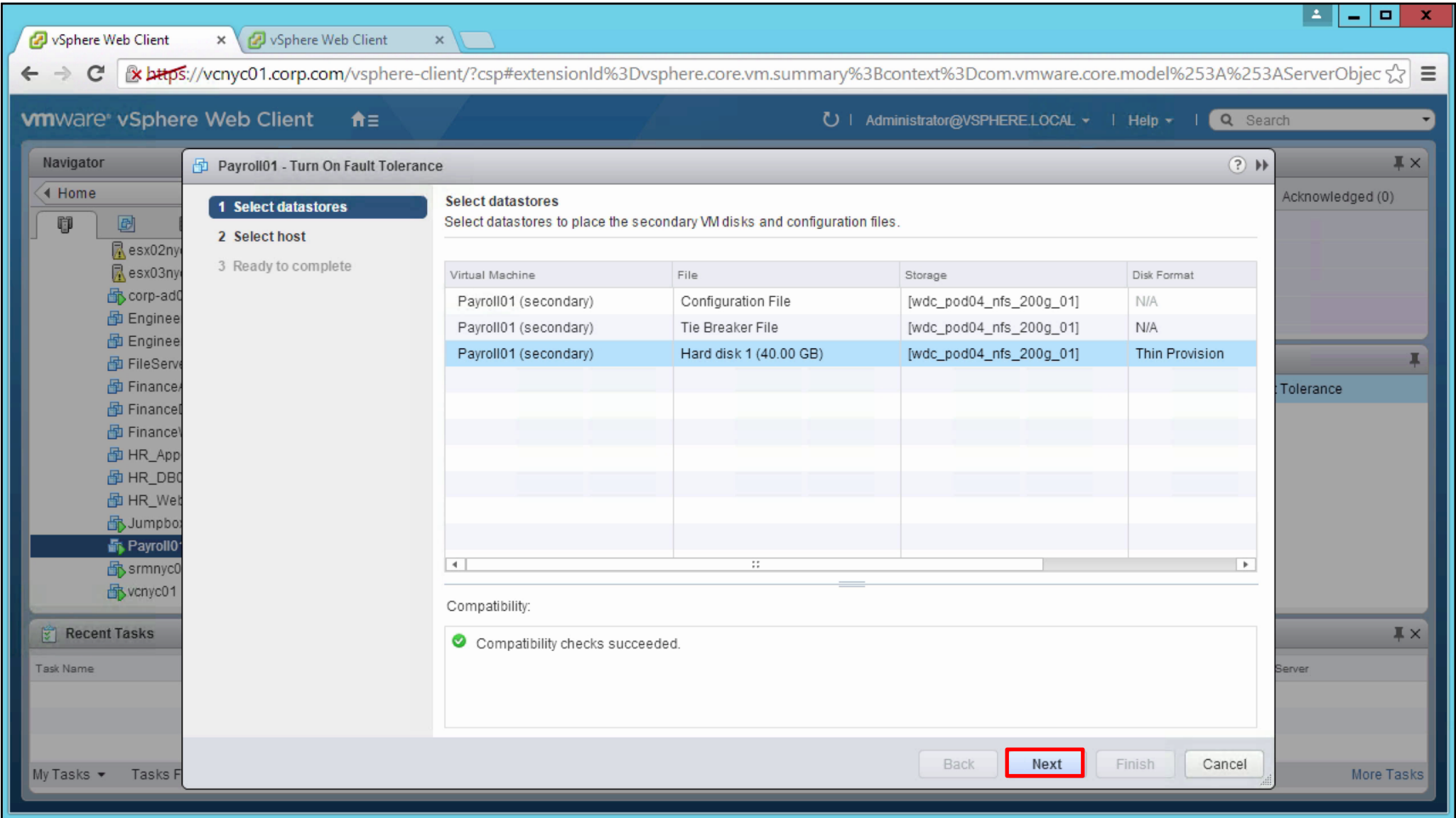
<http://featurewalkthrough.vmware.com>

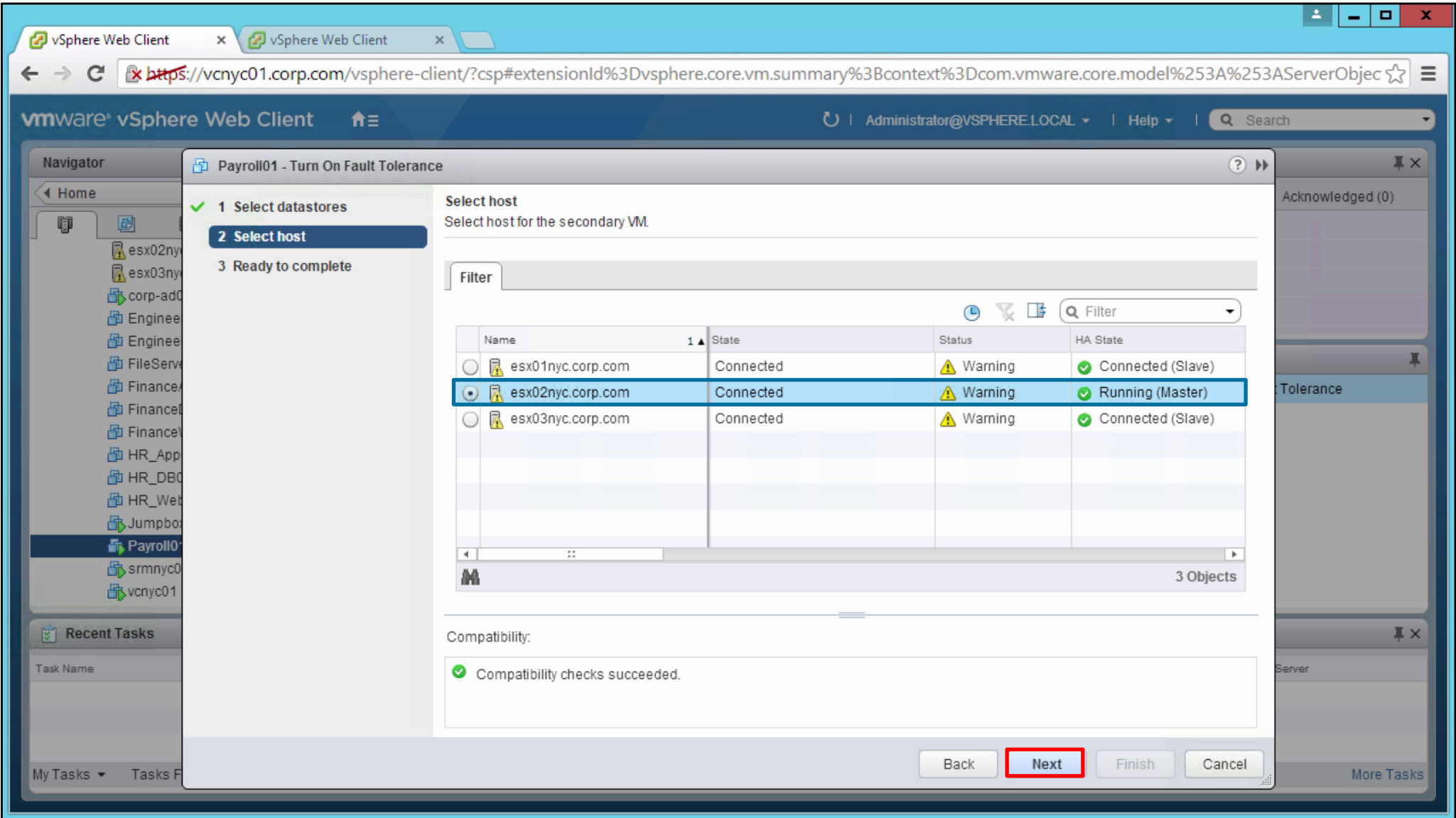
vmware®

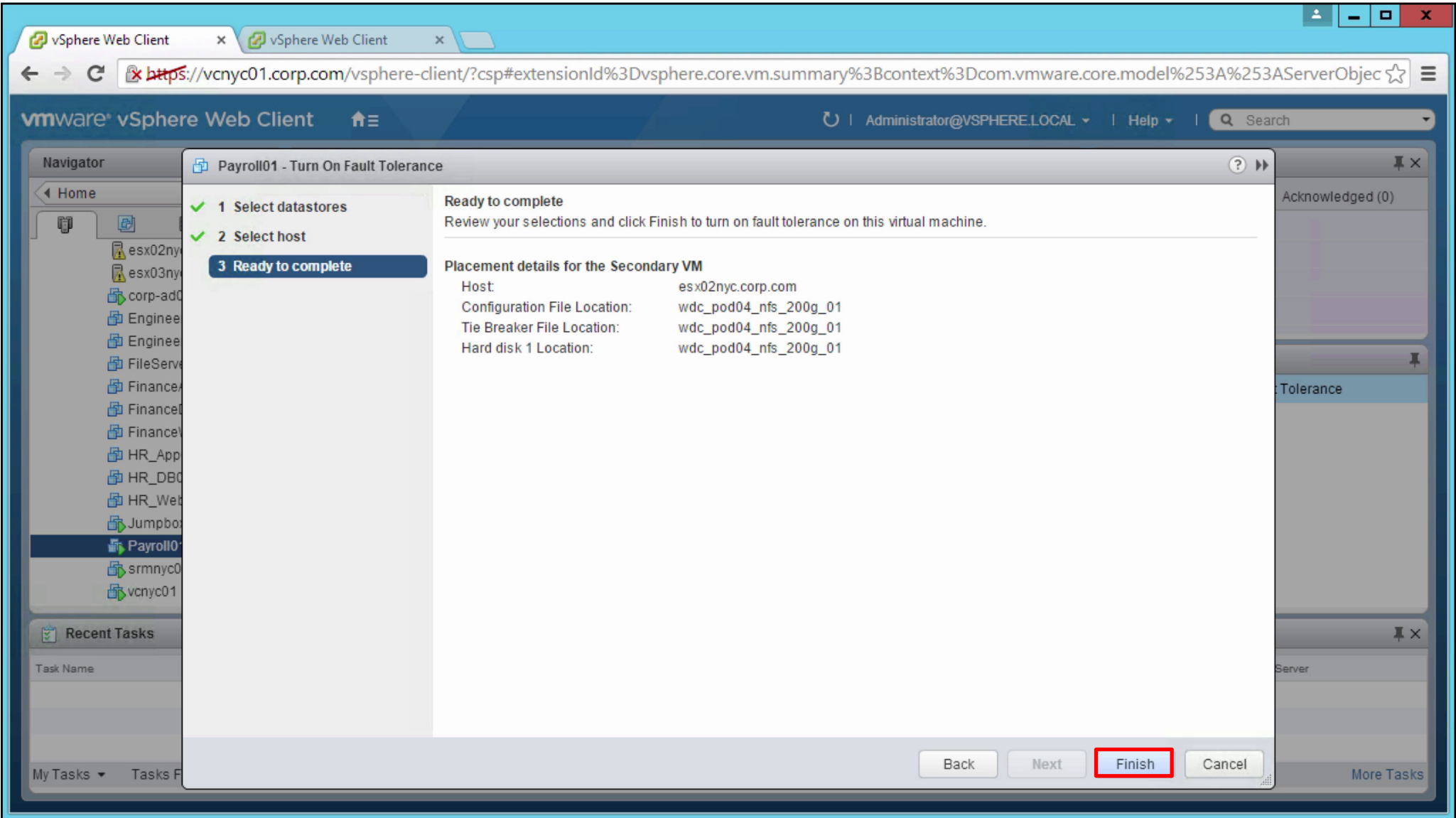












vsphere Web Client

Updated at 1:21 PM Administrator@VSPHERE.LOCAL

vcnyc01.corp.com/vsphere-client/?csp#extensionId%3Dvsphere.core.vm.summary%3Bcontext%3Dcom.vmware.core.model%253A%253AServerObjec

vmware® vSphere Web Client

Navigator

- vcnyc01.corp.com
 - New York
 - Primary
 - esx01nyc.corp.com
 - esx02nyc.corp.com
 - esx03nyc.corp.com
 - corp-ad01
 - EngineeringApp01
 - EngineeringDB01
 - FileServer01
 - FinanceApp01
 - FinanceDB01
 - FinanceWeb01
 - HR_App01
 - HR_DB01
 - HR_Web01

