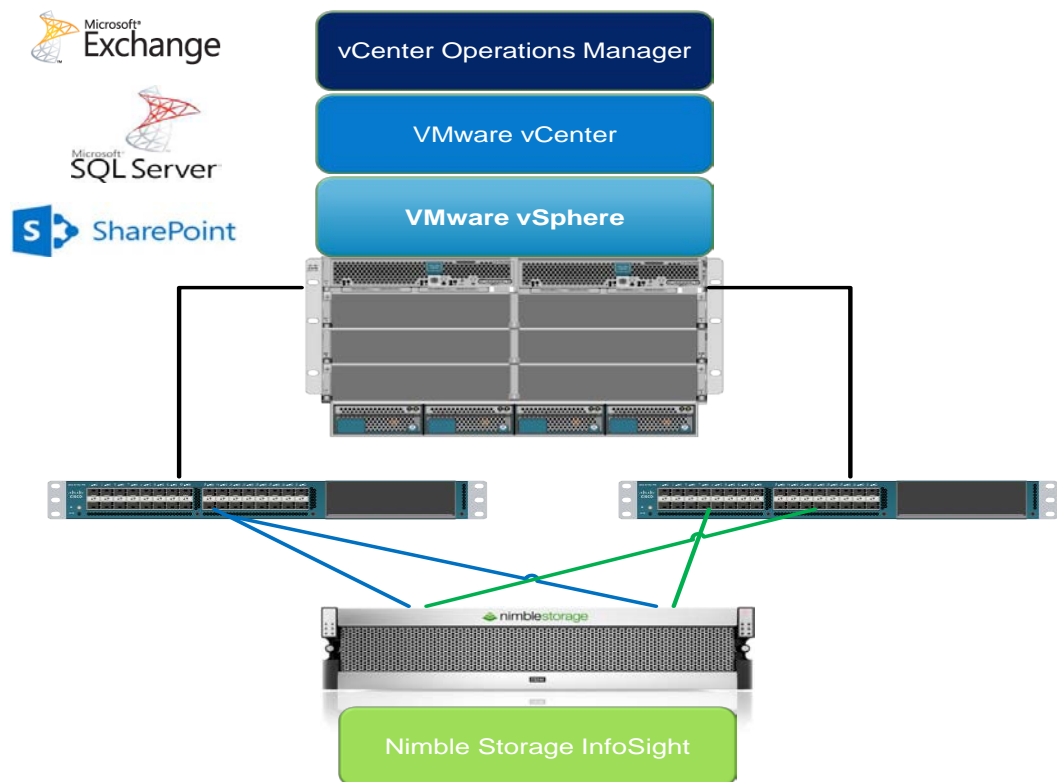




REFERENCE ARCHITECTURE

# Virtualizing Business Critical Applications on SmartStack™

Wen Yu, Nimble Storage Alex Fontana, VMware



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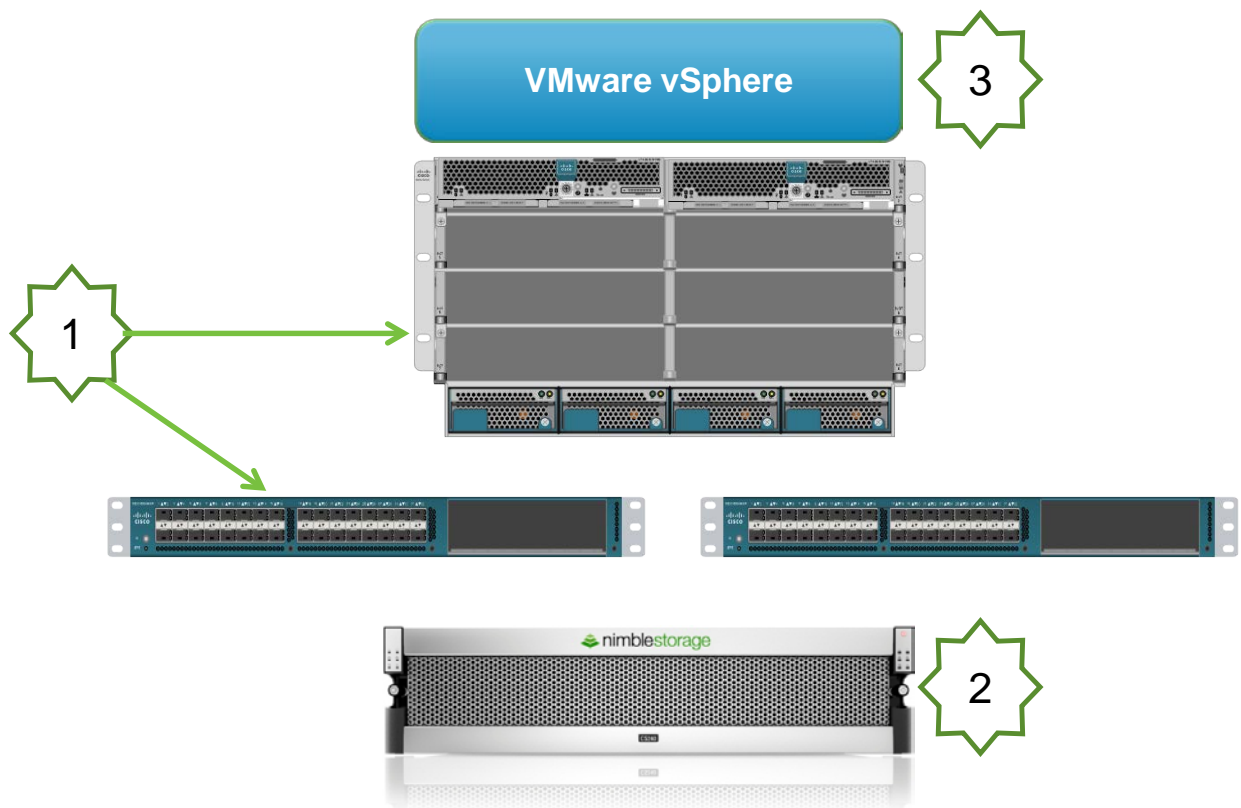
## Preface About This Reference Architecture Guide

This document will highlight design best practices for virtualizing business-critical applications on SmartStack, and showcase what was validated jointly by VMware, Cisco, and Nimble Storage. If you want to learn more about Nimble SmartStack, please contact your sales rep or visit this website for links to more resources:

<http://www.nimblestorage.com/resources/SmartStack.php>

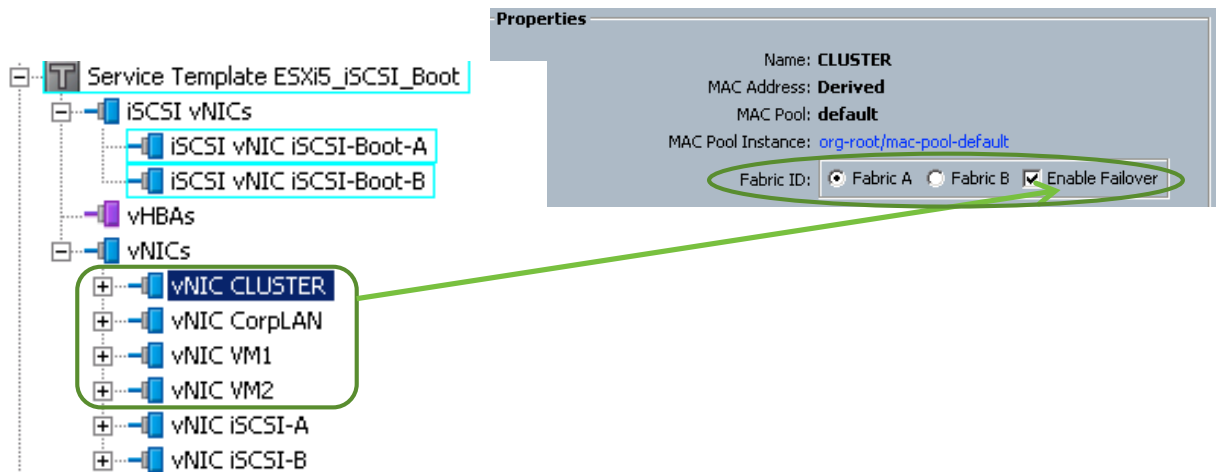
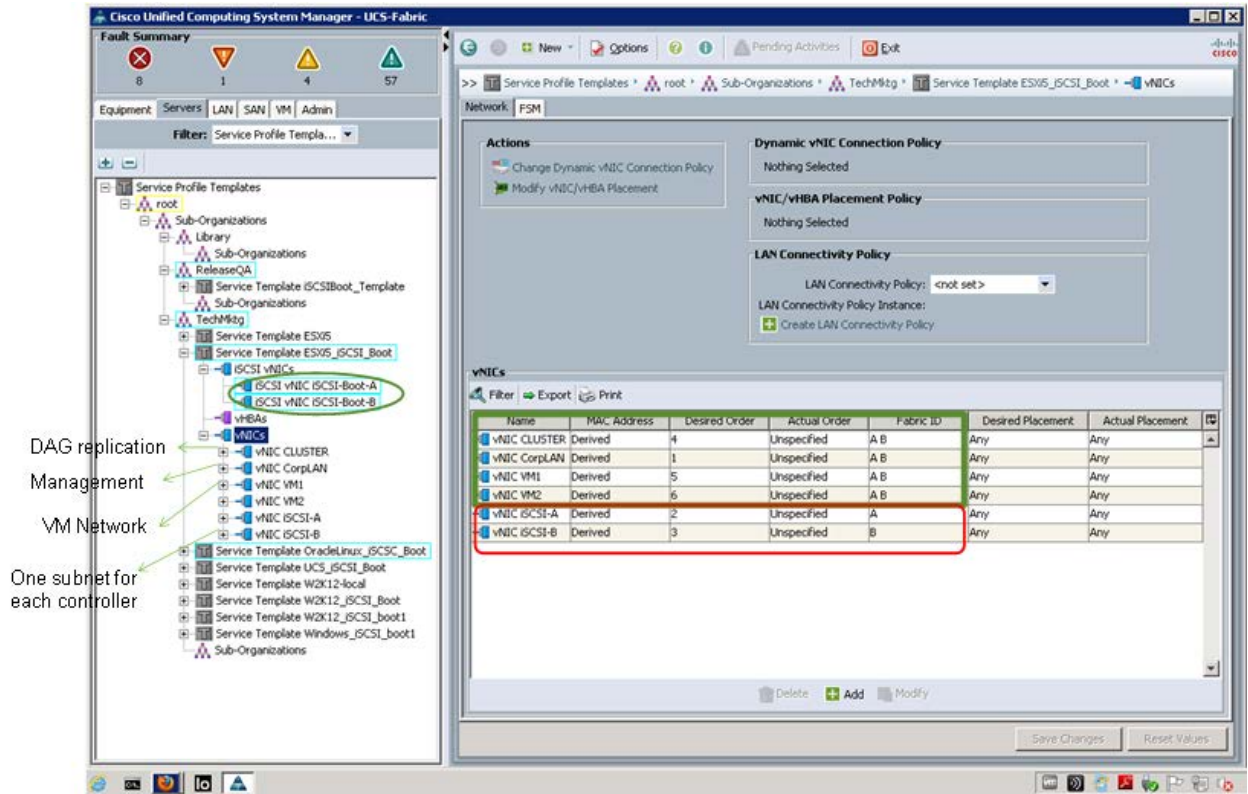
## Chapter 1 Availability

When you virtualize business critical applications, you want to ensure the entire infrastructure has no single point of failure, for both hardware and software, across all layers (compute, network, storage, VM and applications). Here is a list of design considerations:



### 1. UCS

- Cisco UCS blade chassis has redundancy for all components
- Two UCS blade servers in case one of them fails
- Dual UCS Fabric Interconnect configured as a cluster
- UCS fabric NIC failover is used for management and virtual machine traffic



## 2. Storage

- Nimble Storage CS-series array has redundancy for all components
- All volumes provisioned use SATP\_ALUA & PSP\_RR for path failover and load distribution

View: **Datstores** Devices

**Datstores**

Identification	Status	Device	Drive Type	Capacity	Free	Type	Last Update	Alarm Actions
bizappsq08db	Normal	Nimble iSCSI Disk	Non-SSD	100.75 GB	97.47 GB	VMFS5	7/29/2013 5:14:23 PM	Enabled

**Datstore Details**

**ExchangeDB**  
 Location: /vmfs/volumes/...  
 Hardware Acceleration:  
[Refresh Storage Capabilities](#)  
 System Storage Capabilities  
 User-defined Storage Capabilities

**Path Selection**  
 Round Robin (VMware)

**Paths**  
 Total: 2  
 Broken: 0  
 Disabled: 0

**ExchangeDB Manage Paths**

Policy  
 Path Selection: Round Robin (VMware) Change  
 Storage Array Type: VMW\_SATP\_ALUA

Runtime Name	Target	LUN	Status	Preferred
vmhba32:C0:T7:L0	iqn.2007-11.com.nimblestorage:exchangedb-v18609ac9...	0	Active (I/O)	
vmhba32:C1:T7:L0	iqn.2007-11.com.nimblestorage:exchangedb-v18609ac9...	0	Active (I/O)	

