Setup vSphere 6 Cluster with PetaSAN datastores

Version 1.1

Revision History

Date	Version	Description
10-10-2016	1.0	Initial version
28-04-2019	1.1	Performance Optimizations

Contents

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

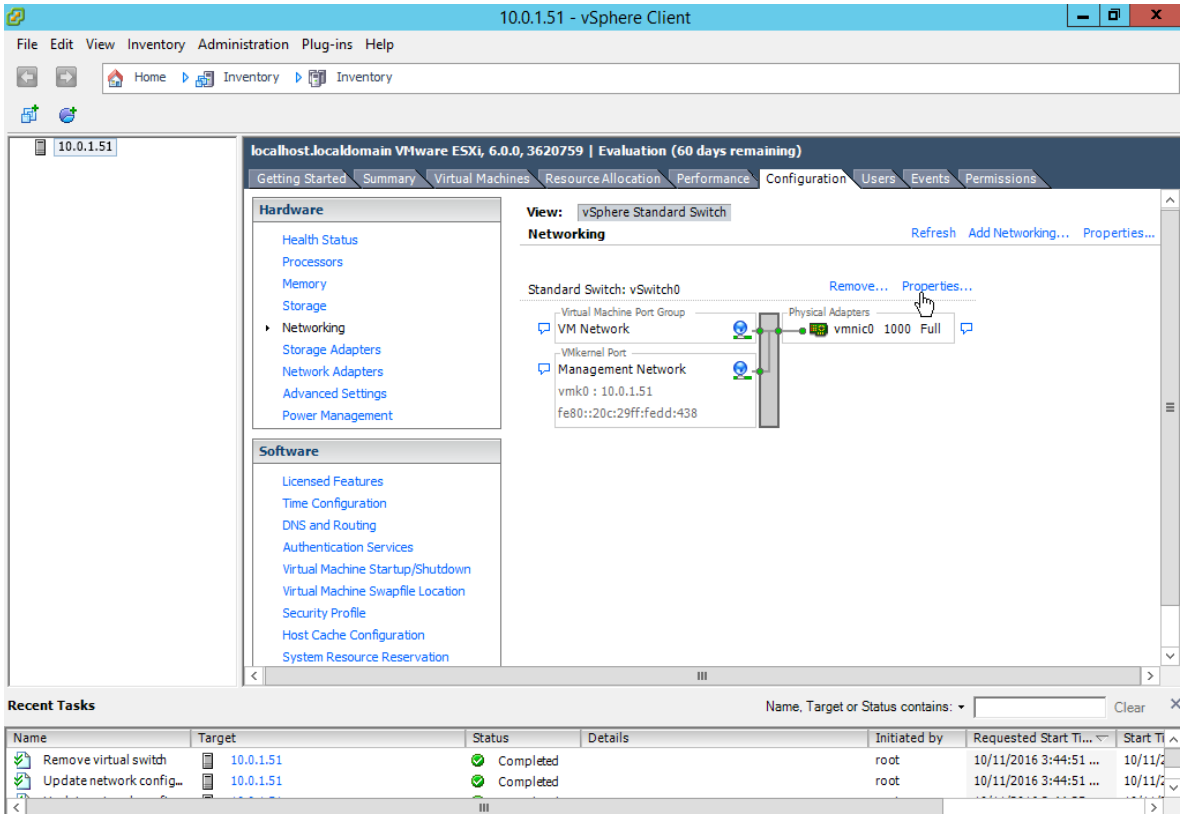
We will set up our new vSphere servers with the following addresses:

	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

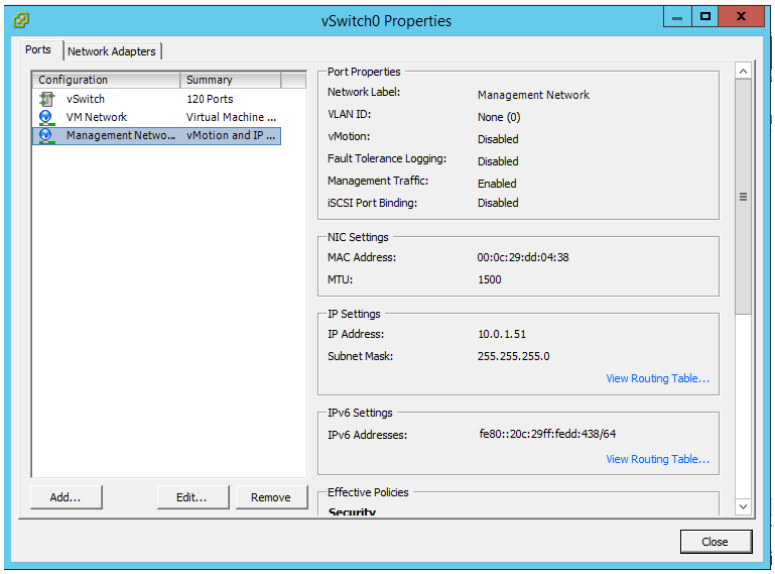
- *Note: Subnets 10.0.4.0 & 10.0.5.0 are assigned to the PetaSAN backend networks.*