Payroll01

Summary

Powered On

Compatibility: ESX 6.0 and later (VM version 11)

VMware Tools: Running, version:9536 (Current)

DNS Name: Payroll01

IP Addresses: 10.144.107.42

Host: esx01nyc.corp.com

MEMORY USAGE: 0.00 B

STORAGE USAGE: 8.23 GB

Virtual machine Fault Tolerance state changed

VM Hardware

Fault Tolerance

Fault Tolerance status: **Not protected** Starting

Secondary VM location: esx02nyc.corp.com

Log bandwidth usage: N/A

VM Storage Policies

VM Storage Policies: --

VM Storage Policy Compliance: --

Last Checked Date: --

Check Compliant

Tags

Alarms

Primary

vSphere HA failover in progress

Payroll01

Virtual machine Fault Tolerance state changed

Work In Progress

Recent Tasks

Task Name	Target	Status	Initiator	Queued For	Start Time	Completion Time	Server
Turn On Fault Tolerance	Payroll01	Completed	VSPHERE.LOCAL\...	5 ms	1/15/2015 1:21:13 PM	1/15/2015 1:21:50 PM	vcnyc01.corp.com

My Tasks Tasks Filter More Tasks

vsphere Web Client

Updated at 1:26 PM | Administrator@VSPHERE.LOCAL | Help | Search

Navigator

- vcnyc01.corp.com
 - New York
 - Primary
 - esx01nyc.corp.com
 - esx02nyc.corp.com
 - esx03nyc.corp.com
 - corp-ad01
 - EngineeringApp01
 - EngineeringDB01
 - FileServer01
 - FinanceApp01
 - FinanceDB01
 - FinanceWeb01
 - HR_App01
 - HR_DB01
 - HR_Web01

Payroll01

Getting Started | **Summary** | Monitor | Manage | Related Objects

Powered On

Compatibility: ESXi 6.0 and later (VM version 11)
 VMWare Tools: Running, version:9536 (Current)
 DNS Name: Payroll01
 IP Addresses: 10.144.107.42
 Host: esx01nyc.corp.com

MEMORY USAGE: 0.00 B
 STORAGE USAGE: 8.23 GB

Launch Remote Console
 Download Remote Console

VM Hardware

Fault Tolerance

Fault Tolerance status	Protected
Secondary VM location	esx02nyc.corp.com
Log bandwidth usage	N/A

VM Storage Policies

VM Storage Policies	--
VM Storage Policy Compliance	--
Last Checked Date	--

Check Compliance

Tags

Assigned Tag	Category	Description

Alarms

All (0) | New (0) | Acknowledged (0)

Work In Progress

Recent Tasks

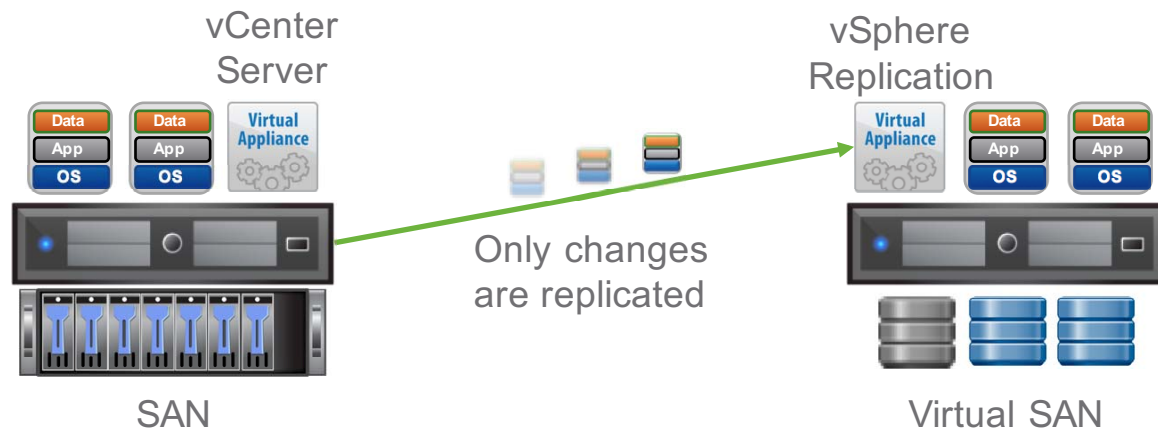
Task Name	Target	Status	Initiator	Queued For	Start Time	Completion Time	Server
Turn On Fault Tolerance	Payroll01	Completed	VSPHERE.LOCAL\...	5 ms	1/15/2015 1:21:13 PM	1/15/2015 1:21:50 PM	vcnyc01.corp.com