Refresh

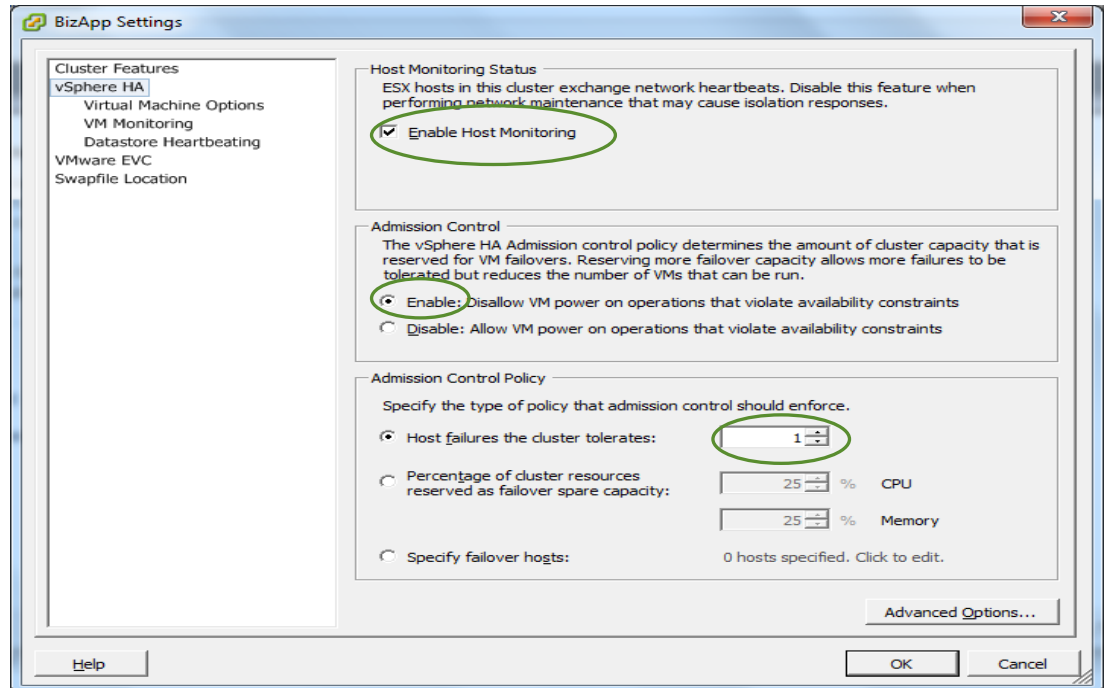
Name: iqn.2013-03.com.ucs:host:15-00023d000001,iqn.2007-11.com.nimblestorage:exchangedb-v18609ac9edd6a7e6.000...  
 Runtime Name: vmhba32:C0:T7:L0

**iSCSI**  
 Adapter: iqn.2013-03.com.ucs:host:15  
 iSCSI Alias:  
 Target: iqn.2007-11.com.nimblestorage:exchangedb-v18609ac9edd6a7e6.0000000e.f5b63d2f  
 172.18.127.103:3260

Close Help

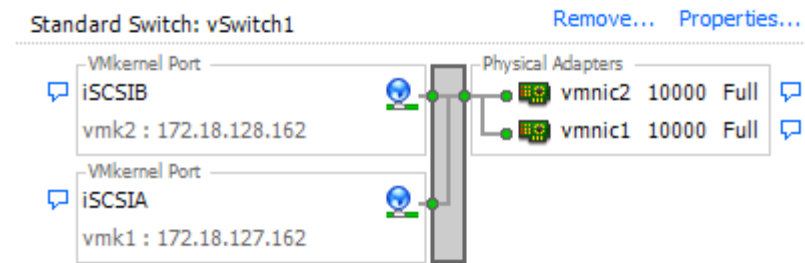
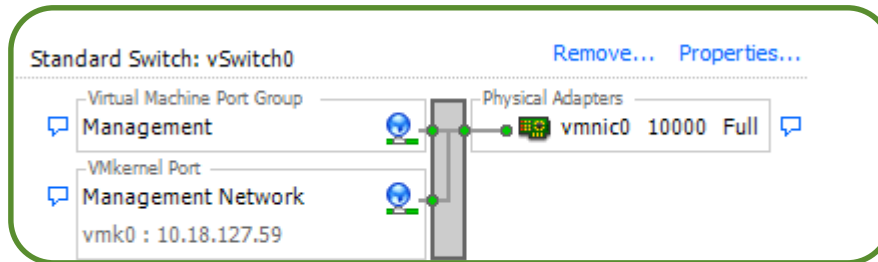
### 3. vSphere

- a. vSphere HA enabled to auto restart VMs in case ESXi server fails
  - i. Host monitoring is enabled to monitor heartbeat of all ESXi hosts in the cluster
  - ii. Admission control is enabled to ensure the cluster has enough resources to accommodate a single host failure
  - iii. N+1 configuration to tolerate for one ESXi host failure

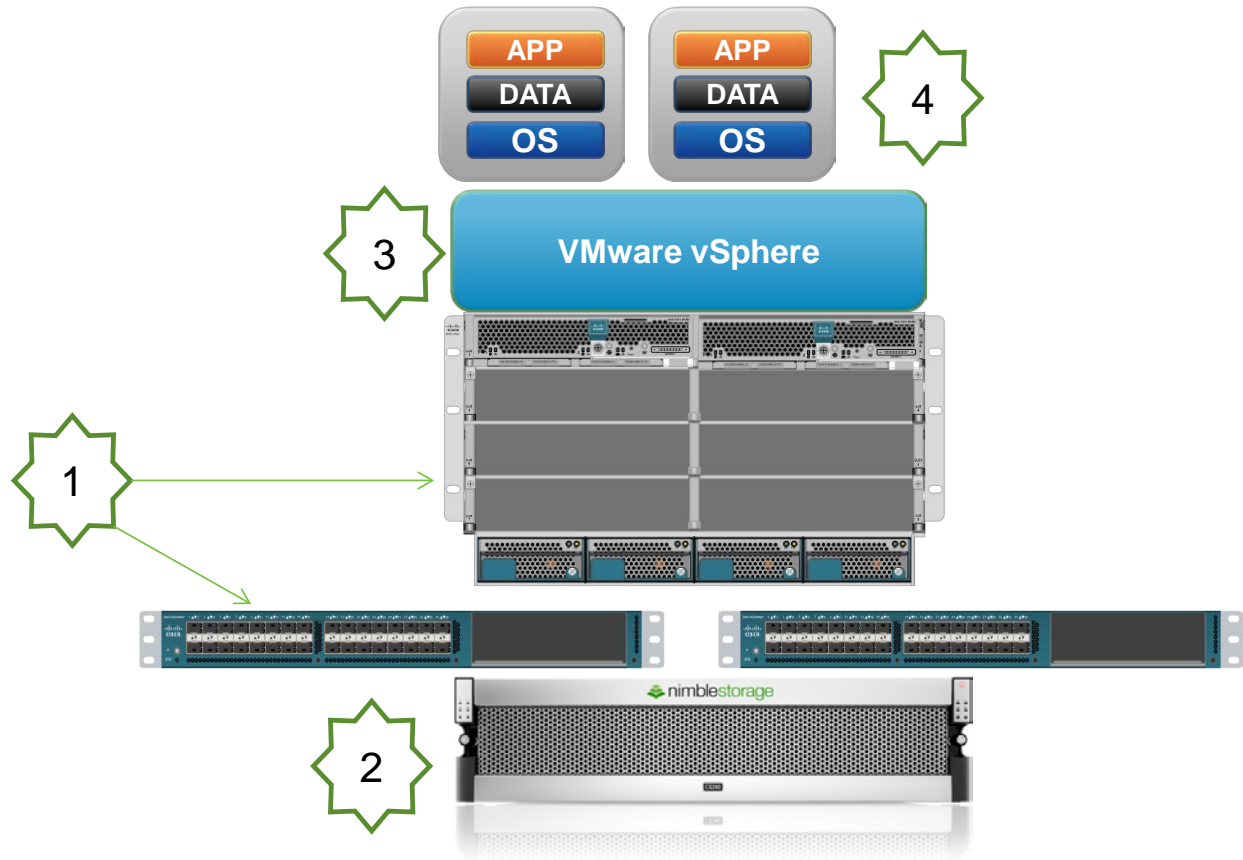


- vSphere Virtual Switch layout (only single vNIC is needed as UCS Fabric failover is enabled for each management and virtual machine traffic vNIC; more on the iSCSI vSwitch later)

## Networking

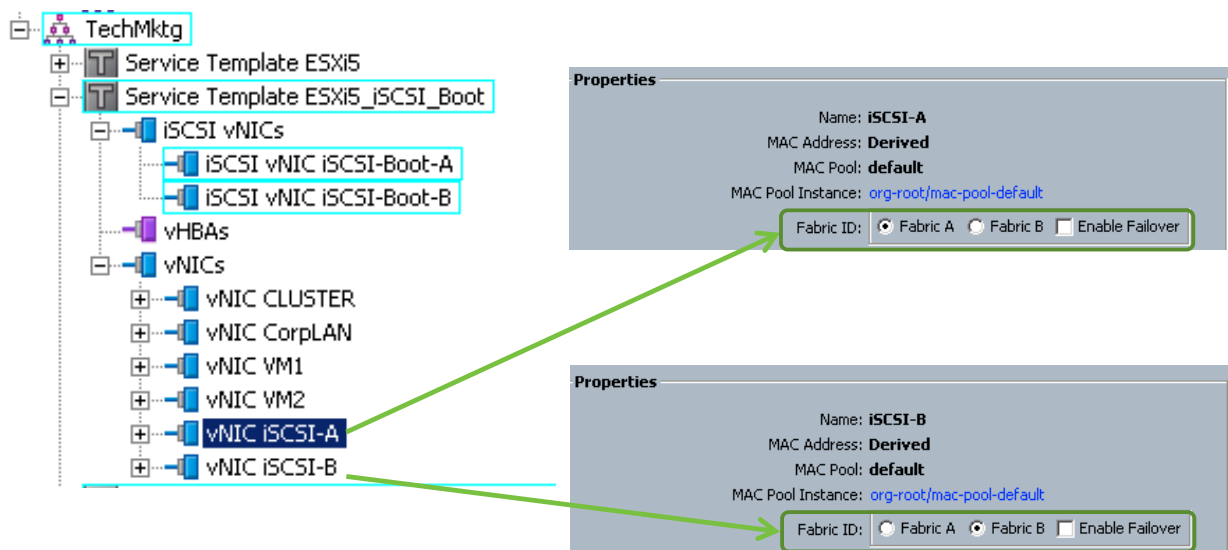


## Chapter 2 Performance Optimization



### 1. UCS

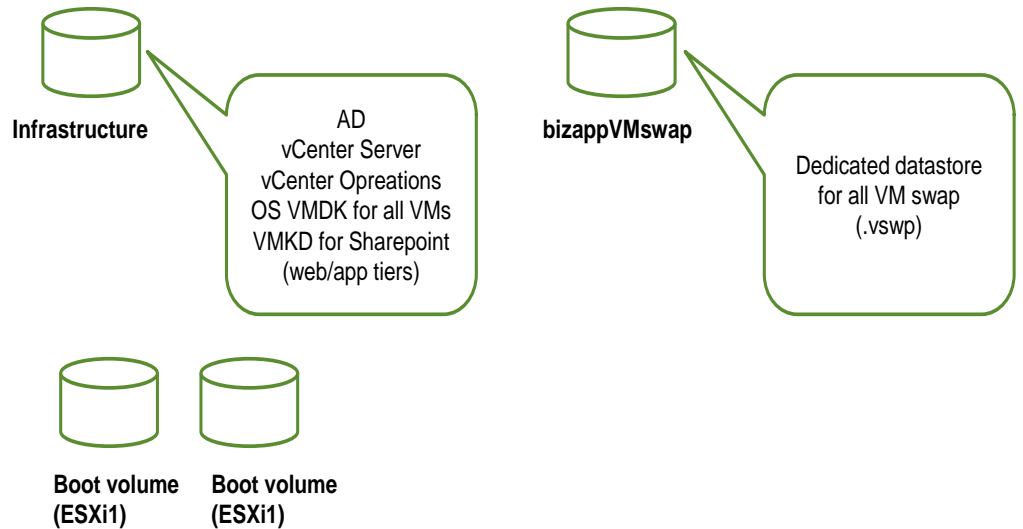
- Dual subnet for directly connecting Nimble to Cisco UCS Fabric Interconnect (without failover of Fabric for the iSCSI vNICs)



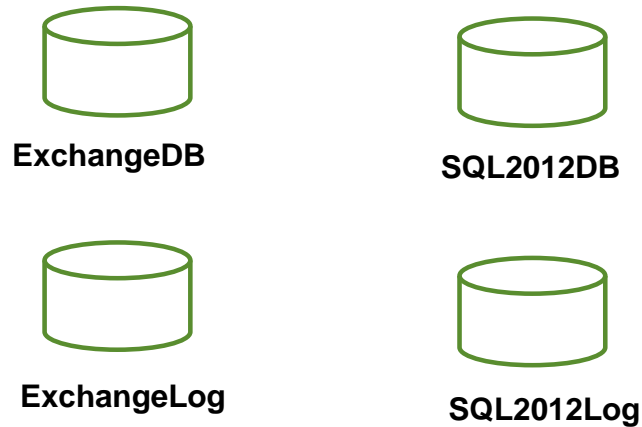


## 2. Storage:

- Storage Volume layout
  - i. Volumes supporting the infrastructure



- ii. Volumes supporting the application



- Performance Policy for each storage volume:

Performance Policy

Identification	Status	Device
bizappVMswap	Normal	Nimble iSCSIDisk...
ExchangeDB	Normal	Nimble iSCSIDisk...
Exchangelog	Normal	Nimble iSCSIDisk...
Infrastructure	Normal	Nimble iSCSIDisk...
iSCSI-boot-godzilla	Normal	Nimble iSCSIDisk...
sql2012db	Normal	Nimble iSCSIDisk...
sql2012log	Normal	Nimble iSCSIDisk...

For VM .vswp swap

For infrastructure VMs and app VM OS VMDKs

Block size 4K  
Compression: ON  
Cache: Disabled

Block size 4K  
Compression: ON  
Cache: Enabled

- Use PSP\_RR to distribute I/O across both paths

Nimble iSCSI Disk (eui.084f713c34b78c386c9ce9002f3db6f5) Manage Paths

Policy

Path Selection: Round Robin (VMware) Change

Storage Array Type: VMW\_SATP\_ALUA

Paths

Runtime Name	Target	LUN	Status	Preferred
vmhba32:C0:T7:L0	iqn.2007-11.com.nimblestorage:exchangedb-v18609ac9...	0	Active (I/O)	
vmhba32:C1:T7:L0	iqn.2007-11.com.nimblestorage:exchangedb-v18609ac9...	0	Active (I/O)	

Refresh

Name: iqn.2013-03.com.ucs:host:15-00023d000001,iqn.2007-11.com.nimblestorage:exchangedb-v18609ac9edd6a7e6.000...