3.2 ESXI-1 Management Network

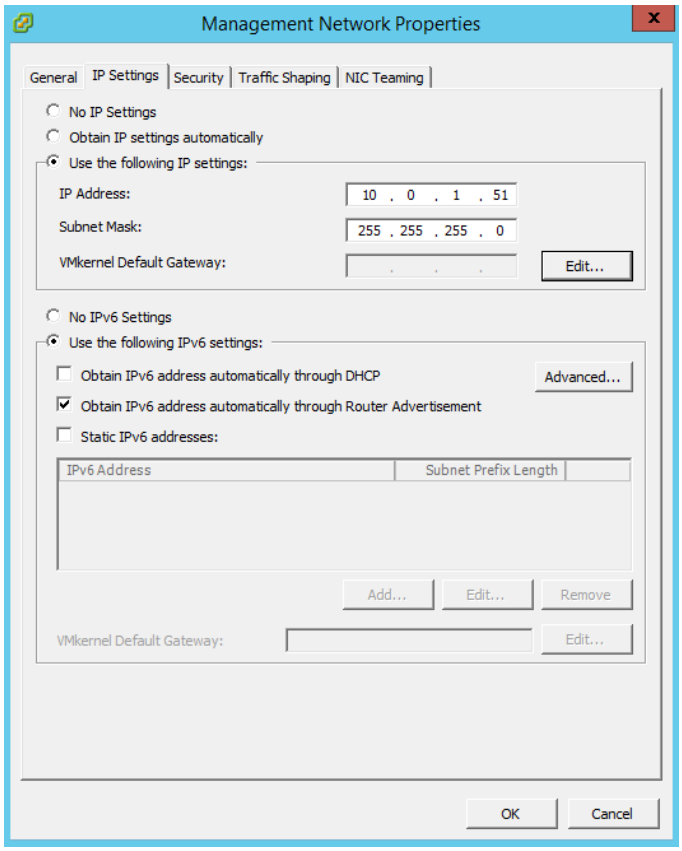
Open vSphere Client and connect to ESXi-1, from "Configuration" -> "Networking" click on "Properties…" for the switch "vSwitch0"

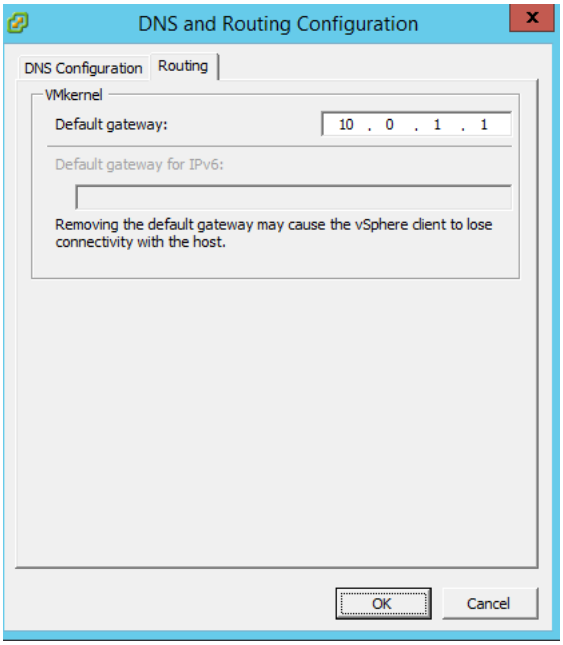


Select the "Management Network" and click "Edit"

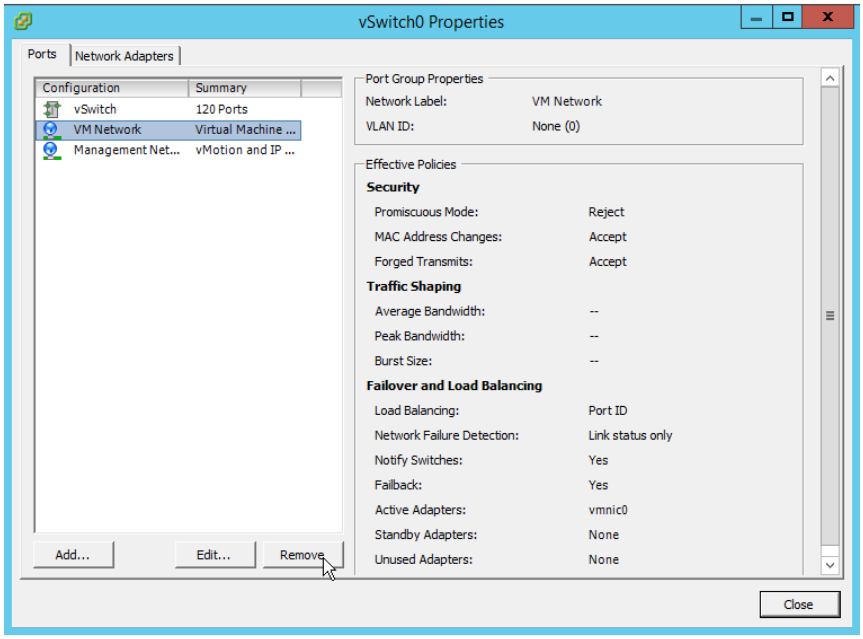


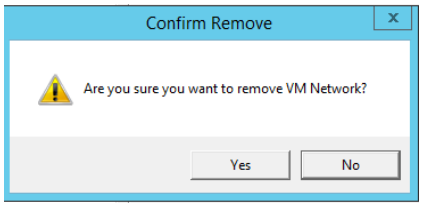
Assign the static IP address. For the default gateway, click “Edit…” to add it:



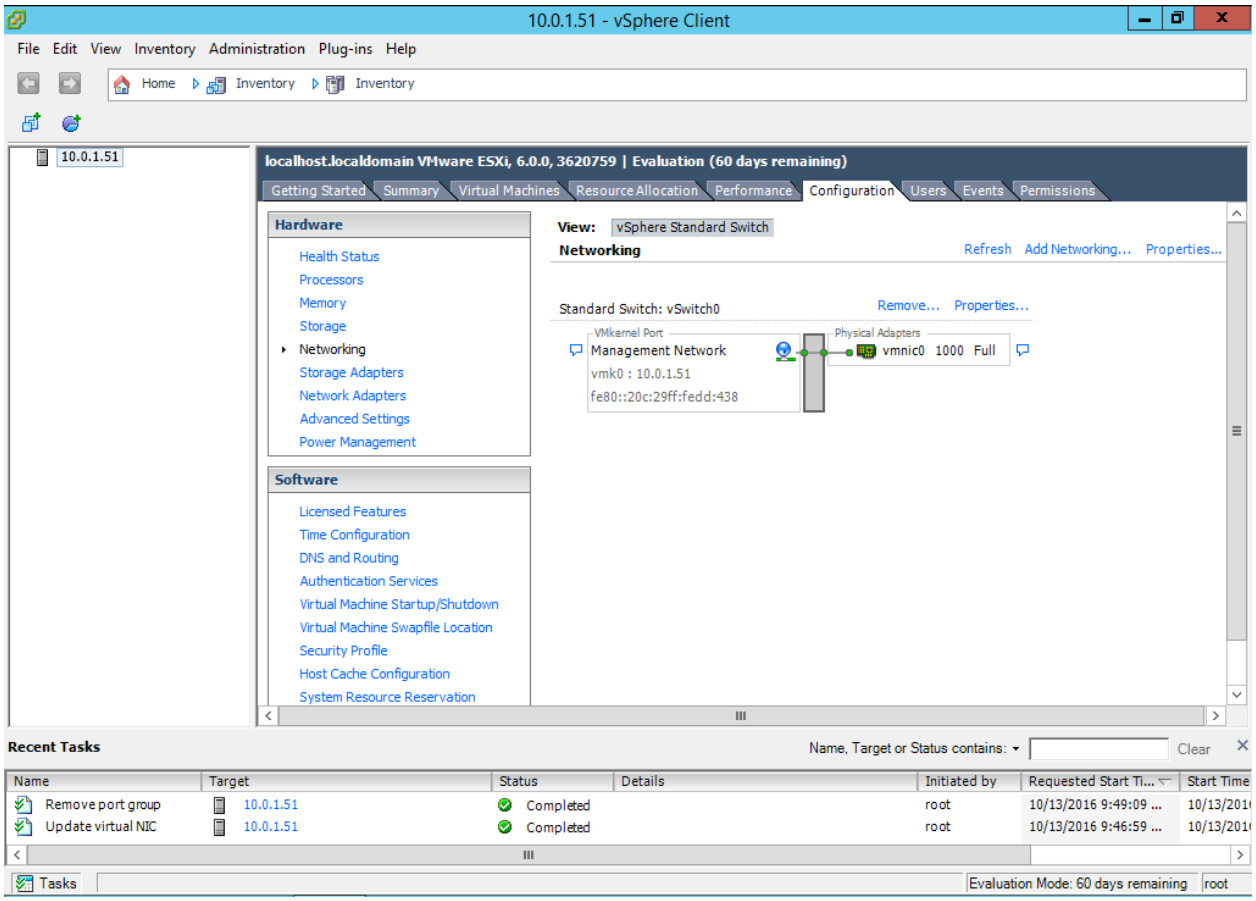


Reconnect if necessary. Open the “vSwitch0” properties again. Select the “VM Network” and click “Remove”, we will add it later on a separate interface together with the vMotion network. Confirm the message box.



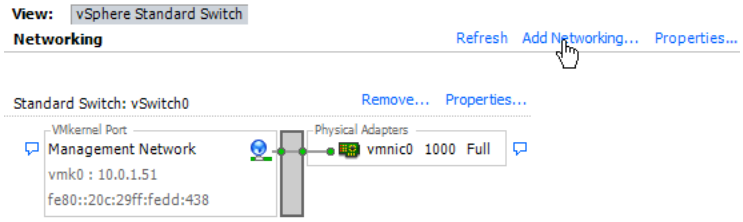


Our Management interface should look like this:

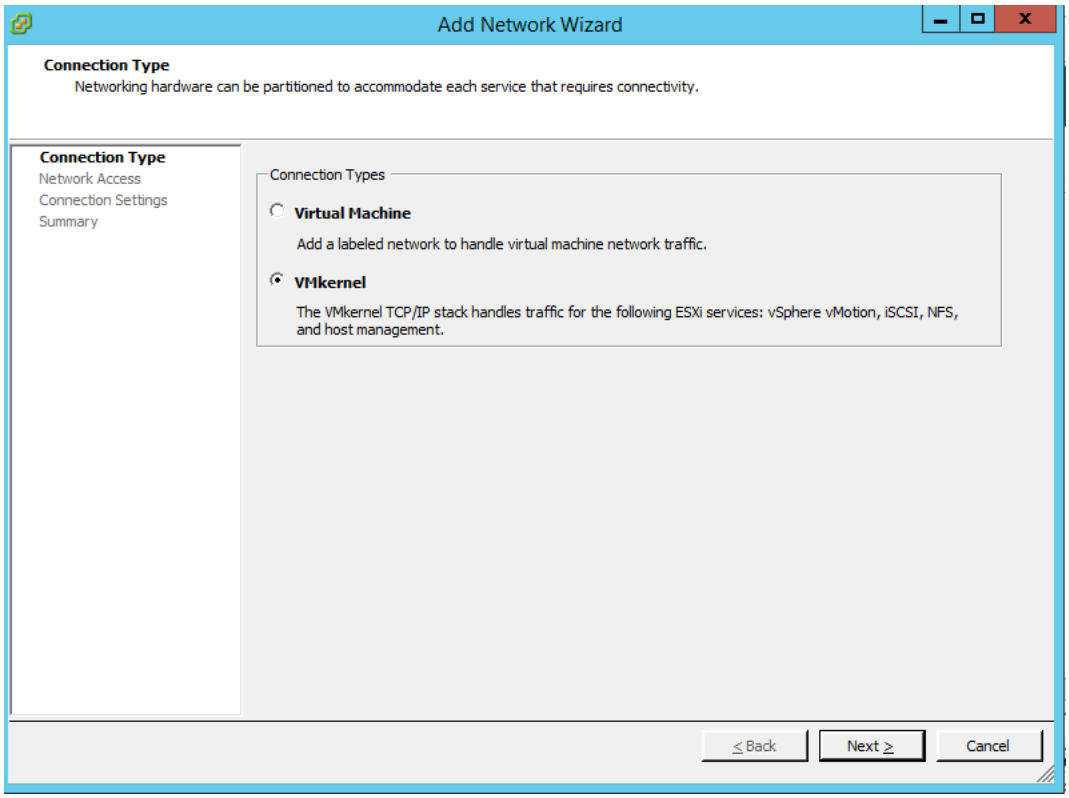


3.3 ESXi-1 iSCSI 1 Network

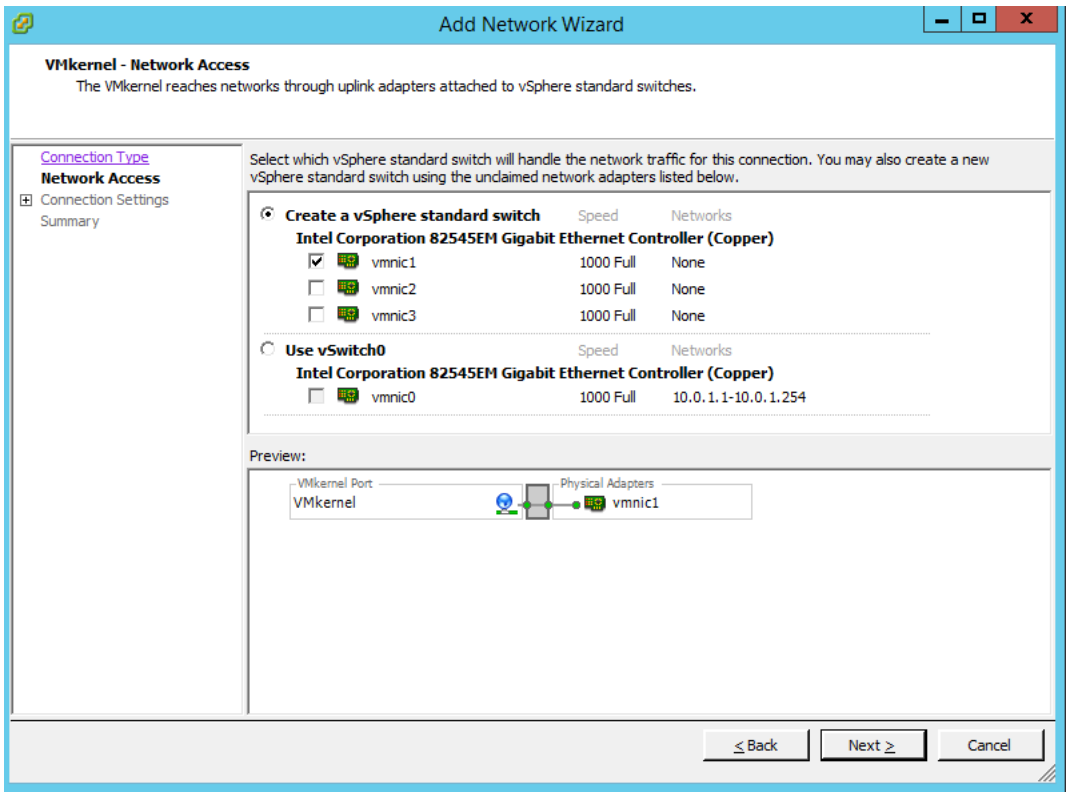
We will now add the iSCSI 1 network on another network interface, click on “Add Networking…”



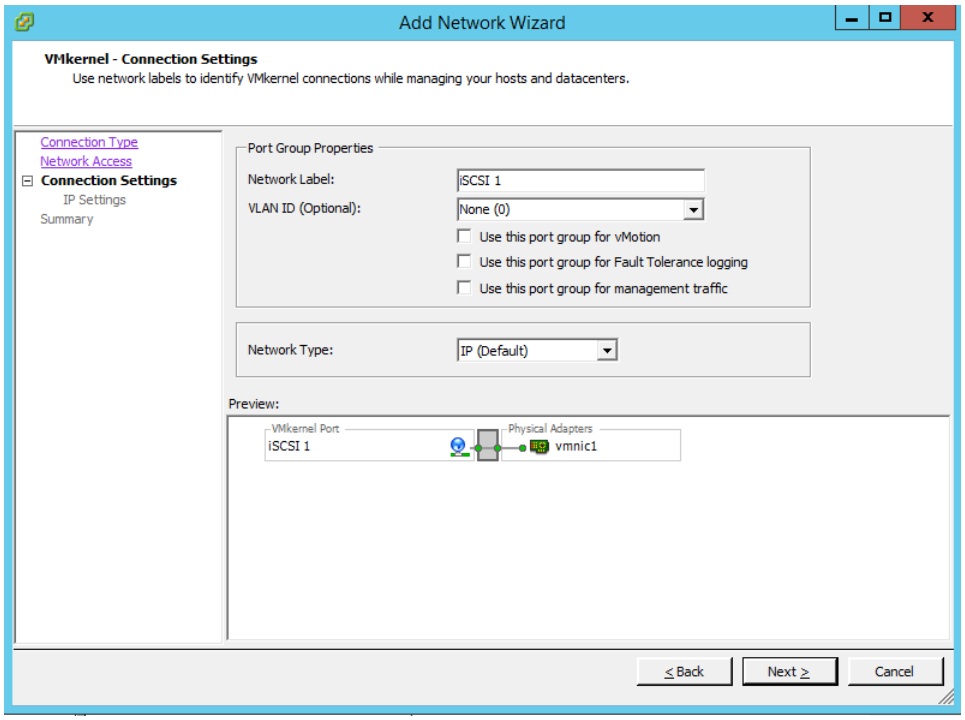
Select “VMkernel”