My Tasks | Tasks Filter | More Tasks

vSphere Replication

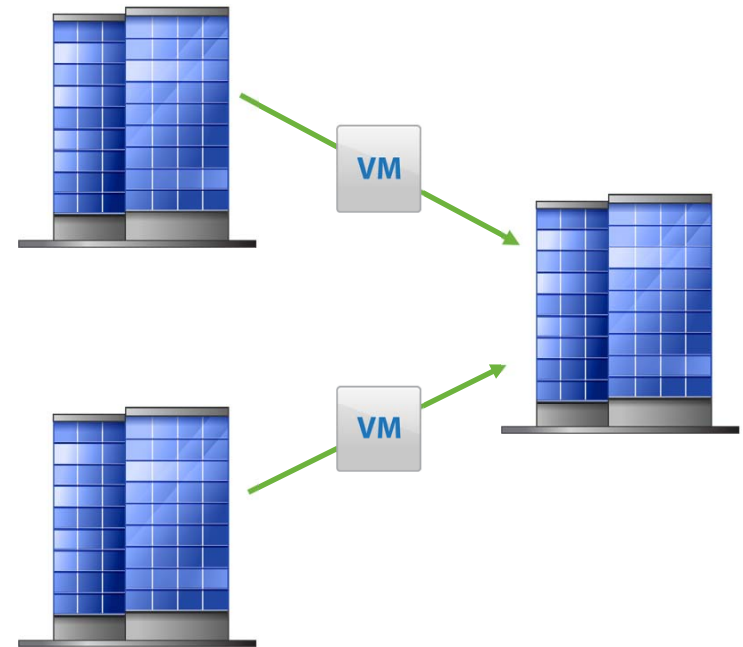
vSphere Replication Overview

- Per-VM, host-based replication
- Network-efficient by replicating only changed data
- Included with vSphere Essentials Plus and higher editions



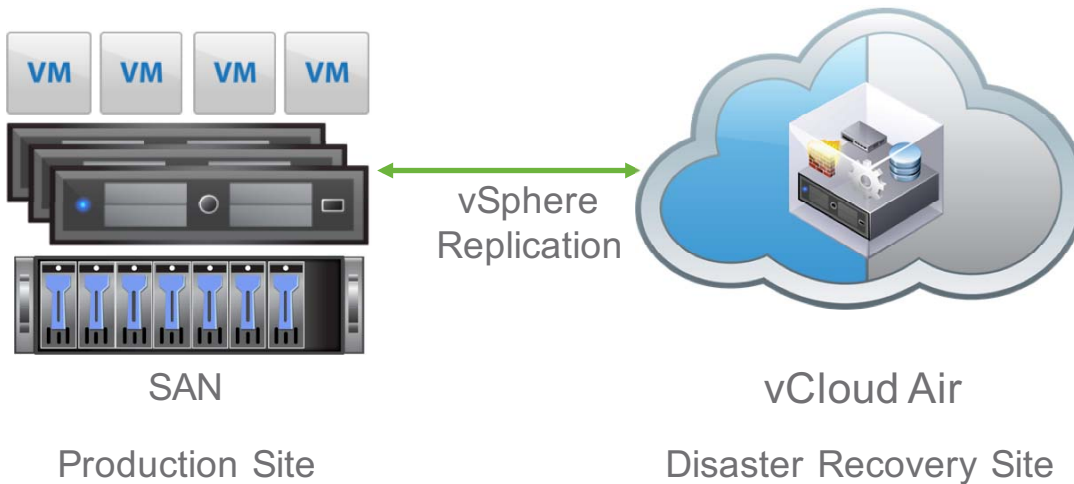
vSphere Replication Overview

- Typical use cases:
 - Data protection
 - Disaster avoidance and recovery
 - Data center migration
 - Within the same site, across sites
 - Remote office / branch office