Runtime Name: vmhba32:C0:T7:L0

iSCSI

Adapter: iqn.2013-03.com.ucs:host:15

iSCSI Alias:

Target: iqn.2007-11.com.nimblestorage:exchangedb-v18609ac9edd6a7e6.0000000e.f5b63d2f  
172.18.127.103:3260

Close Help

- Change default path IOPS to 0

Set iops=0 for each volume

All volumes should have "iops=0"

```

godzilla.sedemo.lab - PuTTY
# esxcli storage nmp psp roundrobin deviceconfig set --type=iops --iops=0 --device=eui.7bc8106d73ab4ad66c9ce9002f3db6f5
# [esxcli storage nmp device list | grep -A 5 Infrastructure]
Device Display Name: Infrastructure
Storage Array Type: VMW_SATP_ALUA
Storage Array Type Device Config: {implicit_support=on;explicit_support=off; explicit_allow=on;alua_followover=on;(TPG_id=0,TPG_state=A0)}
Path Selection Policy: VMW_PSP_RR
Path Selection Policy Device Config: {policy=iops,iops=0,bytes=10485760,useANO=0;lastPathIndex=0; NumIOsPending=0,numBytesPending=0}
Path Selection Policy Device Custom Config:
  
```

### 3. vSphere:

- One VMkernel port for each of the iSCSI vNIC

The diagram illustrates the vSphere network configuration for iSCSI. A Standard Switch named 'iScsiBootvSwitch' is shown with two VMkernel ports: 'iSCSI-B' (vmk2: 172.18.128.153) and 'iSCSI-A' (vmk1: 172.18.127.153). Two physical adapters, 'vmnic2' and 'vmnic1', are connected to the switch. Two screenshots of the 'iSCSI Properties' dialog show the failover order configuration for each vNIC.

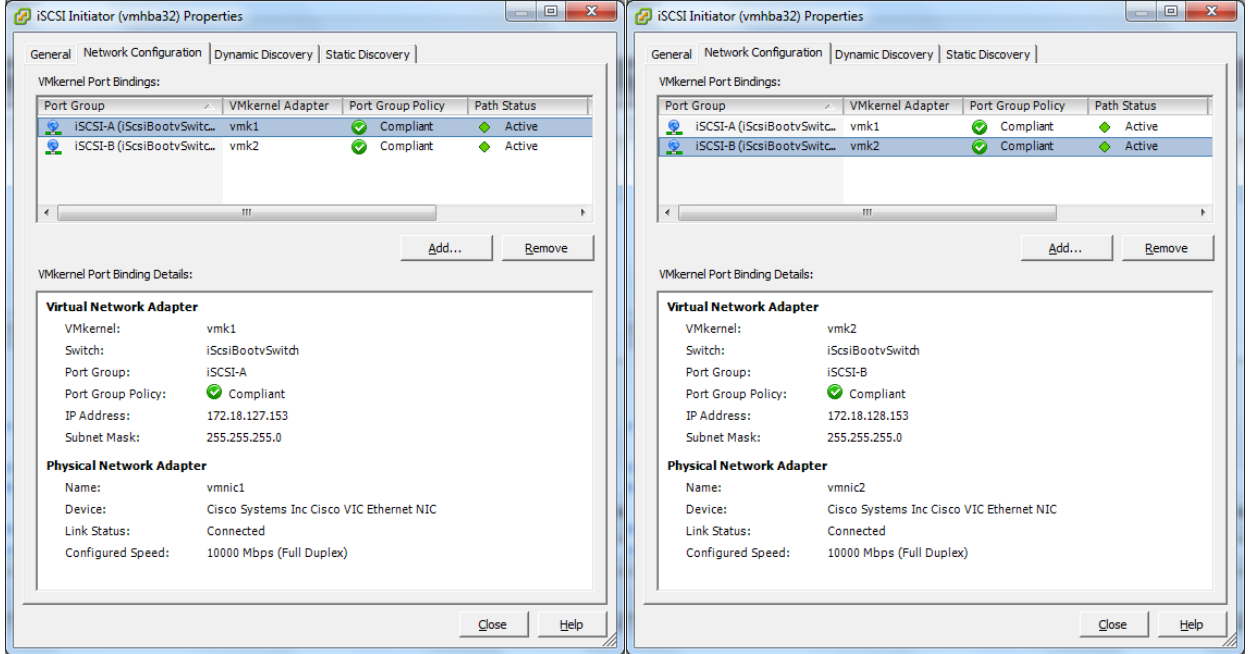
**iSCSI-B Properties - Failover Order:**

Name	Speed	Networks
<b>Active Adapters</b>		
vmnic2	10000 Full	172.18.128.1-172.18.128.254
<b>Standby Adapters</b>		
<b>Unused Adapters</b>		
vmnic1	10000 Full	172.18.127.1-172.18.127.254

**iSCSI-A Properties - Failover Order:**

Name	Speed	Networks
<b>Active Adapters</b>		
vmnic1	10000 Full	172.18.127.1-172.18.127.254
<b>Standby Adapters</b>		
<b>Unused Adapters</b>		
vmnic2	10000 Full	172.18.128.1-172.18.128.254

- Software iSCSI initiator binds to two VMkernel ports

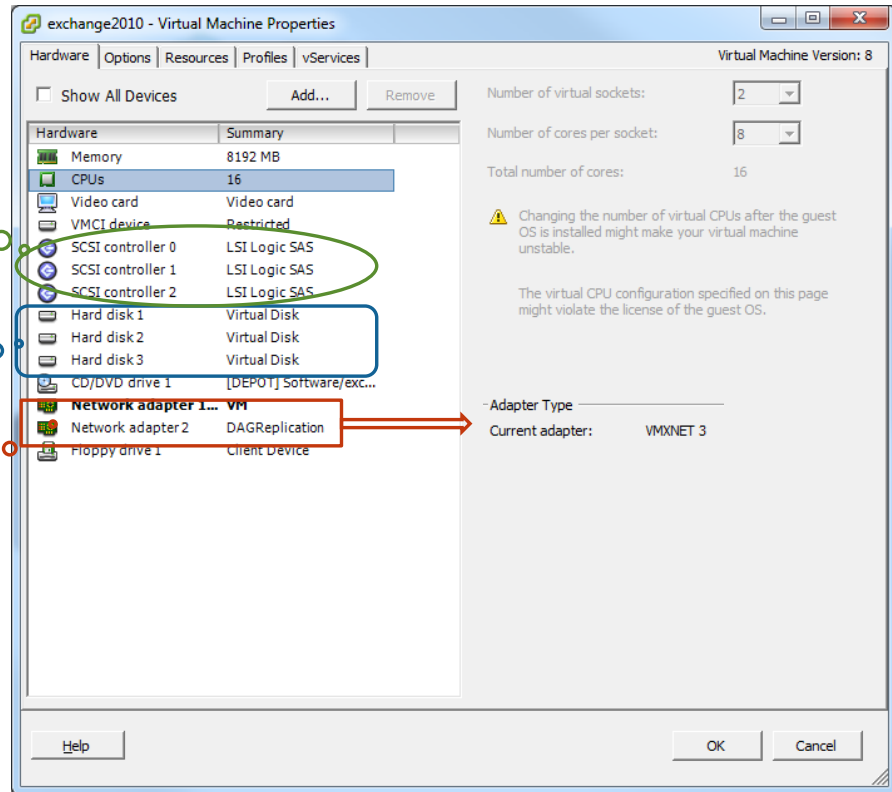


- Separate OS, Data, log into its own VMDK, dedicated virtual SCSI adapter, and use vmxet3 as the virtual adapter
  - For Exchange

Separate vSCSI HBA for each VMDK

Separate VMDK for OS, DB, Log

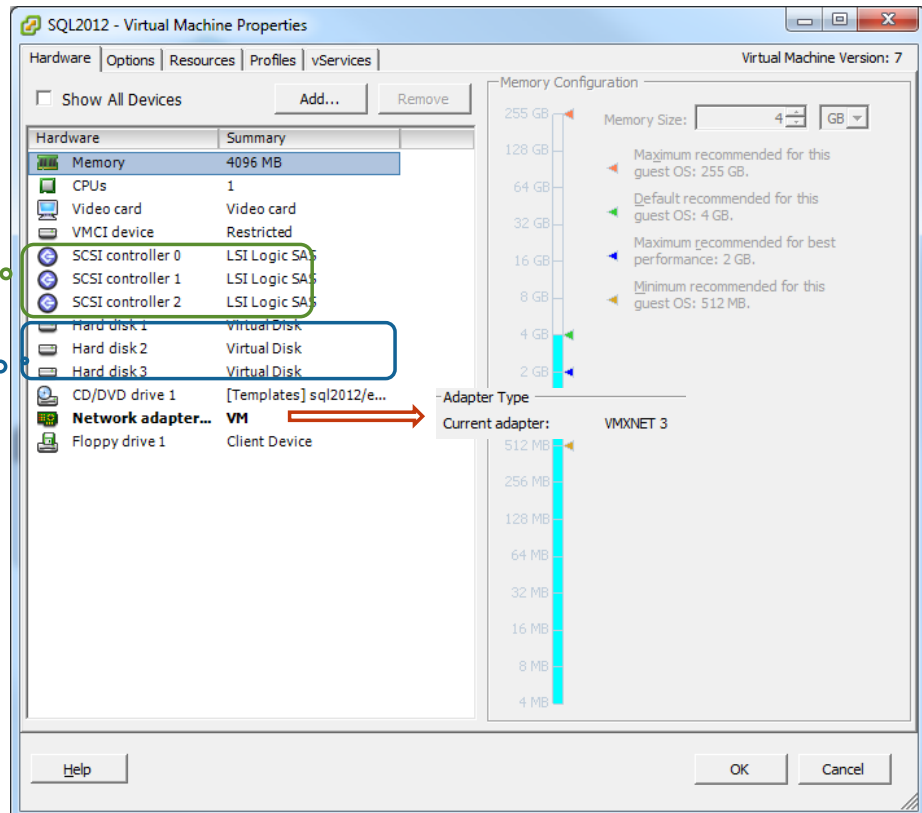
Separate vmnic for MAPI and DAG replication traffic



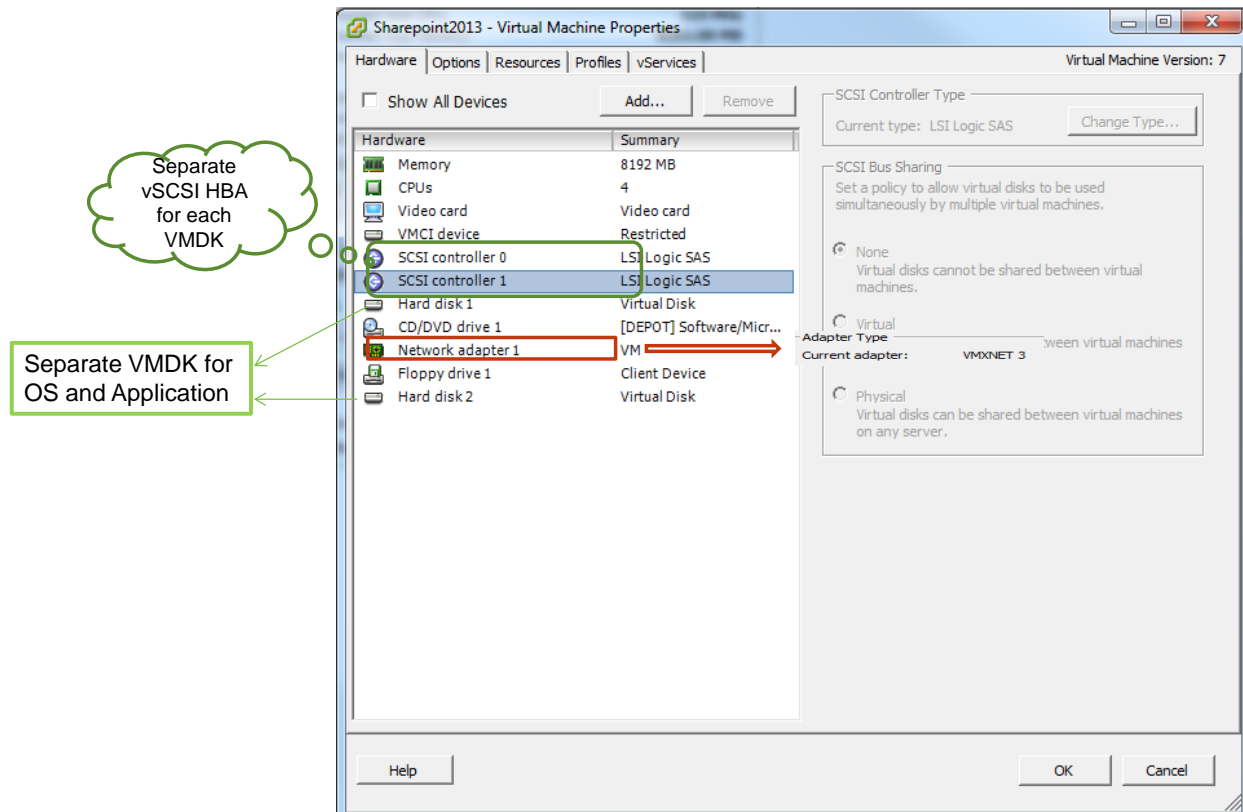
## ii. For SQL Server

Separate vSCSI HBA for each VMDK

Separate VMDK for OS, DB, Log



### iii. For SharePoint

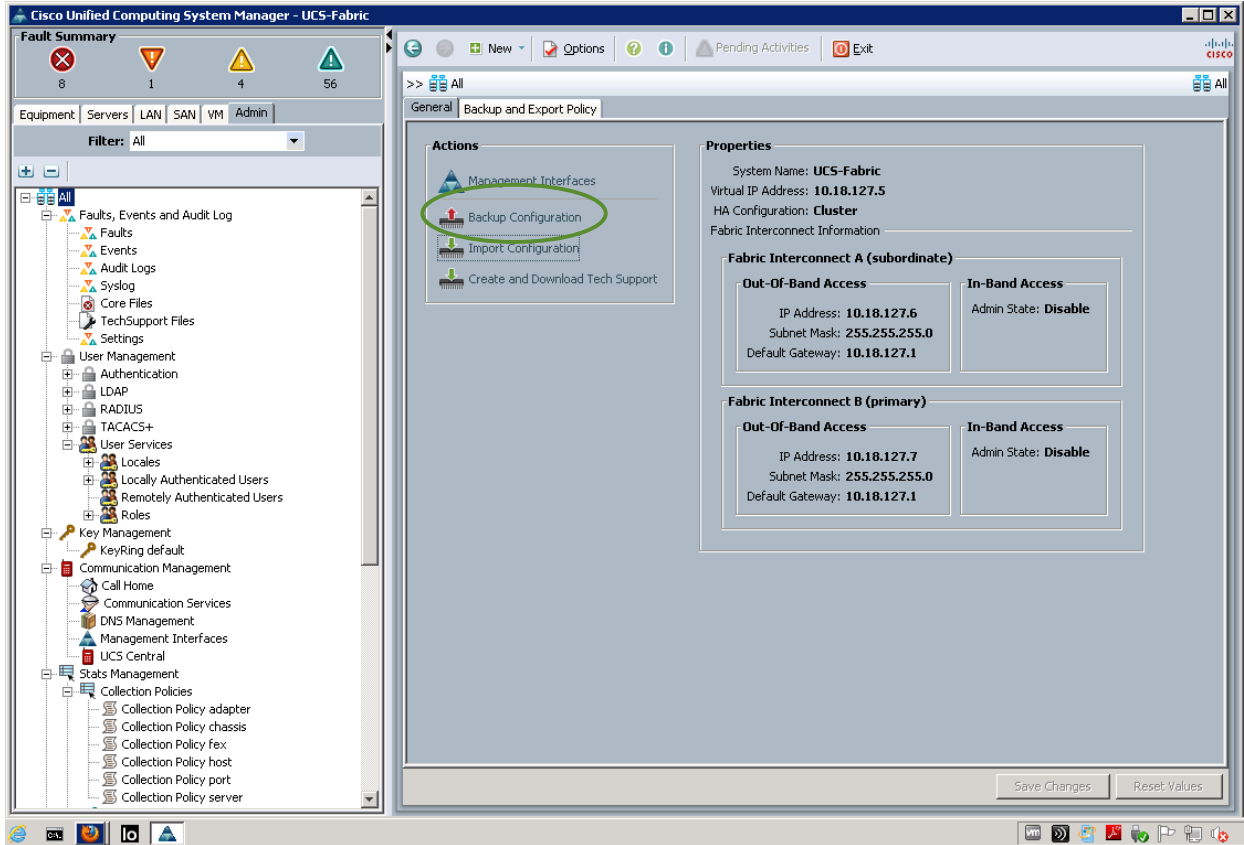


#### 4. VM Guest OS:

- If upgraded from Windows 2003, be sure to align the VM (change partition starting offset to be divisible by 4KB)
- NTFS allocation unit size for data/log partitions should be 64KB

