

Setup vSphere 6 Cluster with PetaSAN datastores

Version 1.1



Revision History

Date	Version	Description
10-10-2016	1.0	Initial version
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1. Purpose

The purpose of this guide is to show how to create an HA and vMotion enabled vSphere 6 cluster which uses PetaSAN scale-out disks for its datastores.

2. Pre-requisites

This guide assumes the reader has followed the Quick Start guide and has deployed a working PetaSAN cluster. We will be using the same subnet assignments as given in the Quick Start example.

Additionally this guide requires:

- 2 x ESXi 6nodes, named ESXi-1 and ESXi-2 with 4 physical interfaces.
- 1 x vCenter6 server
- 1 x Client machine running vSphere 6 Client

3. Network setup

3.1 Configuration Overview

We will set up our new vSphere servers with the following addresses:

	vCenter	ESXi-1	ESXi-2
Management	10.0.1.50	10.0.1.51	10.0.1.52
Gateway	10.0.1.1	10.0.1.1	10.0.1.1
iSCSI 1		10.0.2.51	10.0.2.52
iSCSI 2		10.0.3.51	10.0.3.52
vMotion		10.0.6.51	10.0.6.52

Note: Subnets 10.0.4.0 & 10.0.5.0 are assigned to the PetaSAN backend networks.



3.2 ESXI-1 Management Network

Open vSphere Client and connect to ESXi-1, from "Configuration" -> "Networking" click on "Properties..." for the switch "vSwitch0"



Select the "Management Network" and click "Edit"

Ø	vSwitch0 Properties	_ □	x
Ports Network Adapters			1
Configuration Summary Image: VSWitch 120 Ports Image: VM Network Virtual Machine Image: VM Network Virtual Machine Image: VM Network VMotion and IP	Port Properties Network Label: VLAN ID: VMotion: Fault Tolerance Logging: Management Traffic: ISCSI Port Binding:	Management Network None (0) Disabled Disabled Enabled Disabled	×
	NIC Settings MAC Address: MTU: IP Settings IP Address:	00:0c:29:dd:04:38 1500	
	Subnet Mask:	255.255.255.0 View Routing Table	
	IPv6 Settings	fe80::20c:29ff:fedd:438/64 View Routing Table	
Add Edit Remove	Effective Policies		
		Clo	se



Assign the static IP address. For the default gateway, click "Edit..." to add it:

Seneral IP Settings Security Traffic Shaping NIC Teaming					
No IP Settings Obtain IP settings automatically Use the following IP settings:					
IP Address:	10 , 0 , 1 , 51				
Subnet Mask:	255 . 255 . 255 . 0				
VMkernel Default Gateway:	Edit				
Obtain IPv6 address automatically through Obtain IPv6 address automatically through Static IPv6 addresses: IPv6 Address	DHCP Advanced				
VMkernel Default Gateway:	Add Edit Remove				

DNS and Rou	ting Configuration
DNS Configuration Routing	
Default gateway:	10 . 0 . 1 . 1
Default gateway for IPv6:	
Removing the default gateway connectivity with the host.	may cause the vSphere client to lose
	01/ 01/ 0

Reconnect if necessary. Open the "vSwitch0" properties again. Select the "VM Network" and click "Remove", we will add it later on a separate interface together with the vMotion network. Confirm the message box.



Setup vSphere 6 Cluster with PetaSAN datastores

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Our Management interface should look like this:



3.3 ESXi-1 iSCSI 1 Network

We will now add the iSCSI 1 network on another network interface, click on "Add Networking..."





Select "VMkernel"

Ø	Add Network Wizard	
Connection Type Networking hardware car	n be partitioned to accommodate each service that requires connectivity.	
Connection Type Network Access Connection Settings Summary	Connection Types Virtual Machine Add a labeled network to handle virtual machine network traffic. Virkernel The VMkernel TCP/IP stack handles traffic for the following ESXi services: vSphere vMotion, iSCSI, NFS, and host management.	
	≤ Back Next ≥ Cancel	

Select the "vmnic1" interface (our second interface card)

Ø	Add Network	Wizard		_ D X
VMkernel - Network Acc The VMkernel reaches r	ess eetworks through uplink adapters attached to vSpho	ere standard sw	vitches.	
Connection Type Network Access Connection Settings Summary	Select which vSphere standard switch will hand vSphere standard switch using the unclaimed no Create a vSphere standard switch Intel Corporation 82545EM Gigabit Vmic1 Vmic2 Use vSwitch0 Intel Corporation 82545EM Gigabit	e the network t etwork adapters Speed Ethernet Cor 1000 Full 1000 Full 1000 Full Speed Ethernet Cor	raffic for this connection. You may als slisted below. Networks ntroller (Copper) None None None None Networks ntroller (Copper)	o create a new
	Preview:	1000 Full -Physical Adapter • 📷 vmnic	10.0.1.1-10.0.1.254	
			<u>≤</u> Back Next ≥	Cancel