vSphere Replication Overview

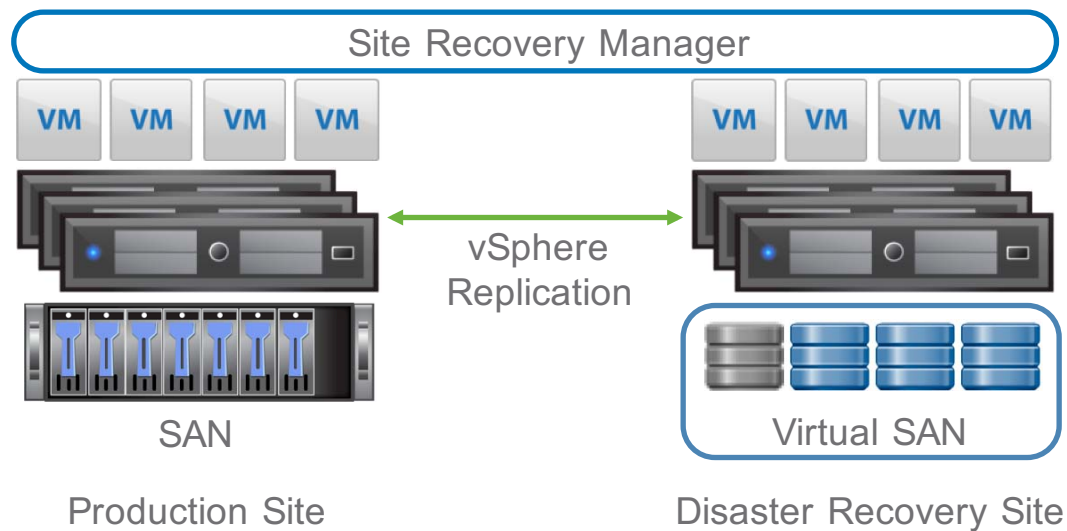
- Replication engine for vCloud Air Disaster Recovery



- Self-service
- Easy deployment
- Flexible RPO
- Test recovery
- Dependable failover

vSphere Replication Overview

- Replication engine for vCenter Site Recovery Manager (SRM)



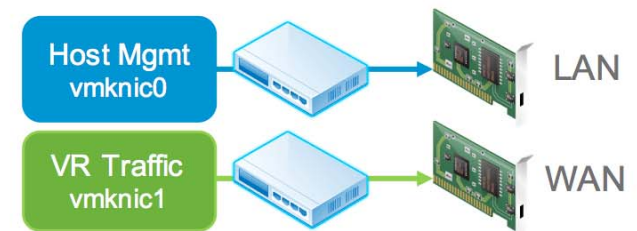
- Orchestration
- Fail-over, fail-back
- IP address changes
- Non-disruptive tests
- History reports

vSphere 6.0 – VMware vSphere Replication

- End-to-end network compression
 - Further reduces bandwidth requirements



- Network traffic isolation
 - Controls bandwidth, improves performance and security

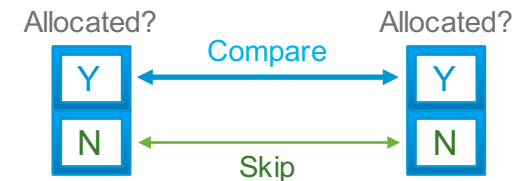


- Linux file system quiescing
 - Increased reliability when recovering Linux VMs

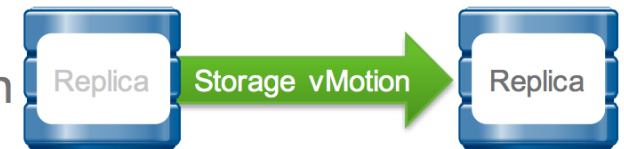


vSphere 6.0 – VMware vSphere Replication

- Faster full sync
 - Improves performance, reduces bandwidth consumption



- Move replicas without full sync
 - Balance storage utilization while avoiding RPO violation