## Chapter 3 Data Protection Infrastructure Protection

- Backup UCSM configuration on a regular basis (service profile templates, service profiles, all environmental configurations for the Fabric Interconnect), especially after changes have been made (for example, modification to service profile, configuration of ports/VLANs in the Fabric Interconnect)



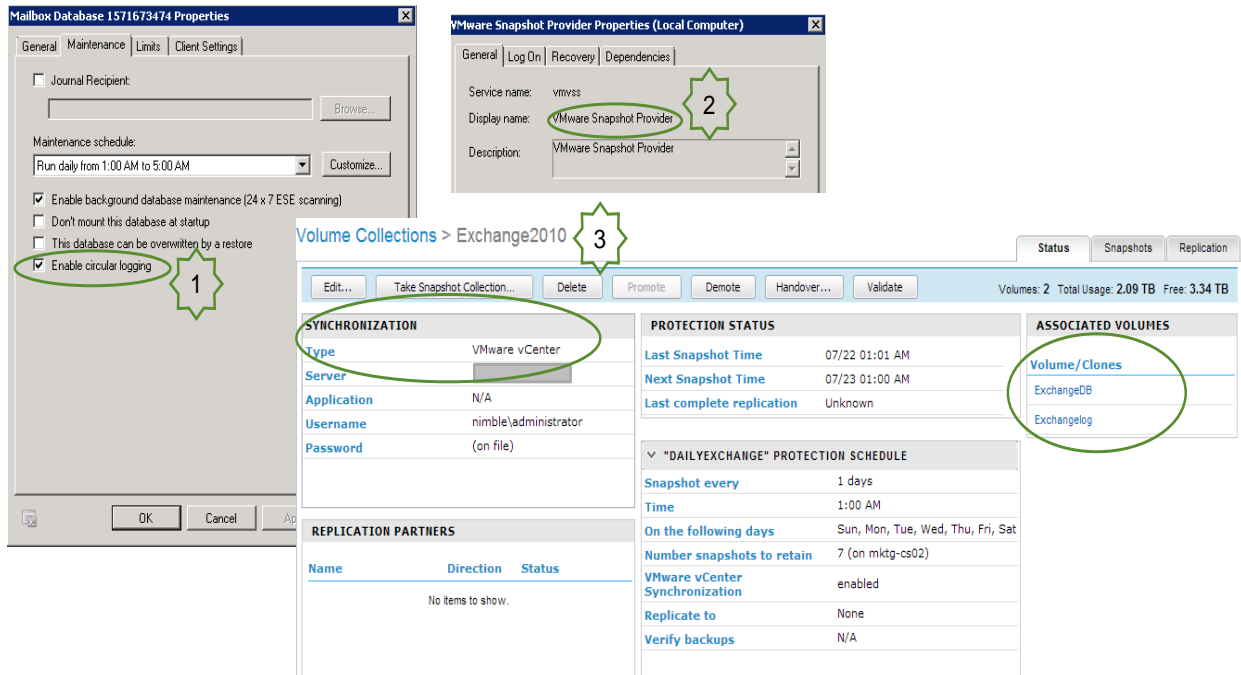
- Backup ESXi sever boot volumes and infrastructure VMs (including Sharepoint Web/App tier) by placing all boot volumes into a single Volume Collection with daily snapshot (NOTE: No snapshot synchronization is needed as crash consistent snapshot is all that's needed)



## Application Protection

- Ensure application consistent snapshot can be taken through Nimble and VMware integration

- Exchange



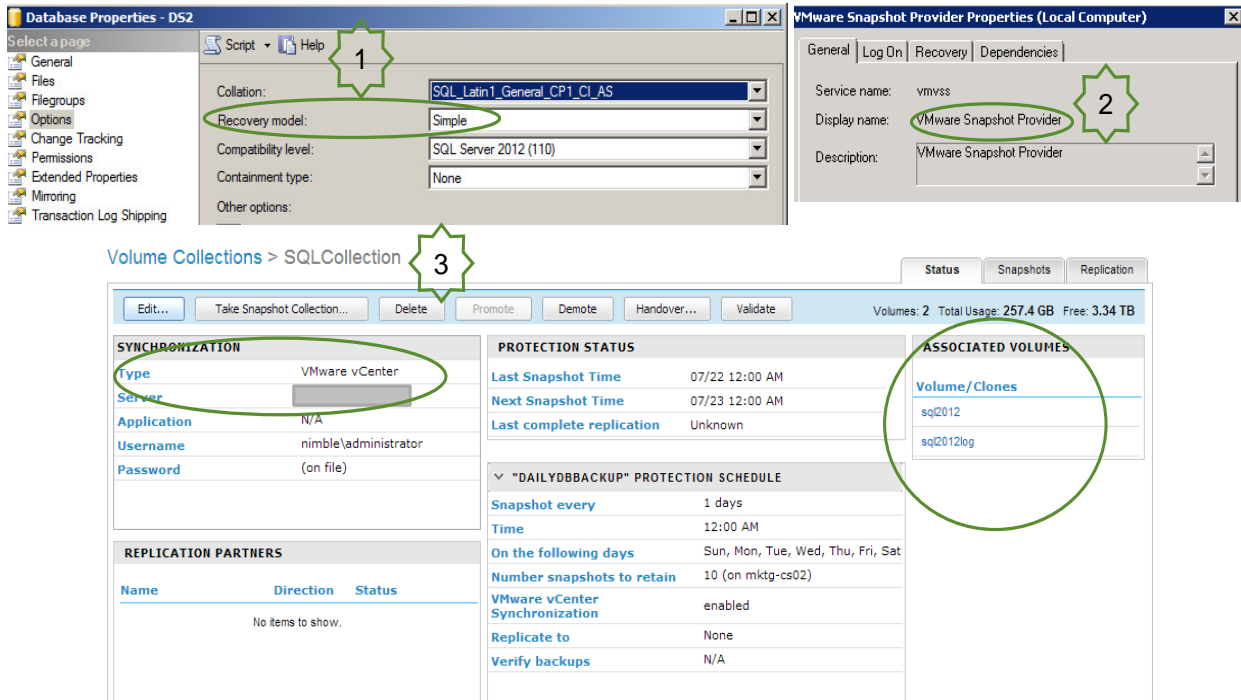
1. For simplicity, each Exchange mailbox database is configured with circular logging

NOTE: The ability to perform log truncation is provided through add-on products such as [Commvault Simpana](#) with Nimble Storage integration or [vSphere Data Protection](#)

2. VMware VSS integration is used to properly quiesce Exchange database for application consistent snapshot
3. VMware vCenter Synchronization is used for the Exchange Volume Collection (the volume collection contains both Exchange database and log datastores)

- SQL Server





1. For simplicity, each SQL database is configured with simple recovery mode

NOTE: The ability to perform full recovery is provided through add-on products such as Commvault Simpana with Nimble Storage integration or vSphere Data Protection

2. VMware VSS integration is used to properly quiesce SQL database for application consistent snapshot
  3. VMware vCenter Synchronization is used for the SQL Volume Collection (the volume collection contains both database and log datastores)
- o Sharepoint:

The Sharepoint Web/Application tier VMDK resides in the Infrastructure volume which is backed up daily. Note the Sharepoint database is backed up through SQL Server volume collection

## Chapter 4 Operational Management

In this chapter we will highlight tools and integrations that help making deployment and operational management simple and easy.

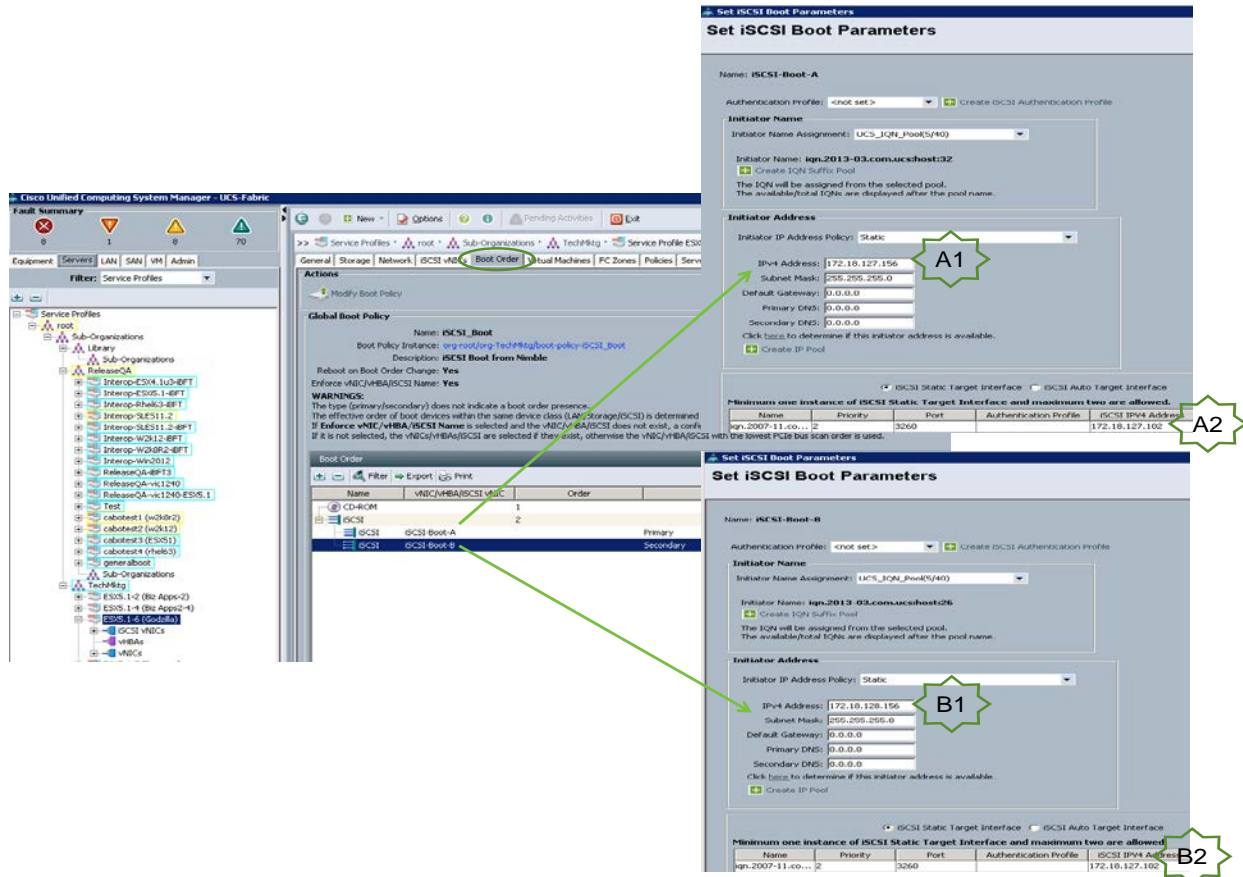
### Server Deployment with Cisco UCS Service Profile

A custom UCS Service Profile template was created for vSphere. It creates a standard for deploying the vSphere environment serving business critical applications, and simplifies scalability expansion down the line. We created two service profiles based on this ESXi template, apply it to each blade, and then modify the boot target for each server. That is it – all subsequent servers that will be added to the environment serving business critical applications will follow the same steps. Here's what the service profile template looks like:

For vNIC

Name	MAC Address	Desired Order	Actual Order	Fabric ID
vNIC CLUSTER	Derived	4	Unspecified	A B
vNIC CorpLAN	Derived	1	Unspecified	A B
vNIC VM1	Derived	5	Unspecified	A B
vNIC VM2	Derived	6	Unspecified	A B
vNIC iSCSI-A	Derived	2	Unspecified	A
vNIC iSCSI-B	Derived	3	Unspecified	B

iSCSI vNICs settings for Boot-from-SAN



- A1: subnet A for iSCSI boot vNIC A
- A2: iSCSI Discovery IP address for Nimble Array
- B1: subnet B for iSCSI boot vNIC B
- B2: iSCSI Discovery IP address for Nimble Array

## Storage Management with Nimble Storage vCenter plugin

Don't want to toggle between different UIs to perform storage related tasks? Just stay in vCenter Server. Nimble Storage plugin allows for new datastore provisioning, cloning, resizing, snapshotting, and monitoring performance statistics, space usage, and compression savings:

Nimble San Jose

Getting Started Summary Virtual Machines Hosts Databases and Datastore Clusters IP Pools Performance Tasks & Events Alarms Permissions Maps Storage Views Nimble mktg-cs02