Name the new network "iSCSI 1", leave the checkboxes unchecked

Add Network Wizard				
VMkernel - Connection Settings Use network labels to identify VMkernel connections while managing your hosts and datacenters.				
Connection Type Network Access Connection Settings IP Settings Summary	Port Group Properties Network Label: VLAN ID (Optional):	SCSI 1 None (0) Use this port group for vMotion Use this port group for Fault Tolerance logging Use this port group for management traffic		
	Network Type:	IP (Default)]	
	ISCSI 1	Physical Adapters		
		Back Next ;	≥ Cancel	

Input the iSCSI 1 IP address for ESXi-1 which is 10.0.2.51

Ø	Add Network Wizard	_ 🗆 🗙
VMkernel - IP Connection Specify VMkernel IP settin	Settings ngs	
Connection Type Network Access Connection Settings JP Settings Summary	C Obtain IP settings automatically C Use the following IP settings: IP Address: IP Address: IP Address: IP Address: ID . 0 . 2 . 51 Subnet Mask: ISS: 255 . 255 . 0 VMkernel Default Gateway: I0 . 0 . 1 . 1 Edit Preview: Previe	
	≤ Back Next ≥	Cancel

3.4 ESXi-1 iSCSI 2 Network

Similarly add a new network for our iSCSI 2, select a "VMkernel" connection type then select "vmnic2" interface

Ø	Add Network	Wizard			x
VMkernel - Network Acc The VMkernel reaches	cess networks through uplink adapters attached to vSphe	re standard sw	vitches.		
Connection Type Network Access	Select which vSphere standard switch will handle vSphere standard switch using the unclaimed ne	the network t twork adapter	raffic for this connection. You may also c listed below.	reate a new	
Summary	Create a vSphere standard switch	Speed	Networks		<u>^</u>
ourmary.	Intel Corporation 82545EM Gigabit	Ethernet Co	ntroller (Copper)		
	Vmnic2	1000 Full	None		
	🖂 🛄 vmnic3	1000 Full	None		_
	O lise vSwitch0	Sneed	Networks		=
	Intel Corporation 82545EM Gigabit	Ethernet Co	atroller (Copper)		
	vmnic0	1000 Full	10.0.1.1-10.0.1.254		
		a 1			
	Use vswitch1	Speed Ethornot Cor	Networks		\sim
		Luiemer co	Itroller (Cobber)		
	Preview:				
	VMkernel	Physical Adapters	2		
			-		
			< Back Next >	Cano	el 1

Name the new network "iSCSI 2", leave the checkboxes unchecked

Ø	Add Network Wizard			
VMkernel - Connection S Use network labels to id	ettings lentify VMkernel connections while r	managing your hosts and datacenters.		
Connection Type Network Access Connection Settings IP Settings Summary	Port Group Properties Network Label: VLAN ID (Optional): Network Type:	ISCSI 2 None (0) Use this port group for VMotion Use this port group for Fault Tolerance logging Use this port group for management traffic		
	UMkernel Port	Physical Adapters	- Canal (
			2 Cancel	

Input the iSCSI 1 IP address for ESXi-1 which is 10.0.3.51

Ø	Add Network Wizard	_ D X					
VMkernel - IP Connectio Specify VMkernel IP set	VMkernel - IP Connection Settings Speafy VMkernel IP settings						
Connection Type Network Access □ Connection Settings Settings Summary	C Obtain IP settings automatically IP Address: IP Address: 10 . 0 . 3 . 51 Subnet Mask: 255 . 255 . 0 VMkernel Default Gateway: 10 . 0 . 1 . 1 Preview: 10 . 0 . 1 . 1 Preview: ISCS i 2 10.0.3.51 Image: Physical Adapters	Edt					
	≤Back	Next ≥ Cancel					

3.5 ESXi-1 VM Network

We will now add the VM Network, this is the network that carries VM traffic. For the connection type select "Virtual Machines".

Ø	Add Network Wizard	-		x
Connection Type Networking hardware can	be partitioned to accommodate each service that requires connectivity.			
Connection Type Network Access Connection Settings Summary	Connection Types	;, NFS,		
	≤Back Next ≥		Canc	el

Select the "vmnic3" interface (our fourth interface card)

Ø	Add Network	Wizard		_ 🗆 X
Virtual Machines - Netw Virtual machines reach	ork Access networks through uplink adapters attached to vSph	ere standard sv	witches.	
Connection Type Network Access Connection Settings	Select which vSphere standard switch will handle vSphere standard switch using the undaimed ne	the network t twork adapters	traffic for this connection. You may a s listed below.	so create a new
Summary	Intel Corporation 82545EM Gigabit	Ethernet Cor 1000 Full	ntroller (Copper) None	
	C Use vSwitch0 Intel Corporation 82545EM Gigabit	Speed Ethernet Cor	Networks ntroller (Copper)	=
	wmic0 Use vSwitch1	1000 Full	10.0.1.1-10.0.1.254	
	Intel Corporation 82545EM Gigabit	Ethernet Con 1000 Full	ntroller (Copper) None	~
	Preview:	Physical Adapter	s	
	VM Network	🗕 🔛 vmnic	3	
<u>,</u>	1		<u>≤</u> Back Next	≥ Cancel

Name the new network "VM Network"

Ø	Add Network Wizard	_ 🗆 🗙				
Virtual Machines - Connection Settings Use network labels to identify migration compatible connections common to two or more hosts.						
Connection Type Network Access Connection Settings Summary	Port Group Properties Network Label: VM Network VLAN ID (Optional): None (0) Preview: VM Network VM Network VM Network VM Network VM Network					
	≤Back	ext ≥ Cancel				

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3.6 ESXi-1 vMotion Network

We will configure our vMotion network to co-exist with the VM network, on our fourth switch"vSwich3" click "Properties...".