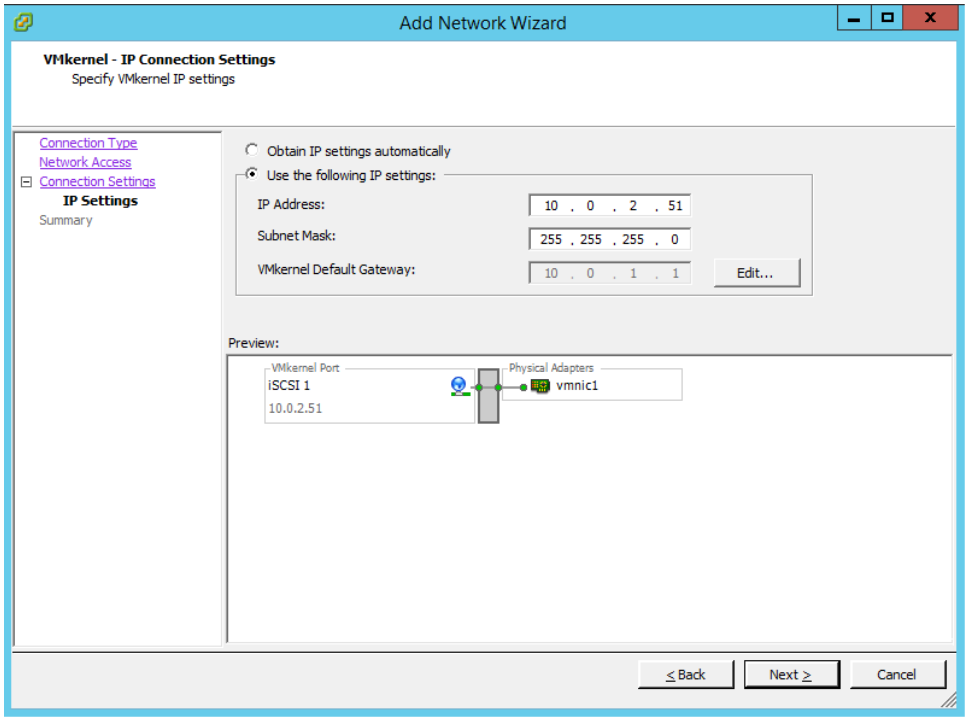
Select the “vmnic1” interface (our second interface card)