General	Datstore	Size	Read IOPS*	Write IOPS*	Read MB/sec*	Write MB/sec*	Compression	Backup Opt.	Storage Usage
Total datstores: 11	ExchangeDB	2.0 TB	0	0	0	0	1.51X	1.89X	1.15 TB
Usage: 3.64 TB	Exchangelog	2.0 TB	0	0	0	0	1.14X	1.29X	473.57 GB
Free: 3.74 TB	Infrastructure	1.5 TB	3	29	0	0	1.71X	2.05X	414.39 GB
	VSI-cs02	1.0 TB	0	1	0	0	1.67X	N/A	132.1 GB
	bizappl/Mswap	100.0 GB	0	0	0	0	10.44X	N/A	744.25 KB
	bizappsql08db	200.0 GB	0	0	0	0	2.82X	N/A	596.18 MB
	bizappsql08logs	200.0 GB	0	1	0	0	4.63X	N/A	30.42 MB
	iSCSI-boot-godzilla	100.0 GB	0	0	0	0	1.07X	1.34X	482.57 MB
	iboot-esx51-4	100.0 GB	0	0	0	0	1.1X	1.14X	837.1 MB
	sql2012db	800.0 GB	0	5	0	0	1.88X	1.95X	211.66 GB
	sql2012log	500.0 GB	0	2	0	0	1.87X	1.91X	91.89 GB

\* Performance measured over a 5 minute period

Commands: **New Datstore**

Performance /Space monitoring

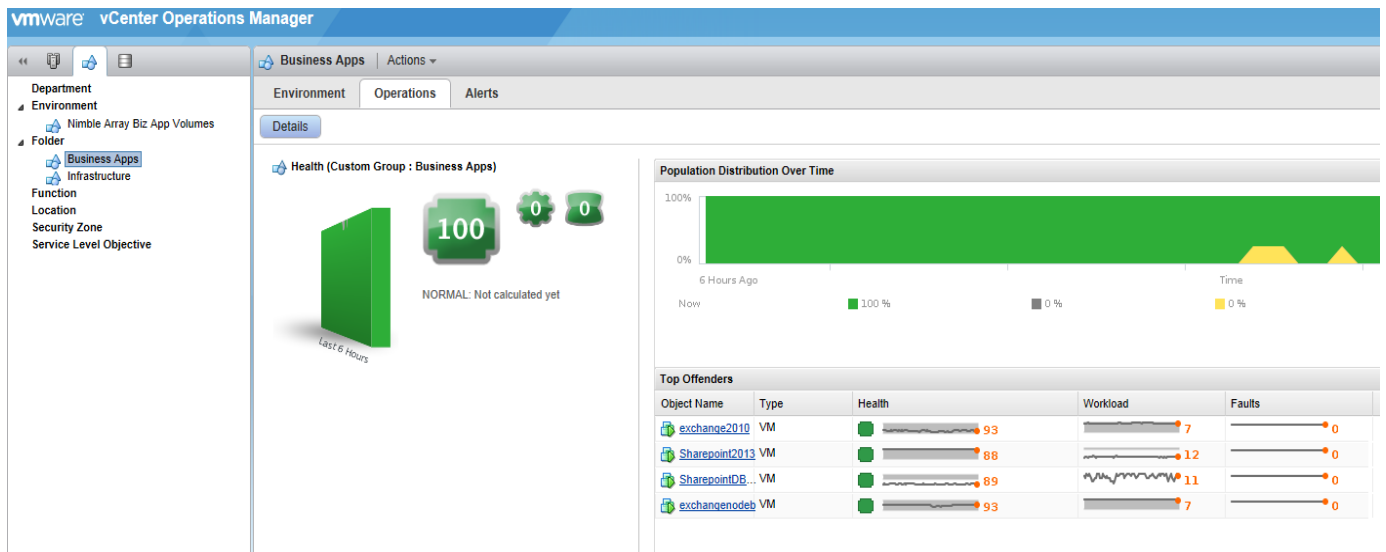
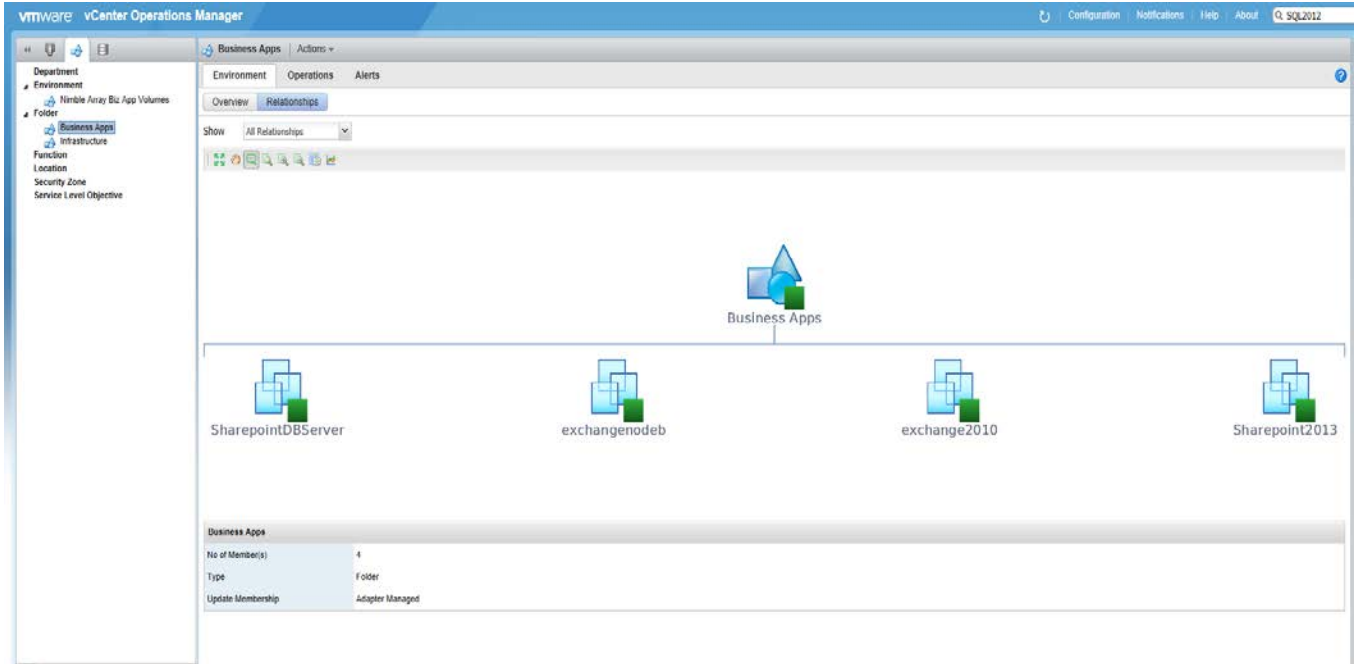
## Operational Management with vCenter Operations Manager

After the environment has been deployed, use vCenter Operations Manager to monitor health, workload and faults in the infrastructure. Good practice is to pay attention to any red icon(s) for Health, Workload and Fault badges, as well as “Alerts”:

The screenshot shows the VMware vCenter Operations Manager interface. On the left is a navigation tree with folders like 'World', 'Nimble SJ Biz App vCenter', and 'BizApp'. The main area displays a dashboard with several rows of system categories, each with a green gear icon representing health and workload. A large green gear icon with the number '7' is prominent in the center. The categories include: WORLD (1 of 1), CUSTOM GROUPS (2 of 3), vCENTER SERVER SYSTEMS (1 of 1), DATACENTERS (1 of 1), CLUSTERS (1 of 1), HOSTS (2 of 2), VMs (9 of 9), and DATASTORES (13 of 16).

You could also leverage the Group view functionality to look at the current health and workload status of all the VMs by their grouping folder:

NOTE: It is recommended to create a custom group with all Nimble Storage datastores. Doing so allows for quick overview of the health and workload status of the Nimble array volumes. Nimble InfoSight could then be used to look at deeper statistics based on heartbeats sent from the array.



## Deep Data Analytics with Nimble InfoSight

It is a good practice to regularly monitor Nimble InfoSight for storage health, availability, performance, data protection reports based on heartbeats from the array:

Wellness tab shows alerts from the array (both hardware and software), as well as support cases that have been open automatically based on criticality of the alerts:

**Your Wellness Overview**  
 This page was last updated on: Jul 29 2013 12:49AM local time

**Event Summary**

	Urgent	Important	For Review
Arrays	1		
Volumes		267	12
Snapshots		2,288	

Click on colored buttons (left) to filter the Events Details table. To select more than one button, hold down the Ctrl key. Click on rows in the Event Details table to edit case creation options.

Events are shown from the last 7 days.

- Show all events
- Hide closed events

Capacity tab shows current array space utilization, as well as projection of when the array would run out of capacity:

**Your Capacity Usage History and Forecast**

**Percent of Array Used**

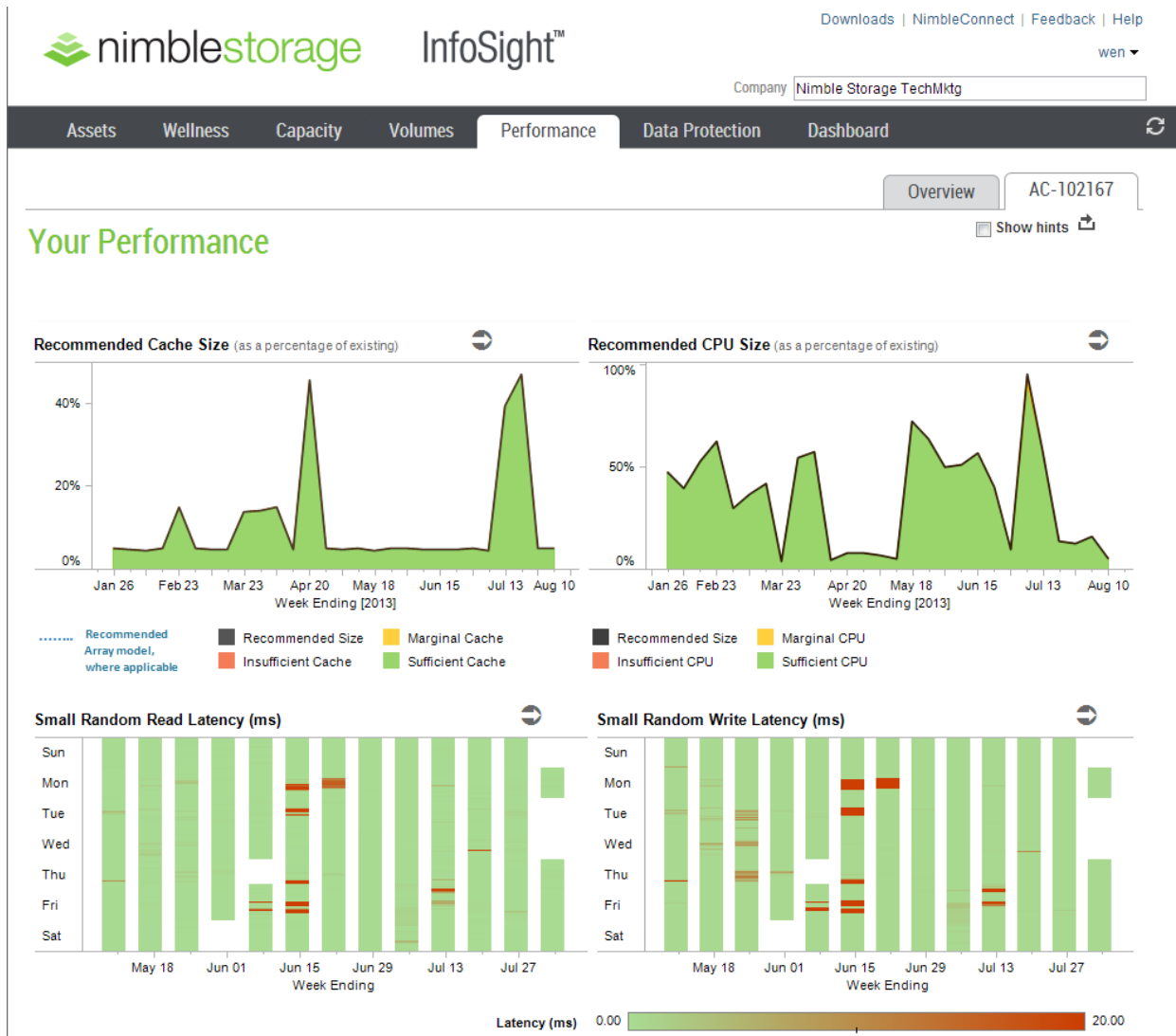
sanjose-cs220  
AA-100267  
CS220

london-cs220  
AA-100270  
CS220

mktg-cs01  
AA-100561  
CS440G-X4

mktg-cs02  
AA-102057  
CS220G-X4

Performance tab shows CPU and cache utilization of the array, as well as average read and write latency based on heartbeat sent by the array:



Data Protection tab shows snapshot/replication configuration for each volume within the Nimble array:

# Coverage

Show hints

**Legend**

- Not Configured
- OK
- Replication Partner

**Performance Policy**

- (All)
- 4K-nc
- archive-32k-nc
- auto1
- Default
- Exchange
- Hyper-V CSV
- IOmeter-4K-AC
- IOmeter-8K-AC
- IOmeter-32K-AC
- iSCSI-Boot
- LogFiles
- Oracle
- oradb-4K-AC
- oradb-AC
- oradb-normal
- oralogs-8k-nc
- oralogs-nc
- sequential32k
- SQL Server 2012
- SQL Server Logs
- SQLServer
- VMware ESX
- VMware ESX 5