In the "Ports" tab click "Add ... "

Ø	vSwitch3 Properties		_ D X
Ports Network Adapters			
Configuration Summary	vSphere Standard Switch Properties		^
T vSwitch 120 Ports	Number of Ports:	120	
👳 VM Network Virtual Machine			
	Advanced Properties		
	MTU:	1500	
	Default Policies		
	Security		
	Promiscuous Mode:	Reject	
	MAC Address Changes:	Accept	=
	Forged Transmits:	Accept	
	Traffic Shaping		
	Average Bandwidth:		
	Peak Bandwidth:		
	Burst Size:		
	Failover and Load Balancing		
	Load Balancing:	Port ID	
	Network Failure Detection:	Link status only	
	Notify Switches:	Yes	
	Failback:	Yes	
Add	Active Adapters:	vmnic3	✓
			Close

Select "VMkernel"

Ø	Add Network Wizard	
Connection Type Networking hardware car	n be partitioned to accommodate each service that requires connectivity.	
Connection Type Connection Settings Summary	Connection Types Virtual Machine Add a labeled network to handle virtual machine network traffic. VMkernel The VMkernel TCP/IP stack handles traffic for the following ESXI services: vSphere vMotion, iSCSI, NFS, and host management.	
	≤Back Next ≥ Cancel	

Name the network "vMotion", this time select the checkbox for "use this port group for vMotion"

Ø	Add Netw	ork Wizard	_ D X
VMkernel - Connection Se Use network labels to ide	ttings htify VMkernel connections while managing yo	ur hosts and datacenters.	
Connection Type Connection Settings IP Settings Summary	Port Group Properties Network Label: VLAN ID (Optional): Nor Nor Network Type: IP (Ition Ition Ise (0) Use this port group for VMotion Use this port group for Fault Tolerance logging Use this port group for management traffic Default)	
	Preview: VMkemel Port vMotion Virtual Machine Port Group VM Network	Physical Adapters	
		≤Back Next	≥ Cancel

Input the vMotion IP address for ESXi-1 which is 10.0.6.51

Ø	Add Network Wizard	_ 🗆 X
VMkernel - IP Connection Specify VMkernel IP set	on Settings ttings	
Connection Type Connection Settings IP Settings Summary	C Obtain IP settings automatically IP Address: 10.0.6.51 Subnet Mask: 255.255.255.0 VMkernel Default Gateway: 10.0.1.1 Edit	
<u>.</u>	<u>≤</u> Back Next≥	Cancel

3.7 ESXi-1 Review network configuration

We are done , our network should be as follows:

		vSphere Standard Switch	View:
efresh Add Networking Properties	Refres	orking	Netwo
perties	Remove Propertie	ard Switch: vSwitch0	Standar
	- Physical Adapters	Mkernel Port	_ VM
Full 🖓	🔸 🕳 🔛 vmnic0 1000 Full	lanagement Network 🛛 👳 🧍	🖓 Ma
		mk0:10.0.1.51	vm
		e80::20c:29ff:fedd:438	fe8
	_	L	
perties	Remove Propertie	ard Switch: vSwitch1	Standar
	Physical Adapters	Mkernel Port	VM
Full 🖓	🛶 🕳 🔛 vmnic1 1000 Full	SCSI 1 😥 🔶	🖓 iSC
		mk1:10.0.2.51	vm
operties	Remove Propertie	ard Switch: vSwitch?	Standar
	Physical Adaptage	Mkamal Datt	VM
Full 🖵	vmnic2 1000 Full	SCSI 2	ISC ISC
		mk2 : 10.0.3.51	VIII

operties	Remove Propertie	rd Switch: vSwitch3	Standar
	- Physical Adapters	firtual Machine Port Group	⊢Vir
Full 🖓	🔸 🕳 🔛 vmnic3 1000 Full	M Network 👳 🔶	🖓 VM
	L	Mkernel Port	VM
	H	Motion 🧕	VM 🖓
		mk3 : 10.0.6.51	vm
perties Full 다	Remove Propertie	Ind Switch: vSwitch3 Intual Machine Port Group M Network Mkernel Port Motion mk3 : 10.0.6.51	Standar VM VM VM vM vm

PetasAN

3.8 ESXi-1 Management network NIC Teaming (Optional)

VMware recommends teaming the interface used for the Management network when setting up a High Availability cluster. This is optional but if we do not do it, it will give us a warning when setting up the HA cluster. To do this, open the "vSwitch0" properties and go to the "Network Adapters" tab, click "Add..."