Name the new network “iSCSI 1”, leave the checkboxes unchecked

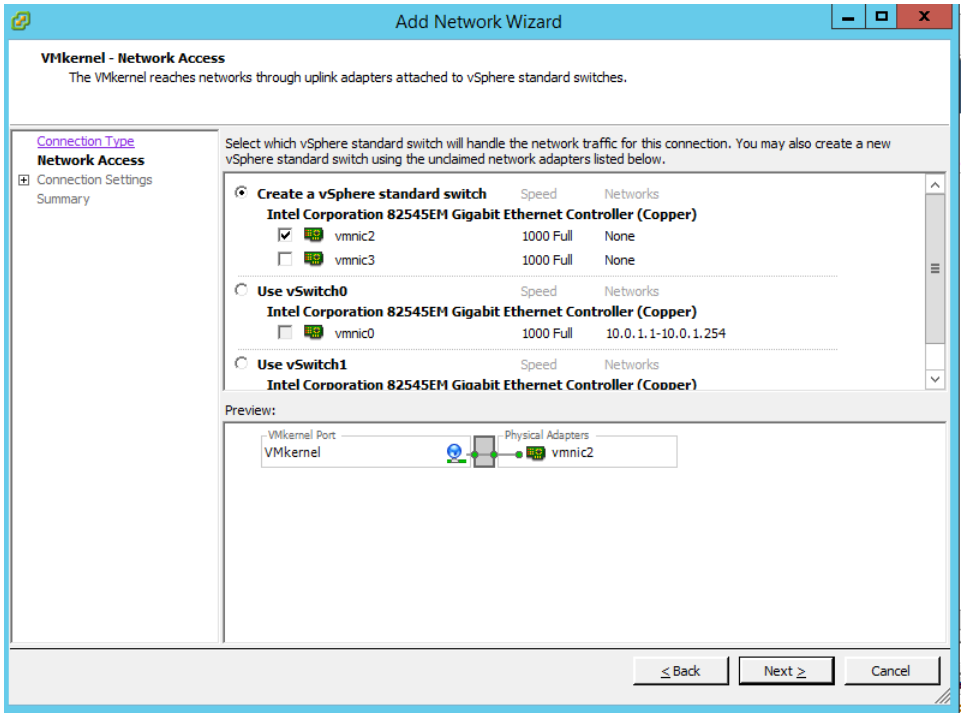


Input the iSCSI 1 IP address for ESXi-1 which is 10.0.2.51

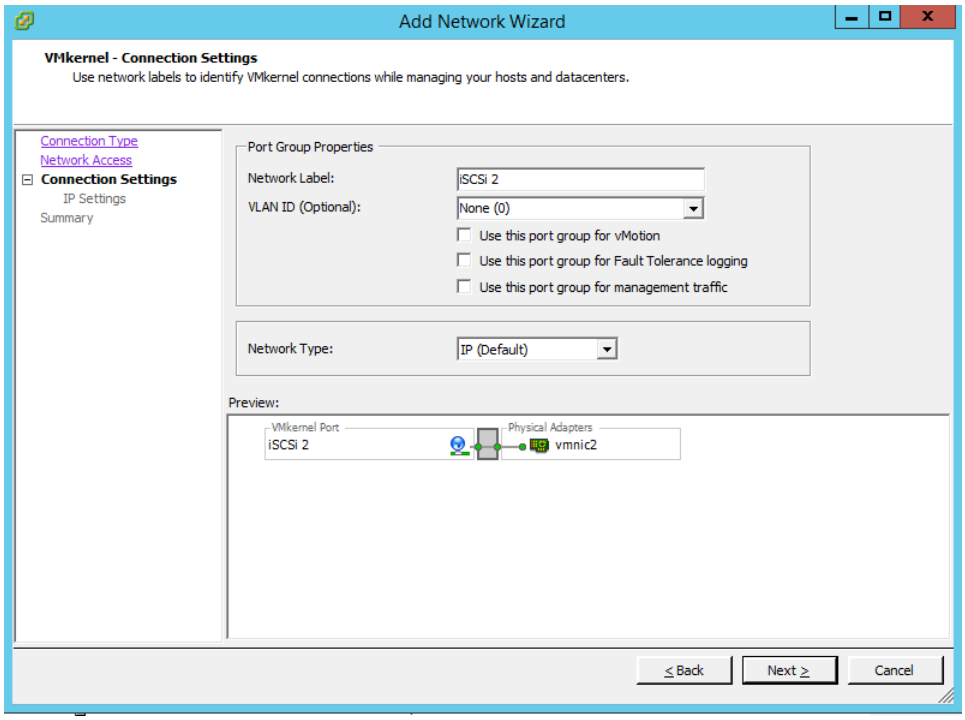


3.4 ESXi-1 iSCSI 2 Network

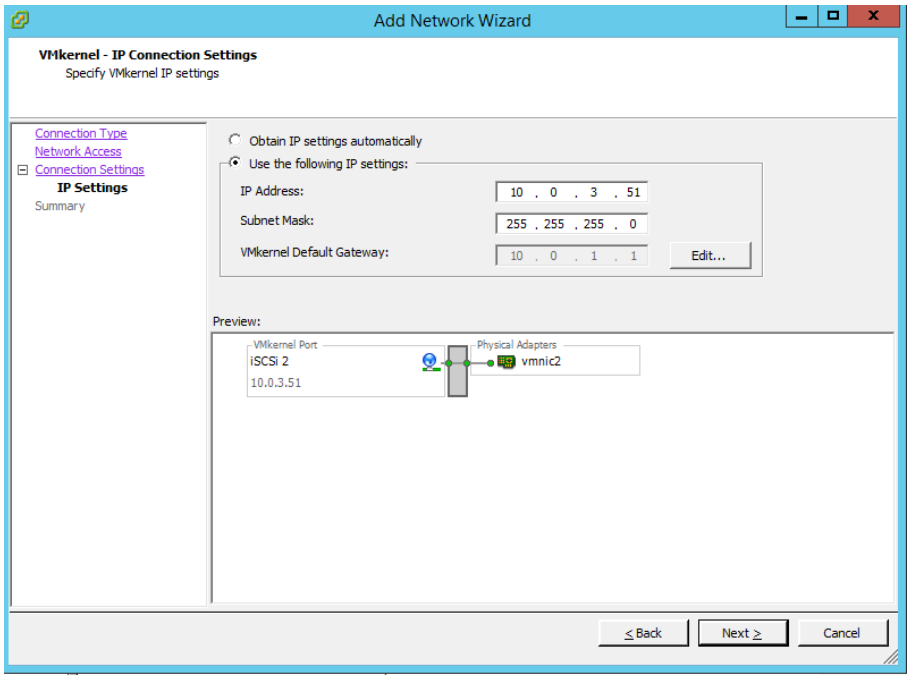
Similarly add a new network for our iSCSI 2, select a “VMkernel” connection type then select “vmnic2” interface