- Virtual appliances run SLES 11 SP3, supports IPv6
 - Improved security and compatibility



vSphere Data Protection

vmware®

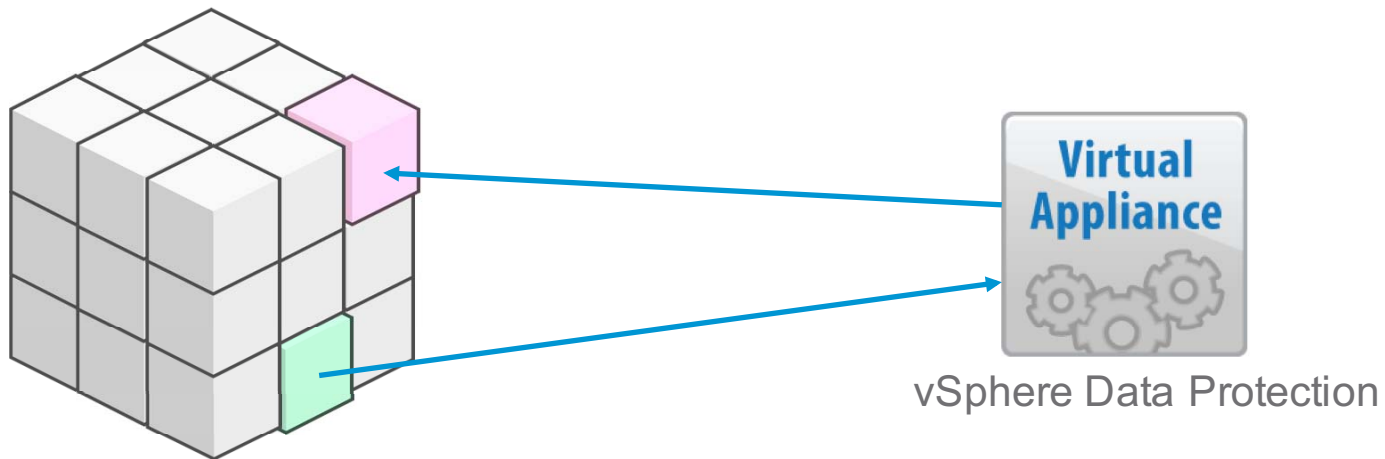
vSphere Data Protection Overview

- Data protection for VMs and applications
 - Agent-less VM backup and restore
 - Agents for SQL Server, Exchange, SharePoint
 - Browser-based file level restore (FLR)
- Included with vSphere Essentials Plus Kit and higher
- Simple virtual appliance deployment
- Managed with vSphere Web Client












vSphere Data Protection Overview

- Agent-less VM backup and restore means easier deployment, less complexity
- Changed Block Tracking (CBT) for backup and restore
 - Minimizes backup window requirements and data transfer
 - First backup is full, subsequent backups are synthetic full



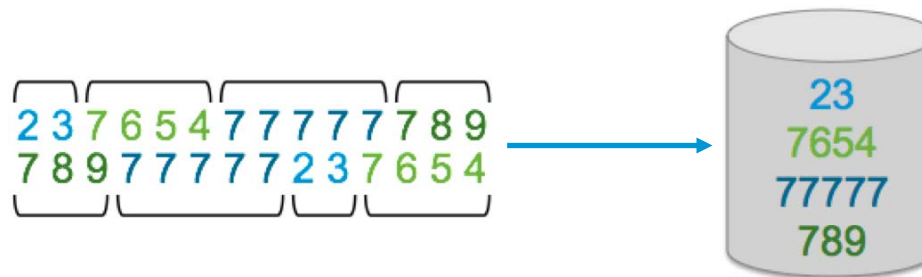
vSphere Data Protection Overview

- Application Agents
 - SQL Server
 - Exchange
 - SharePoint
- Backup and restore individual databases
- Restore Exchange mailboxes
- Application-consistency