	vSwitch0 Pr	operties 📃 🗕 🗖 🗙
orts Network Adapters		
NetworkAdapter	Speed Observed IP ranges 1000 Full 0.0.0.1-255.255.255.254	Adapter Details Intel Corporation 82545EM Gigabit Ethernet Controller (Cop Name: vmnic0 Location: PCI 0000:02:01.0 Driver: e 1000 Status Connected Configured Speed, Duplex: Auto negotiate Actual Speed, Duplex: 1000 Mb, Full Duplex iSCSI Port Binding: Disabled Networks: 0.0.0.1-255.255.255.254
Add	Edit Remove	
		Close

Select a standby nic interface to use

	Add /	Adapter Wiza	rd 🔄	
Adapter Select New adapter vSphere stan	ion s may be taken from a pool of u dard switch.	unused ones, or tra	nsferred from an existing	
Adapter NIC Order Summary	Select one or more adap attached to another vSp standard switch and ado	oters from the follow here standard swi ded to this one.	ving list. If you select an adapter .ch, it will be removed from that v:	that is Sphere
	Name	Speed	Network	
	Unclaimed Adapters		1	
	Intel Corporation 8	2545EM Gigabit	Ethernet Controller (Copper)	
	🗹 📟 vmnic4	1000 Full	None	
	vSwitch1 Adapters			
	Intel Corporation 8	2545EM Gigabit	Ethernet Controller (Copper)	
	vmnic1	1000 Full	None	
	vSwitch2 Adapters			
	Intel Corporation 8	2545EM Gigabit	Ethernet Controller (Copper)	
	vmnic2	1000 Full	None	
	vSwitch3 Adapters			
	Intel Corporation 8	2545EM Gigabit	Ethernet Controller (Copper)	
	vmnic3	1000 Full	None	
			≤Back Next ≥	Cancel

Move the interface down to set it up as standby

Ø	Add Adapter Wizard							
Failover Order New adapters will carry traffic for the vSphere standard switch and its port groups unless specified otherwise.								
Adapter NIC Order Summary	L Policy Failover Order: der Select active and standby adapters for this port group. During a failover, standby adapters activate in the order specified below.							
	Configuration		Summary	-				
	vSwitch		128 Ports					
	Management N	etwork	vMotion and IP StoragePort					
	Name	Speed	Networks	Move Up				
	Active Adapte	rs		Mayo Dawn				
	Standby Adapt	1000 Full	10.0.1.1-10.0.1.63					
	wmic4	1000 Full	None					

That is it, our network setup for ESXi-1 should look like this:

3.9 ESXi-2 Network setup

Setting up our ESXi-2 node follows the same above steps, the only difference is the ip address ending in 52 rather than 51.

View:	vSphere Standard Switch	
Netwo	rking	Refresh Add Networking Properties
Standa	rd Switch: vSwitch0	Remove Properties
VI Mi vn fe	Mkernel Port anagement Network nk0 : 10.0.1.52 80::20c:29ff:fe30:4d1e	Physical Adapters
Standa	rd Switch: vSwitch1	Remove Properties
⊽ IS vn	Mkernel Port CSI 1	Physical Adapters wmnic1 1000 Full
Standa	rd Switch: vSwitch2	Remove Properties
⊽ Vi Vn	Mkernel Port CSSI 2 nk2 : 10.0.3.52	Physical Adapters wmnic2 1000 Full
Standa	rd Switch: vSwitch3	Remove Properties
	rtual Machine Port Group	Physical Adapters
√N ∇ VN vn	Mkernel Port 10tion . nk3 : 10.0.6.52	

3.10 Alternative network configurations

Obviously there are many different ways to setup our network. The one presented is chosen for clarity. In some deployments it may be more compact to use 3 or 2 vSwitches. As far as PetaSAN is concerned, the 2 iSCSI subnets must be on 2 separate physical networks.

4.Storage Setup

4.1 PetaSAN disk creation

Create a 50 TB disk with 4 active paths in PetaSAN for use as an ESXi datastore.

ld Disk						₩ N	lanage Disk > 🖨 Add
Disk Name *:				Password Au	uthentication		
VM Datastore				Yes	No		
1 GB			50 TE	Client ACL :			
			Ш	 All 	IQN(s)		
Size							
50			ТВ				
Active Paths							
4							
iSCSI Subnet *:							
Both •							
Auto assign IP address							
Yes No							
							Cancel Subm
sk List						1	🗄 Manage Disk 🚿 🔳
ow 10 v entries						Search:	
isk Id ↓≟ Size ↓↑	Name 1	Created	↓† IQN		Active Paths	Status	Action
0001 50 TB	VM Datastore	2016-10-09	iqn.2016-05.cor	n.petasan:00001	4	Started	

View the path details for the disk; it is enough to take note of the first ip, which we will later connect to

Active Paths	Х
Disk 00001	
IP	Assigned Node
10.0.2.100	ps-node-02
10.0.2.101	ps-node-03
10.0.3.100	ps-node-04
10.0.3.101	ps-node-01
Close	

4.2 ESXi-1 Storage Adapter

4.2.1 Adding the iSCSI Adapter

In vSphere Client, connect to ESXi-1, go to "Configuration" -> "Storage Adapter" and click "Add..."