Array

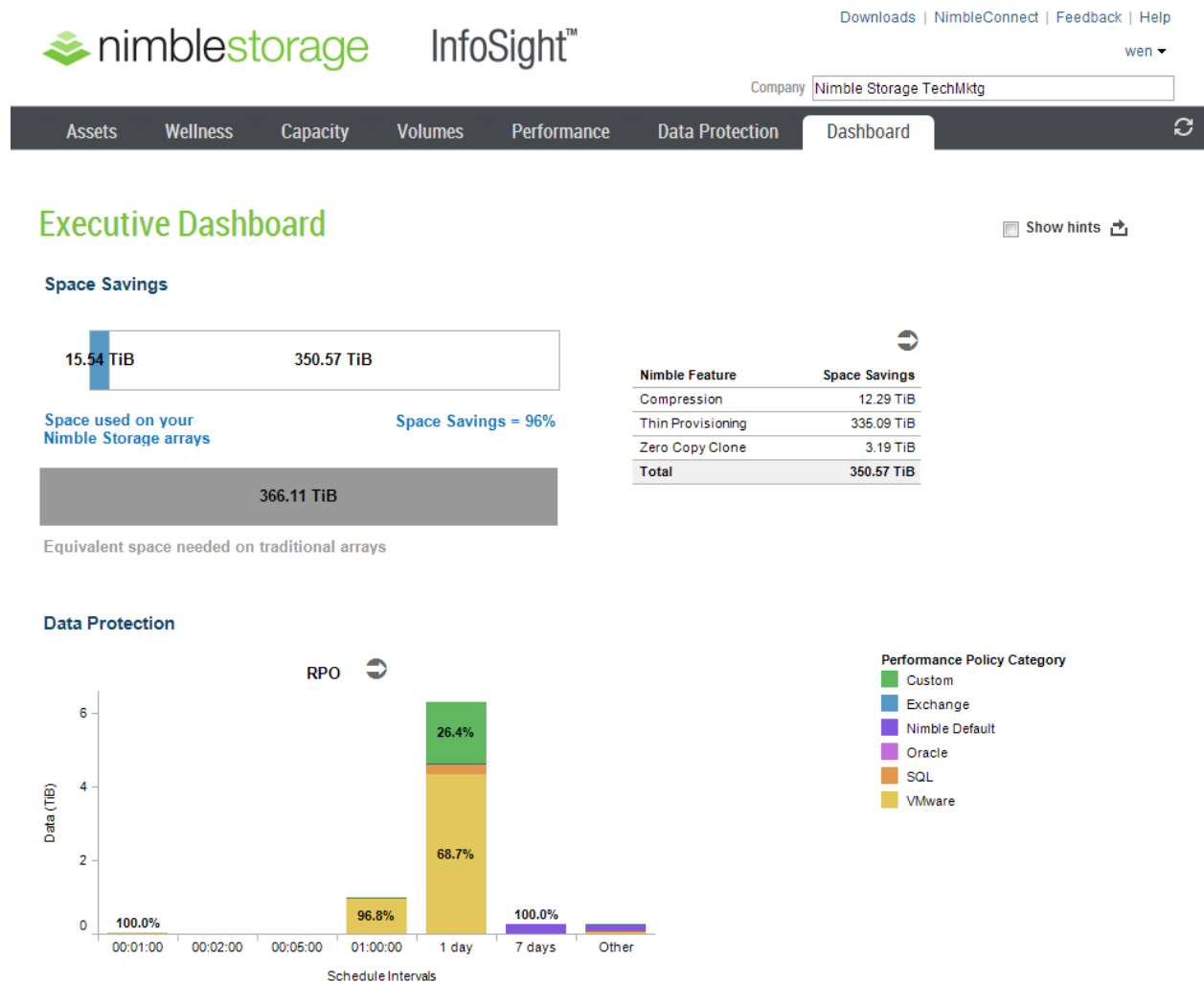
Volume Collection

Volume

	Snapshots	Replication	Array london-cs220	Array mktg-cs01	Array mktg-cs02	Array mktg-cs03	Array mktg-cs460gx2	Array santjose-cs220
IOMETER	<input type="checkbox"/>	<input type="checkbox"/>						
ISO-Library	<input type="checkbox"/>	<input type="checkbox"/>						
jm-lnx-cs59-vol1	<input type="checkbox"/>	<input type="checkbox"/>						
jm-unx-sol11-vol1	<input type="checkbox"/>	<input type="checkbox"/>						
jm-wns-2012-hvc	<input type="checkbox"/>	<input type="checkbox"/>						
Knopp01-LoadIO-Volu.	<input type="checkbox"/>	<input type="checkbox"/>						
LiveDemoVol	<input type="checkbox"/>	<input type="checkbox"/>						
MC-clone-031213	<input type="checkbox"/>	<input type="checkbox"/>						
MC-test-1001	<input type="checkbox"/>	<input type="checkbox"/>						
MC-test-1003	<input type="checkbox"/>	<input type="checkbox"/>						
MM-Jump1-Perf	<input type="checkbox"/>	<input type="checkbox"/>						
MM-VDI-Example	<input type="checkbox"/>	<input type="checkbox"/>						
newSJProduction	<input type="checkbox"/>	<input type="checkbox"/>						
NS-AustinData	<input type="checkbox"/>	<input type="checkbox"/>						
NS-AustinLogs	<input type="checkbox"/>	<input type="checkbox"/>						
NS-Commvault	<input type="checkbox"/>	<input type="checkbox"/>						
NS-Commvault-Backups	<input type="checkbox"/>	<input type="checkbox"/>						
NS-DB-Delete-Me	<input type="checkbox"/>	<input type="checkbox"/>						
NS-Exch-A	<input type="checkbox"/>	<input type="checkbox"/>						
NS-Exch-DB-KrollTest	<input type="checkbox"/>	<input type="checkbox"/>						
NS-Exch-DC	<input type="checkbox"/>	<input type="checkbox"/>						
NS-Exch-Rec-Databas..	<input type="checkbox"/>	<input type="checkbox"/>						
NS-Exch-Rec-Logs	<input type="checkbox"/>	<input type="checkbox"/>						
NS-Files	<input type="checkbox"/>	<input type="checkbox"/>						



Dashboard tab shows summary reports of space savings through compression, data protection level for each volume, snapshot retention duration as well as upgrade recommendations based on workload



## Summary

When you virtualize business critical applications such as Microsoft Exchange, SQL and SharePoint, be sure to design the architecture with the four key pillars of requirements in mind: availability, performance, data protection and operational management. This document highlights the key design principles and best practices that address the requirements from all four pillars. Virtualize with confidence using SmartStack, powered by Cisco, VMware and Nimble Storage.

## Appendix A: Build of Materials (B.O.M)

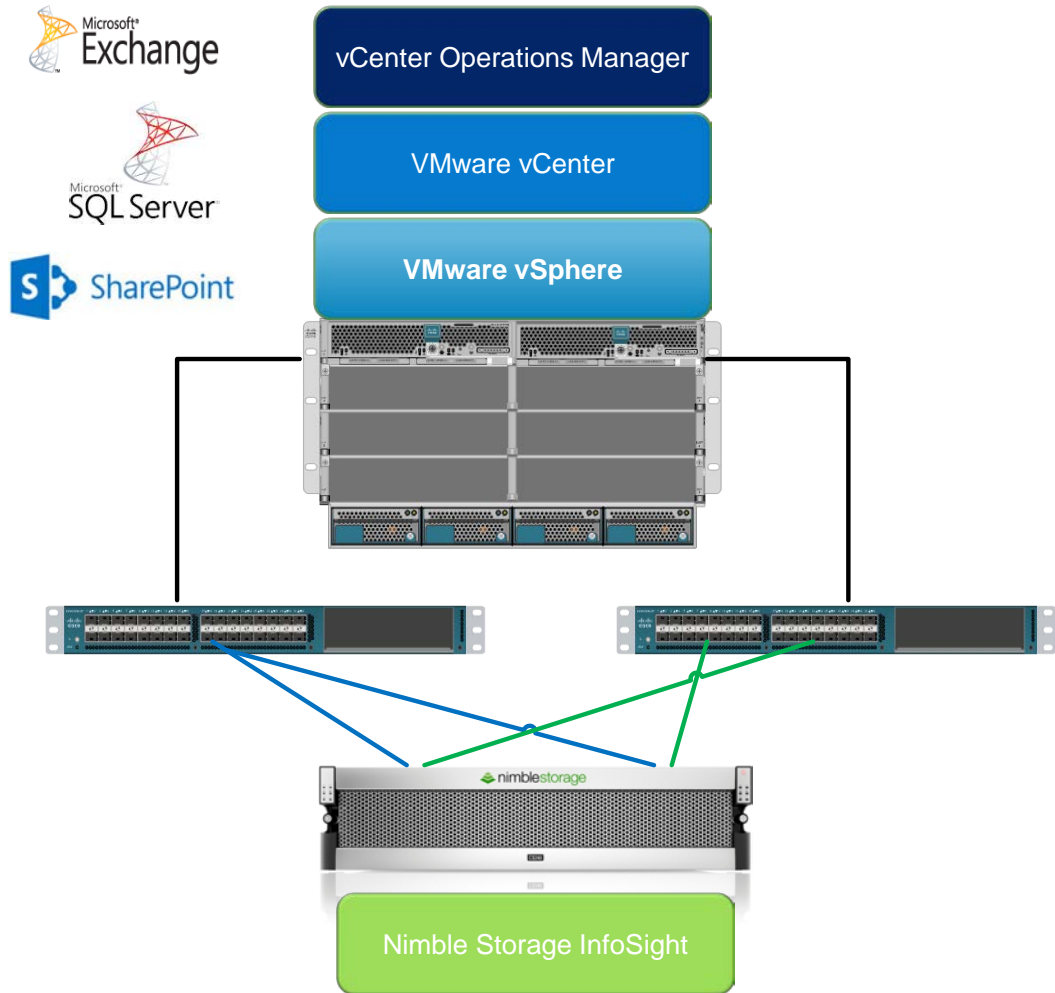
Vendor	Component Model(Quantity)	Software/OS Version
Cisco	UCS B200 M3 Blade Server(x2)	2.1(1e)
	UCS Fabric Interconnect 6248(x2)	
Nimble	CS220G(x1)	1.4.6
VMware	vSphere ESXi (Standard)	5.1
	vSphere vCenter Server (Standard)	5.1
	vCenter Operations Manager	5.7

### Note:

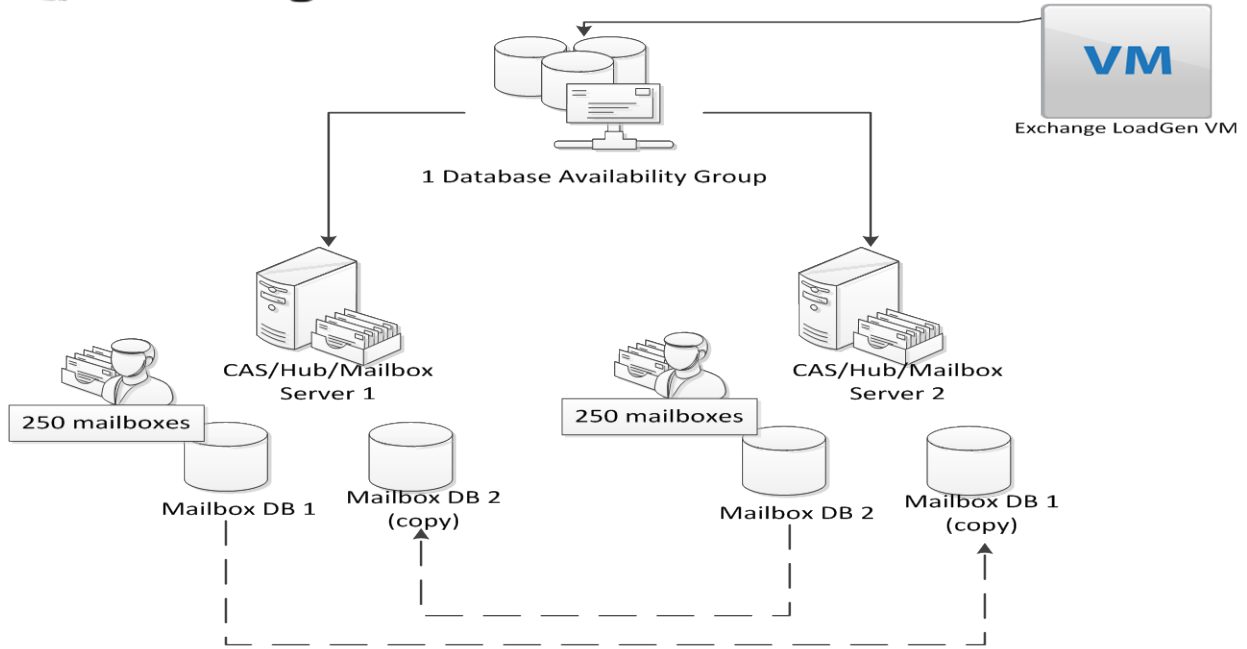
The B.O.M listed above is a reference design of an environment capable of supporting 500+ users with business critical applications. Customers and partners are welcome to use different models of equipment from Cisco for compute, and Nimble for Storage. For example, Cisco UCS C-series rack mountable servers or other blade models, and a Nimble CS400 series could be used in place of the CS200 series, depending on the workload and capacity needs.

## Appendix B: Validation for 500-User Business Critical Applications Environment

### High Level Environment Overview:



**Exchange 2010:**



**Mailbox Database 1571673474 Properties**

General | Maintenance | Limits | Client Settings

Mailbox Database 1571673474

Database path: E:\Program Files\Microsoft\Exchange Server\V14\

Last full backup:

Last incremental backup:

Status: Mounted

Mounted on server: EXCHANGE2010.nimble.sj

Master: nimbledag

Master type: Database Availability Group

Modified: Monday, July 22, 2013 2:08:37 PM

Servers hosting a copy of this database:

- EXCHANGE2010
- EXCHANGENODEB

**Mailbox Database 0862222540 Properties**

General | Maintenance | Limits | Client Settings

Mailbox Database 0862222540

Database path: E:\Program Files\Microsoft\Exchange Server\V14\

Last full backup:

Last incremental backup:

Status: Mounted

Mounted on server: EXCHANGENODEB.nimble.sj

Master: nimbledag

Master type: Database Availability Group

Modified: Monday, July 22, 2013 2:09:04 PM

Servers hosting a copy of this database:

- EXCHANGENODEB
- EXCHANGE2010

**Mailbox**

Database Management | Database Availability Groups | Sharing Policies | Address Lists | Retention Policy Tags | Retention Policies | Offline Address Book