- ▶  Microsoft SQL Server
- ▶  Microsoft SQL Failover Cluster
- ▼  Microsoft SQL AlwaysOn Cluster
 - ▼  aaglistener.vmware.local
 - ▼  aaglistener\sqlserveraag
 -  Customers
 -  Products
- ▶  Microsoft Exchange Server
- ▶  Microsoft Exchange DAG Cluster

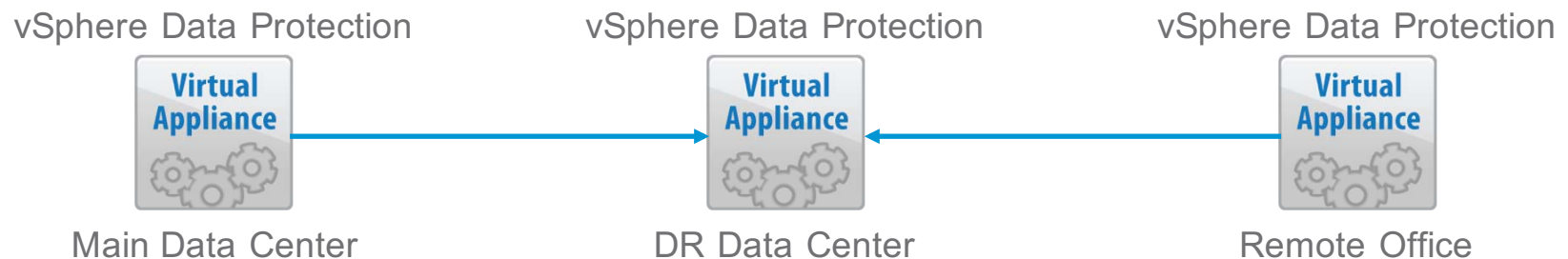
vSphere Data Protection Overview

- Powered by EMC
- Avamar deduplication
 - Variable-length segment deduplication minimizes backup storage consumption
 - Deduplication across all backup data in VDP appliance
 - Typically, 50% to 90% deduplication efficiency*



vSphere Data Protection Overview

- Backup data replication for offsite recovery
- Reliable, secure, efficient transfer of backup data between appliances
 - Data is deduplicated and compressed before replication
 - Only unique data segments are replicated
 - Replicated data is encrypted for security



vSphere Data Protection Overview

- Integration with an EMC Data Domain system
- Utilizes EMC Data Domain Boost to help reduce bandwidth consumption
- Increased capacity, backup data deduplication and compression
- Backup data copy between Data Domain systems

vSphere Data Protection



EMC Data Domain System

Space Usage	
Total Pre-Compression	2132.7 GiB
Total Post-Compression	127.0 GiB
Total Compression (Reduction)	16.8x (94.0%)

vSphere Data Protection Overview

- Typical use cases:
 - Small to medium sized environments
 - Remote office deployments
- 160-200 “average” VMs per 8TB VDP appliance
 - Average VM: 60GB actual data, 5% daily data change rate, 30-day retention
 - Sizing guideline assuming averages above: 20 to 25 VMs per 1TB VDP capacity
 - Longer retention, types of data, etc. will affect actual results
- Up to 20 VDP appliances supported per vCenter Server environment



Call to Action!

- High Availability (HA)
 - Enable HA - Even if you disable admission control
 - Can be used to protect vCenter
- Fault Tolerance (FT)
 - Kick the tires - Hot enable, hot disable
 - Understand its limits
 - Can be used to protect vCenter
- vSphere Replication (VR)
 - DR when cost is a big constraint
- vSphere Data Protection (VDP)
 - There is no reason to not have backups anymore

Additional Resources

- Product Walkthrough Site
 - <http://featurewalkthrough.vmware.com>
- VMCP
 - <http://blogs.vmware.com/vsphere/2015/06/vm-component-protection-vmcp.html>
- vCenter Availability Guide
 - <http://blogs.vmware.com/vsphere/2015/05/vcenter-server-6-0-availability-guide.html>
- Blogs
 - <http://blogs.vmware.com/vSphere>
- Product Documentation
 - <http://www.vmware.com/support/pubs>

Thank You!

Cloud Platform Technical Marketing
<http://blogs.vmware.com/vsphere>

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