Confirm the message box

The iSCSI Software Adapter should be added to the list (in some cases, if it does not appear, reboot your ESXi server). Right click on it and select "Properties..."

Ø		10.0.1.51 - v	Sphere Client				- 0	x
File Edit View Inventory Adr	ninistration Plug-ins Help							
🔄 💽 🏠 Home 🕨 🚮	Inventory 🕨 🗊 Inventory							
10.0.1.51	localhost.localdomain VMware ESX	i, 6.0.0, 3620759	Evaluation (60 da	ys remaining)				
	Getting Started Summary Virtual	Machines Resource	e Allocation Perfor	mance Configuration	Users Events F	Permissions	escan All	
	Hardware	Device	apters	Tupa		Refresh Re	.acuit Airri	— Â
	Health Status	iSCSI Soft	vare Adapter	Туре	VVVVIN			-
	Processors	🕝 vmht	a33	iSCSI	ign.1998		d1ae-82bb-	-5a
	Storage	PIIX4 for	30TX/440BX/MX	IDE Controller	Re	scan		_
	Networking	S vmhb	a0	Block SCSI	Pro	operties		
	 Storage Adapters 	C vmhb	a32	Block SCSI	Re	move		
	Network Adapters	55C1050 F		SCST				
	Advanced Settings							
	Power Management	<		III				> ≡
	Software	Details						_
	Licensed Features	vmhba:	3			Pr	operties	
	Time Configuration	Model:	iSCSI 5	Goftware Adapter				
	DNS and Routing	ISCSI N	ame: iqn. 19	98-01.com.vmware:57fd5	5c27-d1ae-82bb-5a6c	-000c29dd0438-45	i1d4373	
	Authentication Services	Connec	ted Targets: 0	Devices: 0	Paths: 0			
	Virtual Machine Startup/Shutdown	16	Daviana Datha					
	Security Profile	view.	Paulis Paulis					-
	Host Cache Configuration	Name		Runtime Name	e Operational	State LUN	Туре	
	System Resource Reservation	<	111				>	
	<		III					>
Recent Tasks	,,			Name, Target o	or Status contains: •		Clea	ar ×
Name Targ	get S	Status	etails		Initiated by	Requested Start	Ti 🖙 St	art Time
<		Ш						>
Tasks					Evaluatio	n Mode: 60 days n	emaining	root

The "iSCSI Initiator Properties" dialog appears, select "Configure..."

🤣 iS	CSI Initiator (vmhba33) Properties
General Network Configuration	h Dynamic Discovery Static Discovery
Name: Alias:	iqn.1998-01.com.vmware:57ffb528-94d8-92a8-b79f-000c29dd0438-256
Target discovery methods:	Send Targets, Static Target
Software Initiator Properties	
Status:	Enabled
Advanced	. Configure
	Close

Specify the iSCSI Initiator name to identify the ESXi-1 server

🕗 General Properties 🗙
iSCSI Properties iSCSI Name: qn. 1998-01.com.vmware:esx1 iSCSI Alias:
Status Enabled
OK Cancel

Go to the "Network Configuration" tab, Click "Add..."

Ø	iSCSI Initiator (vmhba	a33) Properties	_ □ ×
General Network Conf	iguration Dynamic Discovery St	atic Discovery	
VMkernel Port Bindings	:		
Port Group	VMkernel Adapter	Port Group Policy	Path Status
<	Ш		>
		<u>A</u> dd	<u>R</u> emove
VMkernel Port Binding I	Details:		
			Close

We need to identify which networks are to be used by the iSCSI adapter, select iSCSI 1 and click "OK"

Only VMkernel adapte Ohy VMkernel adapte	Bind with VI	Mkernel Network A	Adapter ×							
If a targeted VMkernel adapter is not listed, go to Host > Configuration > Networking to update its effective teaming policy.										
Select VMkernel adapter to bind with the iSCSI adapter:										
Port Group VMkernel Adapter Physical Adapter										
iSCSI 1 (vSwitch1)		vmk1	vmnic1 (1000, Full)							
iSCSi 2 (vSwitch2)		vmk2	vmnic2 (1000, Full)							
👰 vMotion (vSwitch3)		vmk3	vmnic3 (1000, Full)							
-			vmnic4 (1000, Full)							
-			vmnic0 (1000, Full)							
Virtual Network Adapt	ter									
Virtual Network Adapt	ter									
Virikelner:	VIIIK1									
Switch:	VSWITCH1									
Port Group:	10.00.51									
IP Address:	10.0.2.51									
Subnet Mask:	255.255.25	15.U								
IPV6 Address:	Te80::250:	5611:1668:2068/64								
Physical Network Ada	pter									
Name:	vmnic1									
Device:	Intel Corp	oration 82545EM Gigabi	t Ethernet Controller (Copper)							
Link Status:	Connected	I								
Configured Speed:	1000 Mbp:	s (Full Duplex)								
,			<u>O</u> K <u>C</u> ancel							

Repeat to add iSCSI 2

4.2.2 Discovering our disk

Go to the "Dynamic Discovery" tab, add the first ip address of our PetaSAN disk: 10.0.2.100, this is the IP we took note of when viewing the list of active paths in PetaSAN.