Create Filter

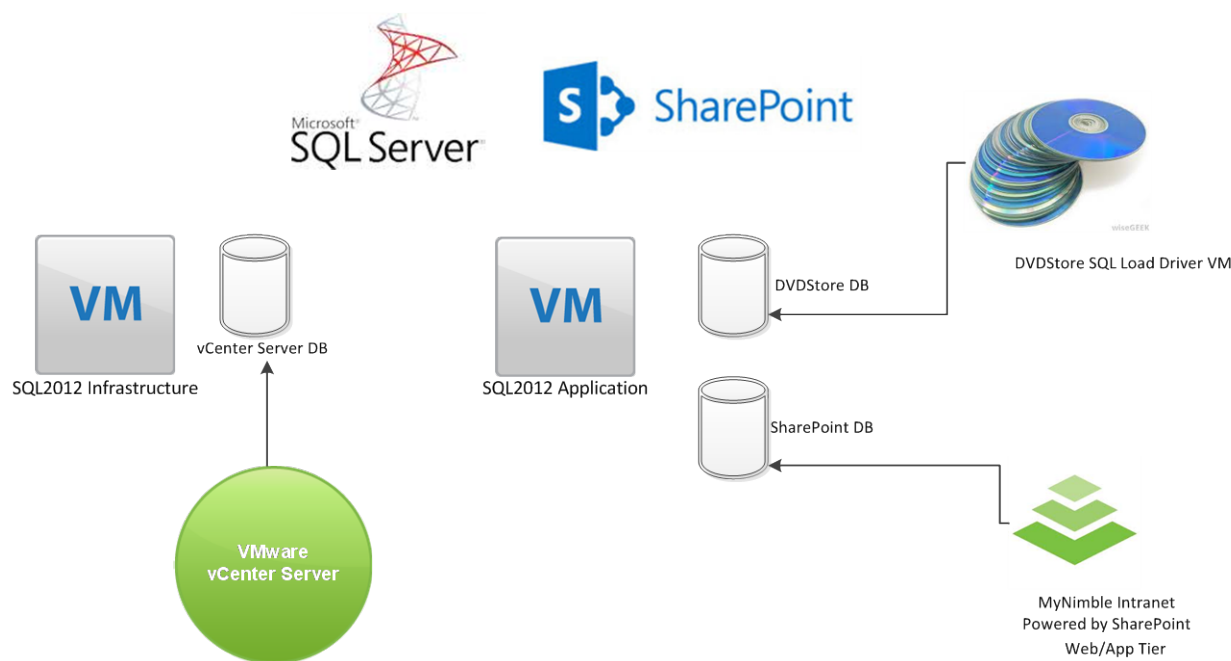
Name	Member Servers	Witness Server	Witness Directory
nimbledag	EXCHANGENODEB, EXCHANGE2010	vcenterserver51.nimble.sj	c:\dagshare

**nimbledag**

Networks

Name	Status
DAGNetwork01	Up
Replication Disabled	
Subnets	10.18.127.0/24
Network Interfaces	
DAGNetwork02	Up
Replication Enabled	
Subnets	172.21.0.0/19
Network Interfaces	

## SQL 2012 and SharePoint 2013:



In case you are wondering how the SmartStack solution performs with real applications, here are the details of the validation:

In short, the physical servers, VMs hosting the applications, and the Nimble CS220G array did not show any signs of resource starvation. The environment could definitely take on additional workload. We leverage vCenter Operations Manager to determine the impact of running all workloads simultaneously, and here are the results:

Summary of observations:

- Mixture of Exchange, SQL and Sharepoint workload shows both random and sequential read and write, with bursts of up to 15000 IOPS
- The SmartStack architecture is well equipped to handle the mixture of workloads without signs of resource starvation for CPU, memory, network or storage (as shown in vCenter Operations charts below)
- Nimble CS220G array shows average latency of under 2 ms for both read and write IO

Details:

Application	Validation Tool	Workload Profile
Microsoft Exchange 2010	LoadGen Version 14.01.0180.003	500 1GB mailboxes (250 in each DAG node with cross replication); Outlook_150

		action profile (150 messages/day); total of 10 hour test simulating 8 hour busy work day
Microsoft SQL Server 2012	DVDStore Version 2.1	Large DVDStore database with 1 million customers and 2 million DVD products
Microsoft Sharepoint 2013	Nimble Storage employees	Day-to-day cross functional usage of Sharepoint farms for page creation, modification, file upload and sharing

NOTE: Validation was conducted with all three workloads running simultaneously

Results:

### Exchange LoadGen Test Report

Microsoft Exchange Load Generator 2010

View Load Generator 2010 Report

**Microsoft Exchange Server Load Generator**

**Test Result Summary**  
**Result:** Succeeded

**Topology Configuration**

Target forest:	NIMBLE
Total number of user groups:	1
Total number of users:	500
Total number of distribution lists:	0
Total number of dynamic distribution lists:	0
Total number of contacts:	0
Total number of external recipients:	0

**Simulation Statistics**

Simulation started:	7/23/2013 12:15:49 AM
Scheduled run length:	000:10H:00M:00S
Actual run length:	000:10H:00M:00S
Stress mode:	False
Remote:	False

**Load Generator Status**

\* Note that if the load generator client only runs user groups with scripted modules, its task counts are expected to be zero.

Type	Name	Task Exceptions	Task Queue Length	Task Skipped	Tasks Completed	Task Dispatched
Master	EXCHANGELOADGEN	0	0	0	113125	113125

**User Groups**

Name	Succeeded	Client type	Action Profile	User Count	Tasks per User Day	TasksCompleted
UserGroup1	Succeeded	Outlook 2007 Online	Outlook_150	500	181	113125

Generated by Microsoft Exchange Synchronization (14.01.0760.002)

Expanding on the Usage tasks completed

UserGroups							
Name	Succeeded	Client Type	Action Profile	User Count	Tasks per User Day	TasksCompleted	
UserGroup1	Succeeded	Outlook 2007 Online	Outlook_150	500	181	113125	
Active Users Statistics							
<b>Active User Count</b>				<b>Duration</b>			
500				10:00:00			
Task Execution Statistics							
Task Name	Count	Actual Distribution(%)	Configured Distribution(%)				
AddPublicDelegateTask	0	0	0				
BrowseAddressBookTask	0	0	0				
BrowseCalendarTask	8159	7	7				
BrowseContactsTask	6899	6	6				
BrowsePublicFolderTask	0	0	0				
BrowseTasksTask	581	0	0				
CreateContactTask	646	0	0				
CreateFolderTask	0	0	0				
CreateTaskTask	630	0	0				
DeleteMailTask	0	0	0				
DownloadOabTask	606	0	0				
EditRulesTask	0	0	0				
EditSmartFoldersTask	602	0	0				
ExportMailTask	0	0	0				
InitializeMailboxTask	0	0	0				
LogoffTask	1898	1	1				
LogonTask	0	0	0				
MakeAppointmentTask	655	0	0				
ModuleInitTask	1	0	0				
MoveMailTask	0	0	0				
PostFreeBusyTask	2486	2	2				
PublicFolderPostTask	0	0	0				
PublishCertificatesTask	0	0	0				
ReadAndProcessMessagesTask	74964	66	66				
RequestMeetingTask	1890	1	1				
SearchTask	0	0	0				
SendMailTask	13108	11	11				
ViewContactDetailsTask	0	0	0				

## DVDStore Results

- Total test run duration: 36018 minutes (~10 hours)
- Total transactions completed: 1892280 orders
- Total new customers added: 378376
- Total number of browse during run: 5677543
- Total number of purchases: 1892280
- Average latency per second to login to DVDStore: 6 millisecond
- Average latency to add new customer: 1 millisecond
- Average latency to browse catalog: 1 millisecond
- Average latency to purchase: 9 millisecond

```

Final (7/23/2013 10:22:10 AM): et=36018.9 n_overall=1892280 opm=3152 rt_tot_last
n_max=220 rt_tot_avg=18 n_login_overall=1513904 n_newcust_overall=378376 n_brows
e_overall=5677543 n_purchase_overall=1892280 rt_login_avg_msec=6 rt_newcust_avg_
msec=1 rt_browse_avg_msec=1 rt_purchase_avg_msec=9 rt_tot_sampled=16 n_rollbacks
_overall=511 rollback_rate = 0.0%

Thread 0: exiting
Controller (7/23/2013 10:22:11 AM): all threads stopped, exiting
n_purchase_from_start= 1894362 n_rollbacks_from_start= 511
Run over

```

## Sharepoint Access

Nimble employees across HR, Engineering, QA, Product Management, Marketing, IT and Sales all had access to “MyNimble” (Nimble’s intranet backed by Sharepoint 2013 with SQL 2012 back-end). All team members were able to access various intranet pages, upload and edit shared documents, while Exchange Loadgen and DVDStore workloads were running on the SmartStack.

MyNimble Home Company Search MyNimble Core Team Blog Sites

HR

Engineering  
Finance  
HR  
IT  
Legal  
Marketing  
Operations  
Sales

HR Calendar  
Employee Benefits  
Policies, Procedures, and Values  
Templates and User Guides  
Global Recruiting  
Employee Wellness and Events  
New Employees  
Manager Resources  
FAQ  
Contact Us  
HR Insider Homepage

**HR**  
nimblestorage

**What's Happening in HR?**

Our First Body Wellness Initiative launched on 3/13/13! If you had a chance to enjoy an on-site massage, please give us your [feedback](#). If you did not have a chance to attend, the massage team will be back monthly. Look out for an email each month to sign up [here!](#)

Our first Nimble Night took place at the San Jose Sharks Tank where the Sharks beat the Canucks 3-2! For those of you who attended and had a great time (or those who could not make it...) look out for our next Nimble Night email! For more information see our [Events](#) page.

Are you a member of the HR team? Visit the [HRInsider Page](#).

**HRInsider**  
Homepage

**New To Nimble?**  
Visit our [New Employee](#) page where you can:

- Visit our new employee resources center
- Find fun things to do in the area
- Find out who can help you
- Get connected with other new employees

**Looking for benefits Information**  
Visit our [Employee Benefits](#) page where you can:

- Watch quick benefit videos
- Look up benefit plans information
- Look up equity information



BROWSE PAGE

Home  
Nimble TME Playground

Libraries  
Lists  
Recent  
Documents  
Tasks  
Site Contents

Welcome to the Document Center  
Use this site to create, work on, and store documents. This site can become a collaborative repository for authoring documents within a team, or a knowledge base for documents across multiple teams.

Newest Documents

- VDI\_bootcamp\_session\_2\_3
- VDI\_bootcamp\_session\_1
- coolio
- bent
- airfare
- wenster

Modified By Me

- bent
- airfare

## Resource Utilization

ESXi Server1 Resource Utilization:

vmware vCenter Operations Manager

bizappex4.sedemo.lab | Actions

Dashboard Environment Operations Planning

Details Events All Metrics

Workload (Host : bizappex4.sedemo.lab : Running)

35 95 0

0

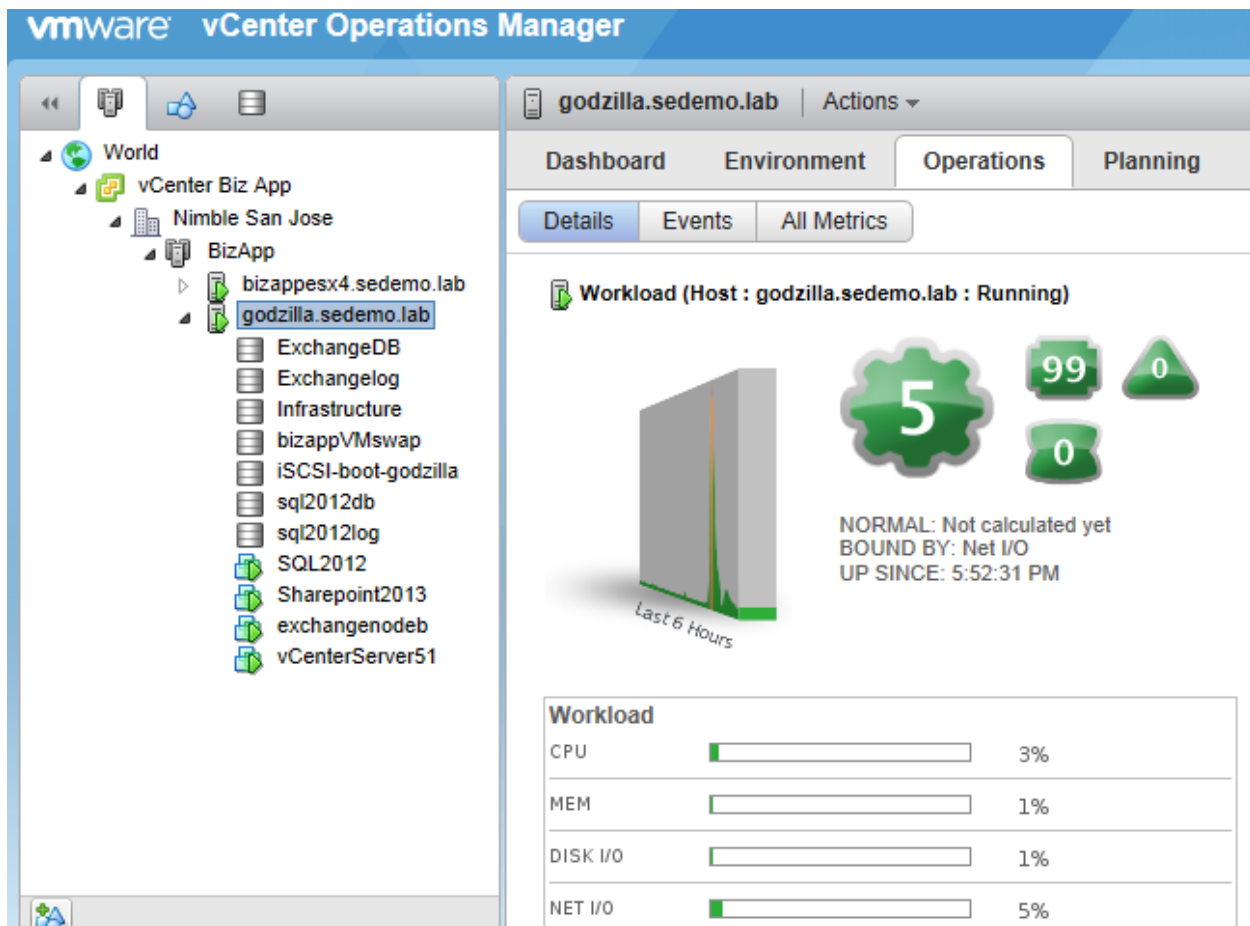
NORMAL: Not calculated yet  
BOUND BY: CPU  
UP SINCE: 5:52:31 PM

Workload		
CPU	<div style="width: 35%;"></div>	35%
MEM	<div style="width: 5%;"></div>	5%
DISK I/O	<div style="width: 4%;"></div>	4%
NET I/O	<div style="width: 12%;"></div>	12%