Name the new network “iSCSI 2”, leave the checkboxes unchecked

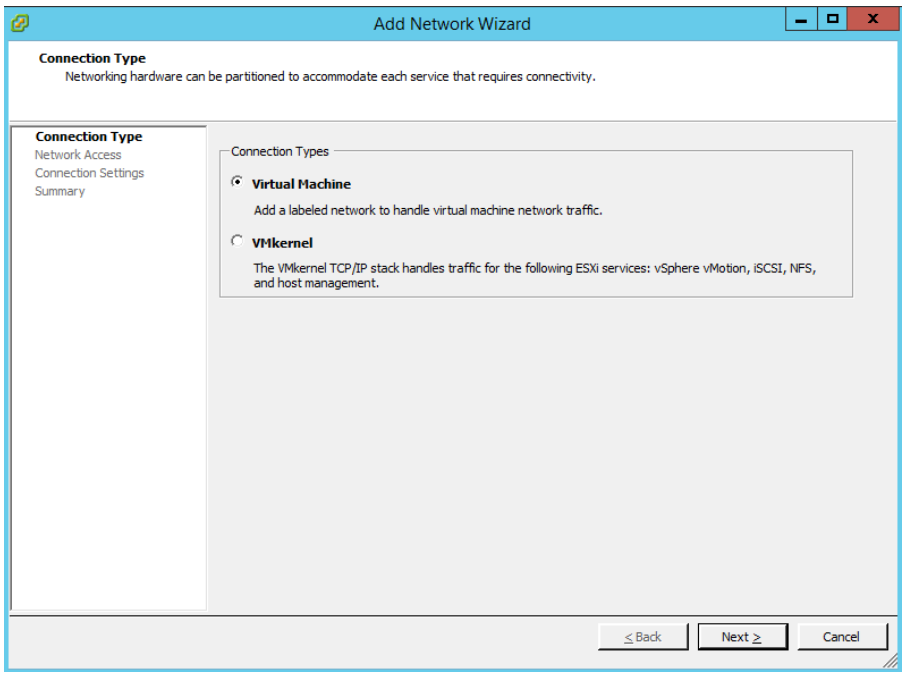


Input the iSCSI 1 IP address for ESXi-1 which is 10.0.3.51

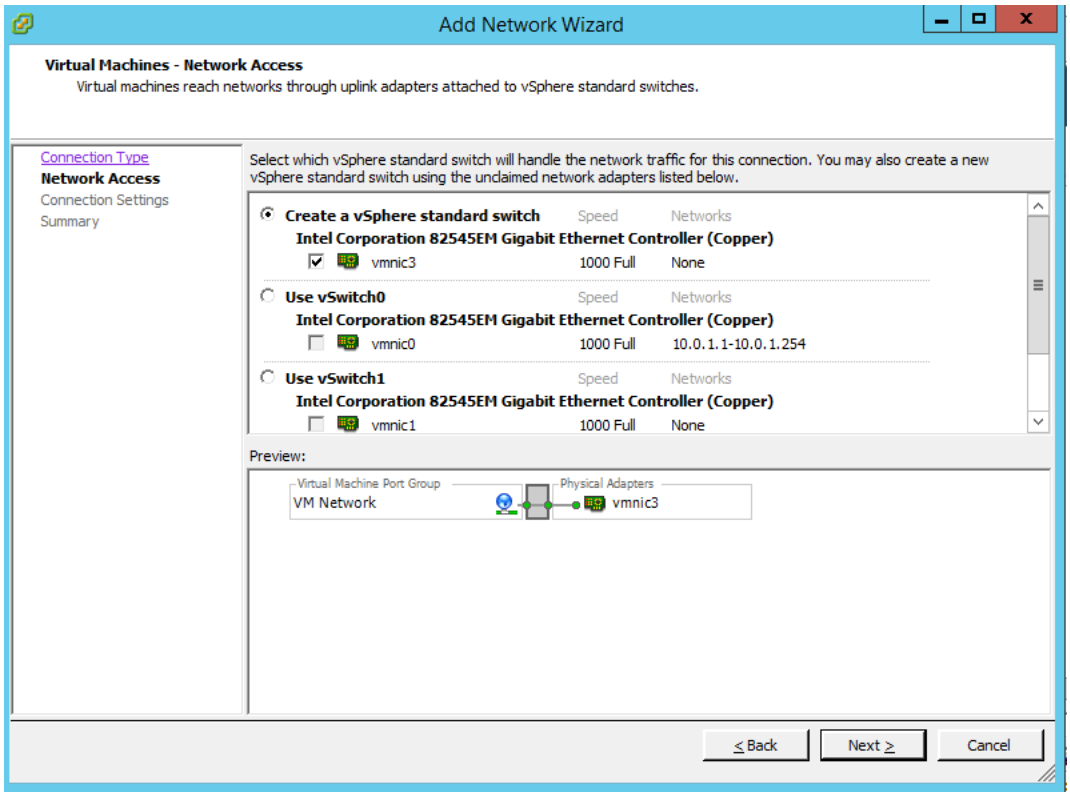


3.5 ESXi-1 VM Network

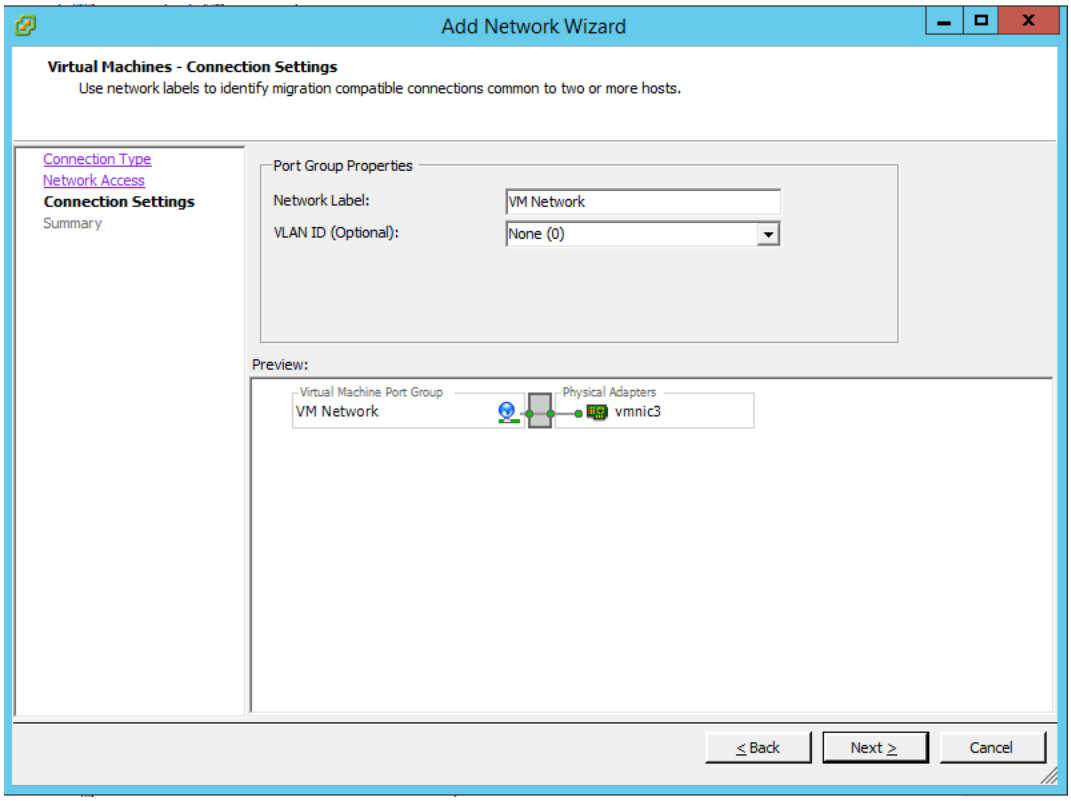
We will now add the VM Network, this is the network that carries VM traffic. For the connection type select “Virtual Machines”.