ISCSI Ser	verLocation
[Add Send Target Server
	iSCSI Server: 10.0.2.100 Port: 3260 Parent: 10.0.0.000
	Authentication may need to be configured before a session can be established with any discovered targets.
	OK Cancel

Close the "iSCSI Initiator Properties" dialog and confirm to rescan the adapter.

4.2.3 Path Policy Management

The PetaSAN disk should be detected and added to the list under "Devices". Take note of the assigned device name starting with letters naa.xxx as will use it later for further optimization. Right click and select "Manage Paths…"

Storage Adapters			Add	Remove	Refresh	Rescan All
Device	Туре	WWN				
iSCSI Software Adapter						
📀 vmhba33	iSCSI	ign.1998-0	1.com.vm	ware:esx1:		
PIIX4 for 430TX/440BX/MX	IDE Controller					
📀 vmhba0	Block SCSI					
🕝 vmhba32	Block SCSI					
53c1030 PCI-X Fusion-MPT	Dual Ultra320 SCSI					
🎯 vmhba1	SCSI					
Details						
vmhba33 Model: iSCSI iSCSI Name: iqn.19 iSCSI Alias:	Software Adapter 998-01.com.vmware:esx1	L				Properties
Connected Targets: 4	Devices: 1	Paths:	4			
View: Devices Paths						
Name	Runtime Nam	ie Ope	rational S	tate LUN	Туре	Drive T
PETASAN iSCSI Disk (naa.60	01405 vmhba33:	Rename			disk	SSD
		Manage	Daths			
		Data ala	r atris	A		
		Detach				
		Copy ide	ntifier to	clipboard		
<	III					>

In the "Manage Paths" select "Round Robin (VMware)" then click "Change"

l P	PETA	SAN iSCSI Disk (naa.600140500001000000	000000000000000000000000000000000000000	00000	0) Manage	Paths	
Policy							
Path Selection:		Round Robin (VMware)				-	Change ,
Storage Array I	ype:	VMW_SATP_ALUA					-
Paths							
Runtime Name		Target	LUN	Stat	us	Prefer	red
vmhba33:C7:T0	:L0	iqn.2016-05.com.petasan:00001:10.0.3.101:3260	0	•	Active		
vmhba33:C4:T0	:L0	iqn.2016-05.com.petasan:00001:10.0.2.101:3260	0	•	Active		
vmhba33:C3:T0	:L0	iqn.2016-05.com.petasan:00001:10.0.3.100:3260	0	•	Active		
vmhba33:C0:T0	:L0	iqn.2016-05.com.petasan:00001:10.0.2.100:3260	0	•	Active (I/O)		
							Refresh
Name:	vn	1hba33:C7:T0:L0					
Runtime Name:	vn	1hba33:C7:T0:L0					
iSCSI							
Adapter:	iqn	.1998-01.com.vmware:esx1					
iSCSI Alias:							
Target:	iqn	.2016-05.com.petasan:00001					
	10.	.0.3.101:3260					
							Class
							Close

All paths should change to "Active (I/O)" status, click "Close"

🖉 Р	ETASAN iSCSI Disk (naa.60014050000100000	0000000000	00000) Manage	Paths X
Policy				
Path Selection:	Round Robin (VMware)			Change
Storage Array T	VDE: VMW SATE ALLIA			
bianage / and / i	, , , , , , , , , , , , , , , , , , ,			
Paths				
Runtime Name	Target	LUN	Status	Preferred
vmhba33:C7:T0	:L0 iqn.2016-05.com.petasan:00001:10.0.3.101:3260	0	🔶 Active (I/O)	
vmhba33:C4:T0	:L0 iqn.2016-05.com.petasan:00001:10.0.2.101:3260	0	 Active (I/0) 	
vmhba33:C3:T0	:L0 iqn.2016-05.com.petasan:00001:10.0.3.100:3260	0	 Active (I/0) 	
vmhba33:C0:T0	:L0 iqn.2016-05.com.petasan:00001:10.0.2.100:3260	0	 Active (I/0) 	
1				
				Refresh
Name:	vmhba33:C7:T0:L0			
Runtime Name:	vmhba33:C7:T0:L0			
iSCSI				
Adapter:	ign.1998-01.com.vmware:esx1			
iSCSI Alias:				
Target:	iqn.2016-05.com.petasan:00001			
	10.0.3.101:3260			
1				
				dur
				Close

4.2.4 Adjusting Round Robin IOPS limit (Optional)

The default VMware Round robin algorithm load balances between the different paths every 1000 i/o operations. For better performance in symmetric arrays, it is better to set this value to 1.

Connect to the ESXi via ssh

Execute the following command to list our devices

esxcfg-scsidevs -c | awk '{print \$1}' | grep naa.