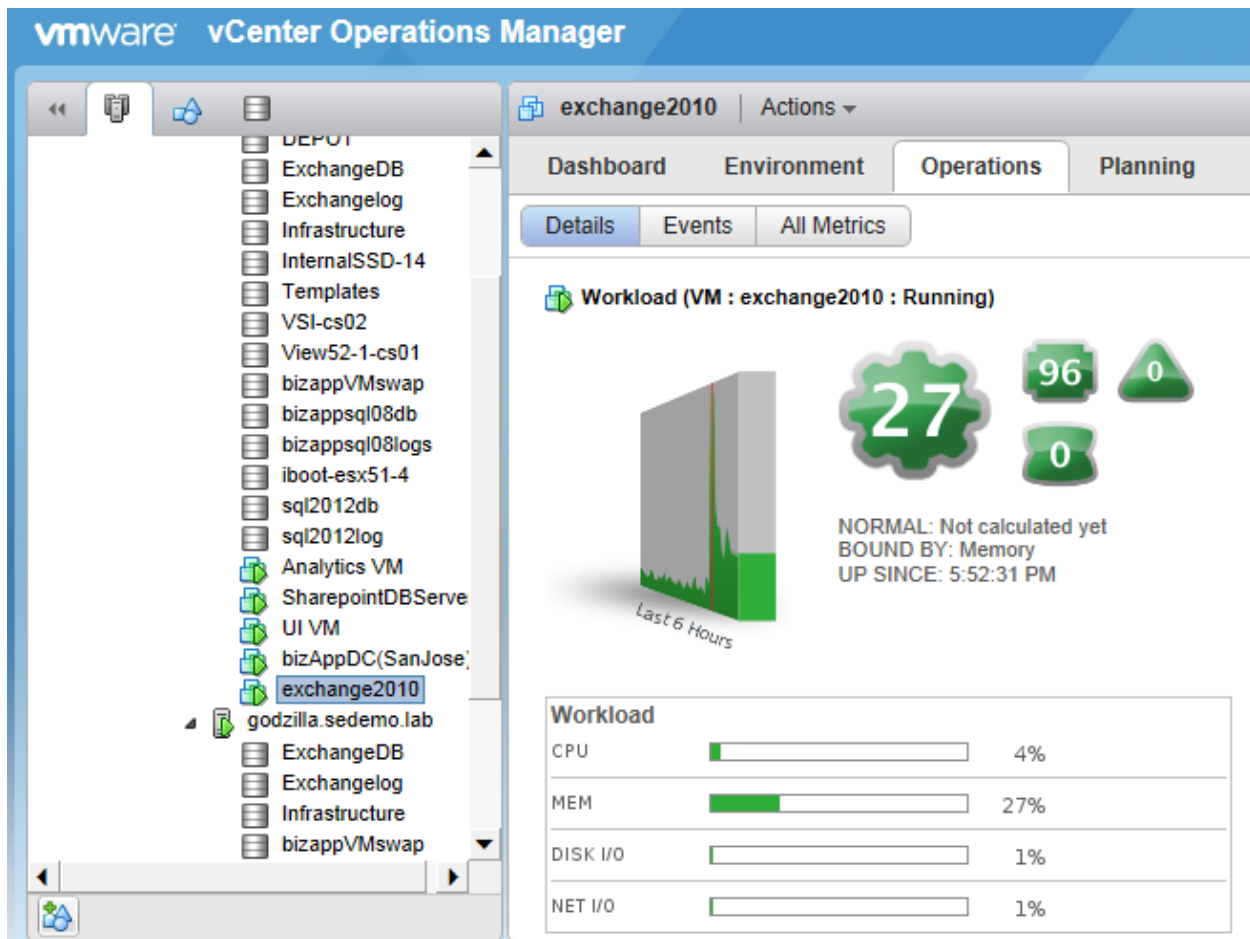
World

- vCenter Biz App
  - Nimble San Jose
    - BizApp
      - bizappex4.sedemo.lab
        - godzilla.sedemo.lab
          - ExchangeDB
          - Exchangelog
          - Infrastructure
          - bizappVMswap
          - iSCSI-boot-godzilla
          - sql2012db
          - sql2012log
          - SQL2012
          - Sharepoint2013
          - exchangenodeb
          - vCenterServer51

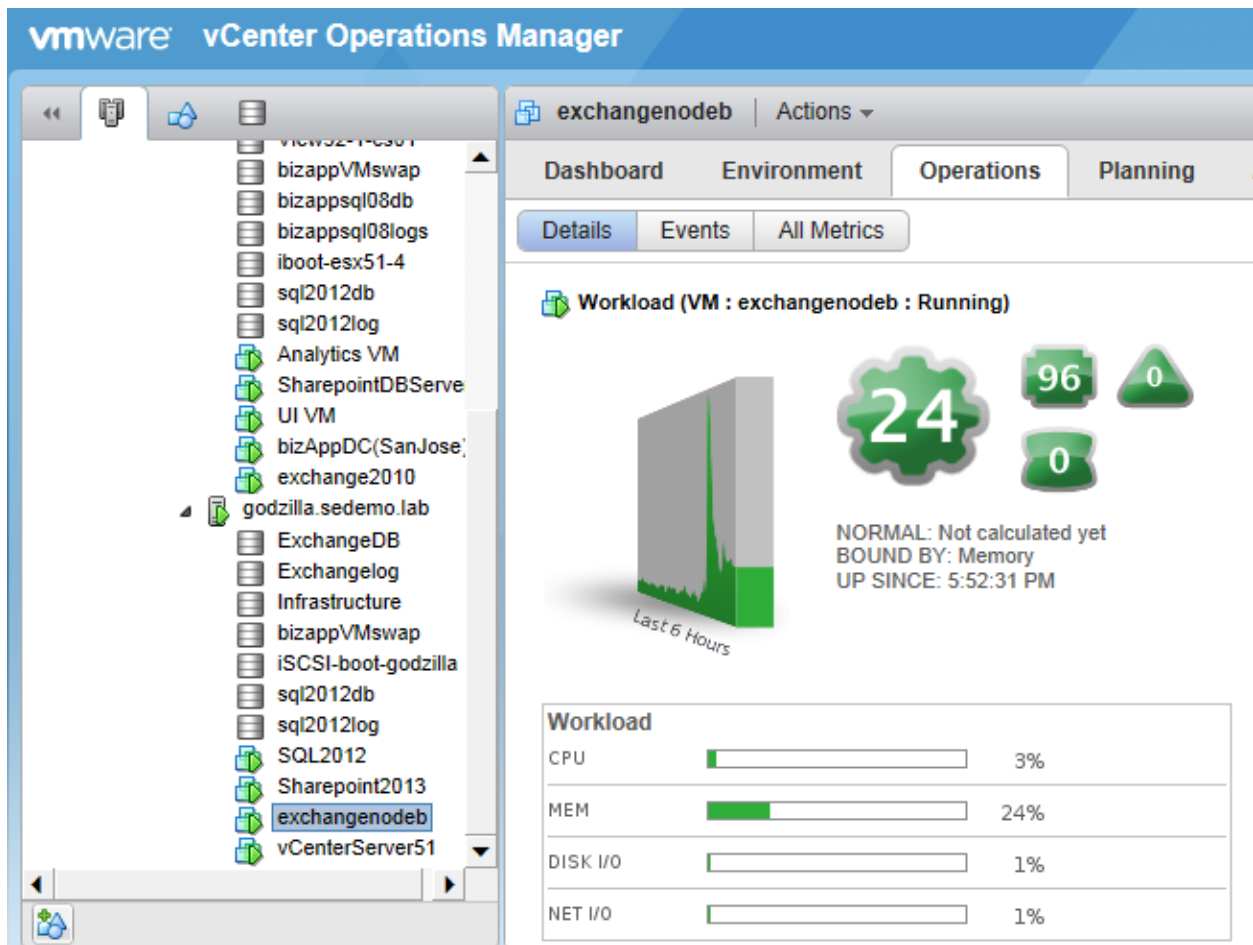
ESXi Server 2 Resource Utilization:



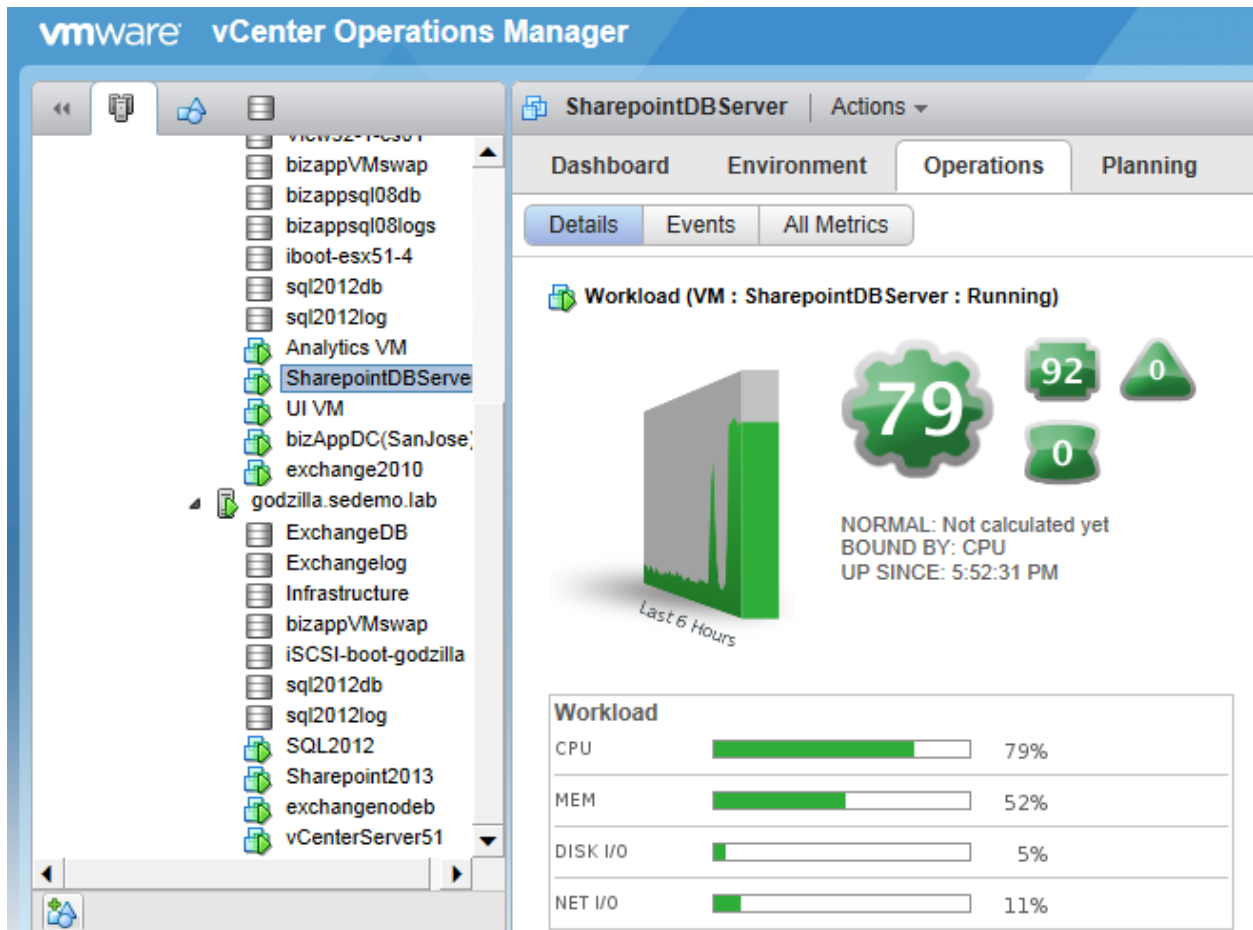
Exchange DAG node 1 Resource Utilization:



Exchange DAG group node 2 Resource Utilization:

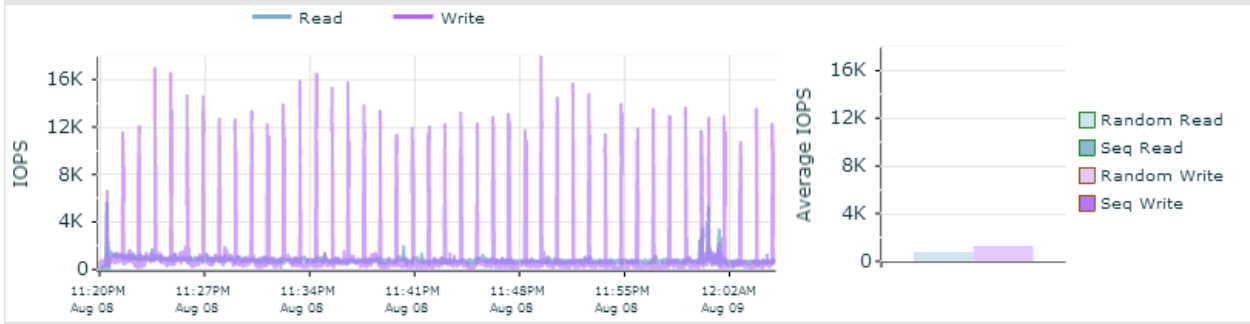


SQL DB serving DVDStore and Sharepoint databases Resource Utilization:

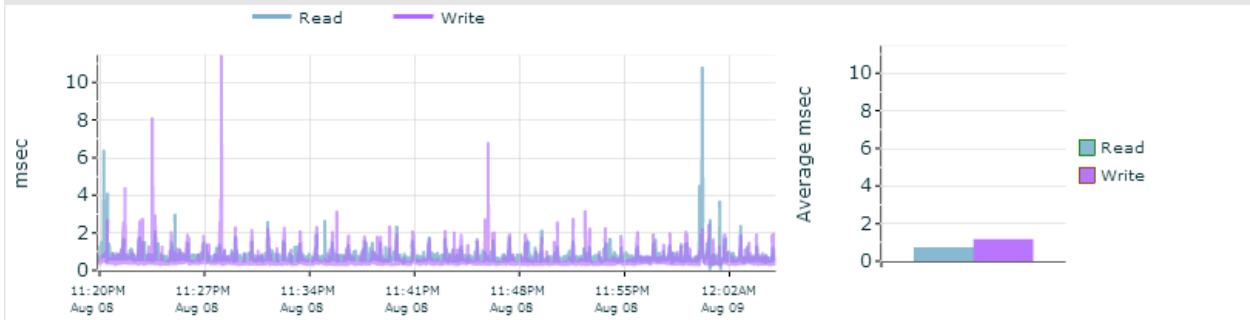


Nimble Storage CS220G Array IOPS and Latency chart:

### IOPS



### AVERAGE LATENCY





2740 Zanker Road, San Jose, CA 95134

Phone: 877-364-6253; 408-432-9600

Email: [info@nimblestorage.com](mailto:info@nimblestorage.com)

[www.nimblestorage.com](http://www.nimblestorage.com)