This should list the devices for example:

naa.60014050000100000000000000000000

naa.60014050000300000000000000000000

You can also identify the devices from the "Storage Adapters" listed under the "Devices" tab.

esxcli storage nmp psp roundrobin deviceconfig set --type=iops --iops=1 --device=naa.60014050000100000000000000000000000

4.3 ESXi-2 Storage Adapter

Repeat the same steps to configure the iSCSI Adapter on ESXi-2, just specify a different initiator name in the "General" tab -> "Configure"

4.4 Adding a Datastore

We now need to add our PetaSAN disk as datastore. From "Configuration" -> "Storage" click "Add Storage..."

Note: These steps need to be done only from ESXi-1. Do not add the datastore from ESXi-2.

C ¹		10.0.1.51 - v	Sphere Client					- • ×
File Edit View Inventory Administration Plug-ins H	elp							
🕞 💽 🔥 Home 🕨 🚮 Inventory 🕨 🕅 Invent	ory							
6 S								
10.0.1.51 localhost.localdomain VMware E	Xi, 6.0.0, 3620	759 Evaluation (50 days remaining)					
Getting Started Summary Virtu	I Machines Re	source Allocation	Performance Config	uration Users E	vents Permi	issions		
Hardware	View	Datastores Devi	ces					
Health Status	Data	stores			Refresh	Delete	Add Stornge	Rescan All
Processors	Iden	tification 🗠	Device	Drive Type	Capacity	FI	ree Type	LastUpdate
Memory		datastore1	Local VMware, Di	SSD	32.50 GB	31.55	GB VMFS5	9/24/2016 3:58
► Storage								
Networking								
Storage Adapters								
Network Adapters								
Advanced Settings								
Power Management								
Software								
Licensed Features	1			u.				>
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DNS and Routing	Data	store Details						Properties
Authentication Services								
Virtual Machine Startup/Shutdow	n							
Virtual Machine Swaphie Location								
Heet Cache Configuration								
System Resource Reservation								
Agent VM Settings								
Advanced Settings								
Recent Tasks						Fuelvet	Mada, CO d	×
V IdSKS						Evaluation	n mode: 60 days	remaining root

For storage type, leave the default selection of "Disk/LUN"

Ø	Add Storage
Select Storage Type Specify if you want to form	nat a new volume or use a shared folder over the network.
Disk/LUN Select Disk/LUN Current Disk Layout Properties Formatting Ready to Complete	Storage Type
	≤ Back Next ≥ Cancel

Select our PetaSAN disk then click "Next >"

Ø	Add Sto	orage		_ D X			
Select Disk/LUN Select a LUN to create a dat	astore or expand the current one						
Disk/LUN Select Disk/LUN	Name, Identifier, Path ID, LUN, Capacity, Expandable or VMFS Label contai • Clear						
Current Disk Layout	Name	Path ID	LUN 🗠 Drive Ty	/pe Capacity VMF			
Properties	PETASAN iSCSI Disk (naa.60014050	iqn.2016-05.com	0 SSD	50.00 TB			
	You have selected a solid state d space for host cache which will in datastore after it is created, nav properties.	rive. Datastores create prove system performa igate to the host cache	d on solid state drive ance. If you want to configuration page a	is can be used to allocate configure cache on the and edit the datastore			
			≤Back	Next ≥ Cancel			

Name the datastore "PetaSANDataStore 1"

Ø	Add Storage	- - X
Properties Specify the properties for th	e datatore	
Disk/LUN Select Disk/LUN Current Disk Layout Properties Formating Ready to Complete	Enter a datastore name	
	≤ Back	Next Cancel

Leave the default size of "Maximum available space"

Ø	Add Storage	_ D X
Disk/LUN - Formatting Specify the maximum file size	e and capacity of the datastore	
Disk/LUN Select Disk/LUN Current Disk Lavout Properties Formatting Ready to Complete	Capacity Cap	
	≤ Back Next ≥	Cancel

> Note: For our disk size of 50TB, it will take a couple of minutes to format.

4.5 Adding a second Datastore (Optional)

VMware recommends having more than one datastore when setting up a High Availability cluster. This is optional but if we do not do it, it will give us a warning when setting up the HA cluster. To do this, repeat the steps for adding a disk in PetaSAN, discovering it and specifying its path policy on both nodes, finally add it as a new datastore from ESXi-1.

6. Building the cluster

Log into vCenter and create a new datacenter.

Under the new datacenter, create a new cluster

Ø						P	etaSAN-vCer	ter - vSphere Client			_ 0	x
File	Edit	View	Invent	ory	Administration Plug-ins	Help						
	->		Home	Þ	🚮 Inventory 🕨 👘 Hos	ts and Clusters				Search Inventory		9
ø	邮	II.	<u> </u>	ę								
Ē	Peta	SAN-v	Center		PetaSAN-Center							
1.7		PetaSA	N-Cente	1	New Folder	Ctrl+F	ines Host	s IP Pools Performance	Tasks & Events Alarms	Permissions Mans		
				山	New Cluster	► Ctrl+L			Lingue el France Linguine (close tab	6	
L				1	New Datastore Cluster	4	host	Add a virtual machine	Complete set-up	close tab p		^
L				Et.	Add Host	Ctrl+H						
L				R.	New Virtual Machine	Ctrl+N						
				<u></u>	New vSphere Distributed	Switch Ctrl+K	tualization	coffware such as		Vietual Machines		
					Add Datastore		es. Addin	g a host to the	A REAL	Virtual Machines		
					Rescan for Datastores		Server management.					
				Migrate Virtual Machine Networking	Networking	X or ESXi software. If you visit the VMware Web site						
					Add Permission	Ctrl+P				Host		
					Alarm		the location	on of the host on				
L					Open in New Window	Ctrl+Alt+N	e account	(typically				
					Remove				N			
L					Rename					Datacenter		
					To continu	e vCenter Serve	r setup, click A	Add a host.				
					📑 Add a	host						
L												
												~
Rece	nt Tas	ks			1				Name, Target or Status o	ontains: •	Clear	×
Nam	e			1	Target		Status	Details	Initia	ed by . vCenter Server		F

Specify the name "HA" for the cluster name, select "Turn On vSphere HA"

Ø	New Cluster Wizard	_ D X
Cluster Features What features do you wan	t to enable for this duster?	
Cluster Features vSphere HA Virtual Machine Options VM Monitoring VMware EVC VM Swapfile Location Ready to Complete	Name HA Cluster Features Select the features you would like to use with this duster. Image: Turn On vSphere HA vSphere HA detects failures and provides rapid recovery for the running within a duster. Core functionality includes host and virb monitoring to minimize downtime when heartbeats cannot be det vSphere HA must be turned on to use Fault Tolerance. Turn On vSphere DRS vSphere DRS enables vCenter Server to manage hosts as an agg resources. Cluster resources can be divided into smaller resource and virtual machines. vSphere DRS also enables vCenter Server to manage the assign to hosts automatically, suggesting placement when virtual machine migrating running virtual machines to balance load and enforce re policies. vSphere DRS and VMware EVC should be enabled in the cluster ir and migrating VMs with Fault Tolerance turned on, during load balance	virtual machines ual machine ected. pregate pool of pools for users, groups, ment of virtual machines nes are powered on, and esource allocation n order to permit placing alancing.
	≤ Back N	xt≥ CtivGencelWin

Click "Next >" several times accepting the default values until the wizard finishes. Then right click on the newly created HA cluster and select "Add Host..."

Ø			PetaSAN-vCenter - vSph	nere Client 📃 🗖 🗙
File Edit Vie	v In	ventory Administration Plug-ins H	elp	
	<u></u>	Home 👂 🚮 Inventory 👂 🗊 Hosts	nd Clusters	ह्य • Search Inventory 🔍
1 8 0		it .		
PetaSAN	-vCen SAN-C	ter HA Center Getting Started St	mmary Virtual Machines Hosts Resource	Allocation Performance Tasks & Events Alarms Permissions Maps Profile 🛾 D
	E	New Virtual Machine		close tab 🕅
	đ	New Resource Pool Ctrl+C		
	譜	New vApp Ctrl+A	f hosts. When you add a host to	a er's
		Rescan for Datastores	er manages the resources of all	hosts
		Host Profile	•	Cluster
		Add Permission Ctrl+F	Sphere High Availability (HA) an Resource Scheduler (DRS) solut	d jons
		Alarm	tesource ceneduler (Br(c) solution	
	1	Edit Settings		Host
		Open in New Window Ctrl+Alt+N		
		Remove		
		Kename		Datacenter vCenter Server
				vSphere Client
				Explore Further
				×
				Learn more about clusters
Recent Tasks				Name, Target or Status contains:
Name		Target	Status Datails	Initiated by UCenter Server E

Enter the Management IP for ESXi-1 and its root username and password.

0	Add Host Wizard	_ D X
Specify Connection Settings Type in the information used to conn	ect to this host.	
Connection Settings Host Summary Ready to Complete	Connection Enter the name or IP address of the host to add the host: 10.0.1.51 Authorization Enter the administrative account information for the use this information to connect to the host and exaccount for its operations. Username: root Password: *******	to vCenter.
	<u>≤</u> Back	Next > Cancel

Click "Next >" several times accepting the default values until the wizard finishes. Repeat the same steps to add ESXi-2.

On completion, verify the cluster is healthy and then vMotion and HA are configured and running.

7. Creating Virtual Machines

Our cluster is now ready, with HA and vMotion enabled. It's time to start using it. Right click on an ESXi node and select "New Virtual Machine".

8. Performance Optimization

8.1 MaxIoSize

ESXi restricts iSCSI I/O to a maximum of 128k, this should be increased to the maximum of 512k. To list current size *esxcli system settings advanced list -o /ISCSI/MaxIoSizeKB* To increase io size to maximum: *esxcli system settings advanced set -o /ISCSI/MaxIoSizeKB -i 512* Important: A reboot is required on the ESX host for change to take effect

8.2 VMotion

Before starting vmotion between 2 datastores/disks, make sure that all the paths of disk1 and disk2 are active on the same set of hosts, if they are not then you can move paths via the path assignment page. We want to avoid having a host that serves a path of 1 disk and not the other, this will slow down things significantly.