Select the “vmnic3” interface (our fourth interface card)

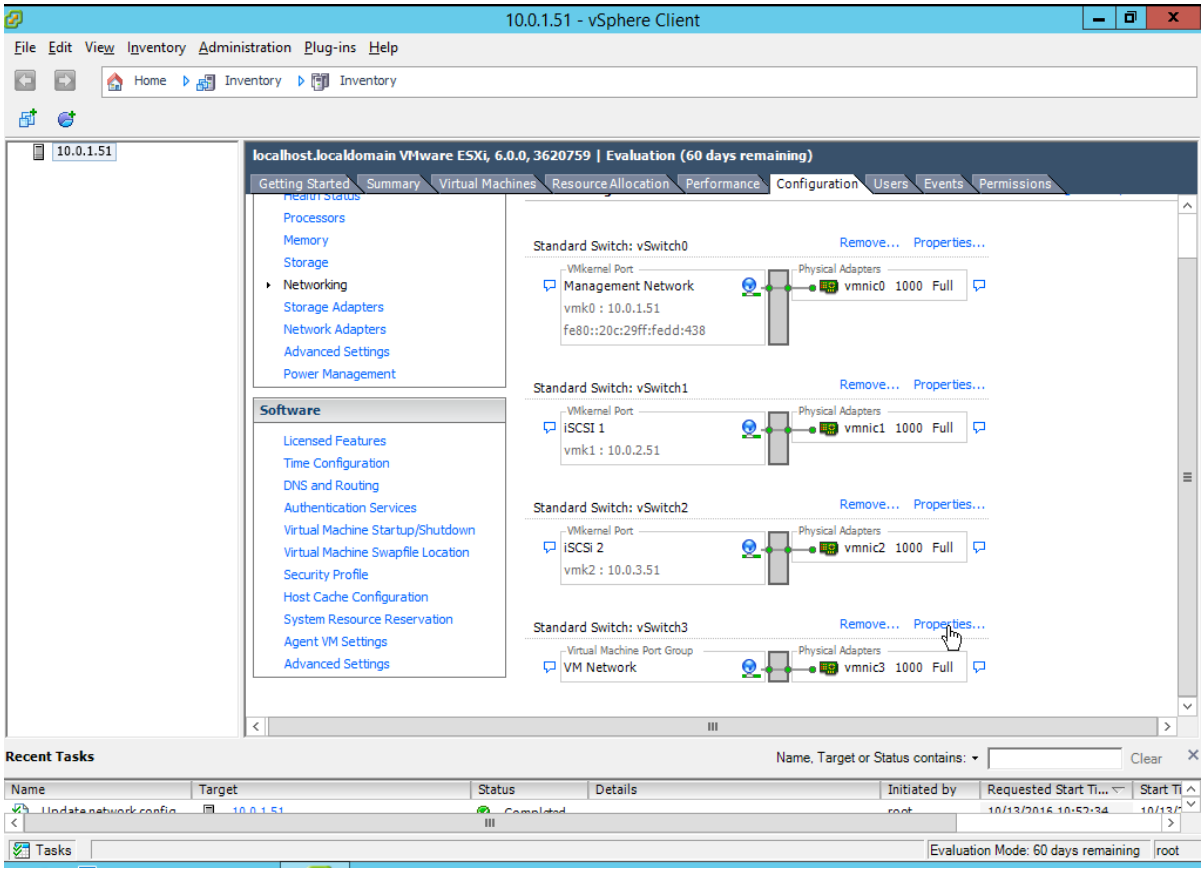


Name the new network “VM Network”

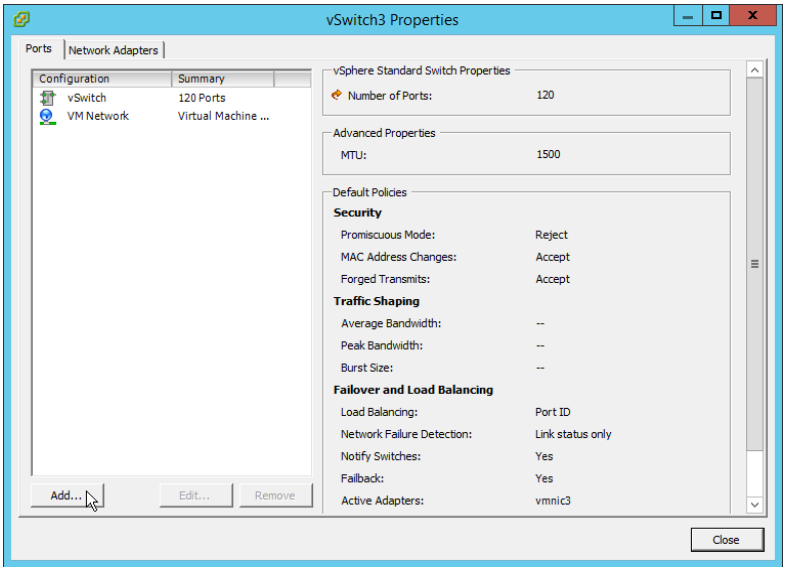


3.6 ESXi-1 vMotion Network

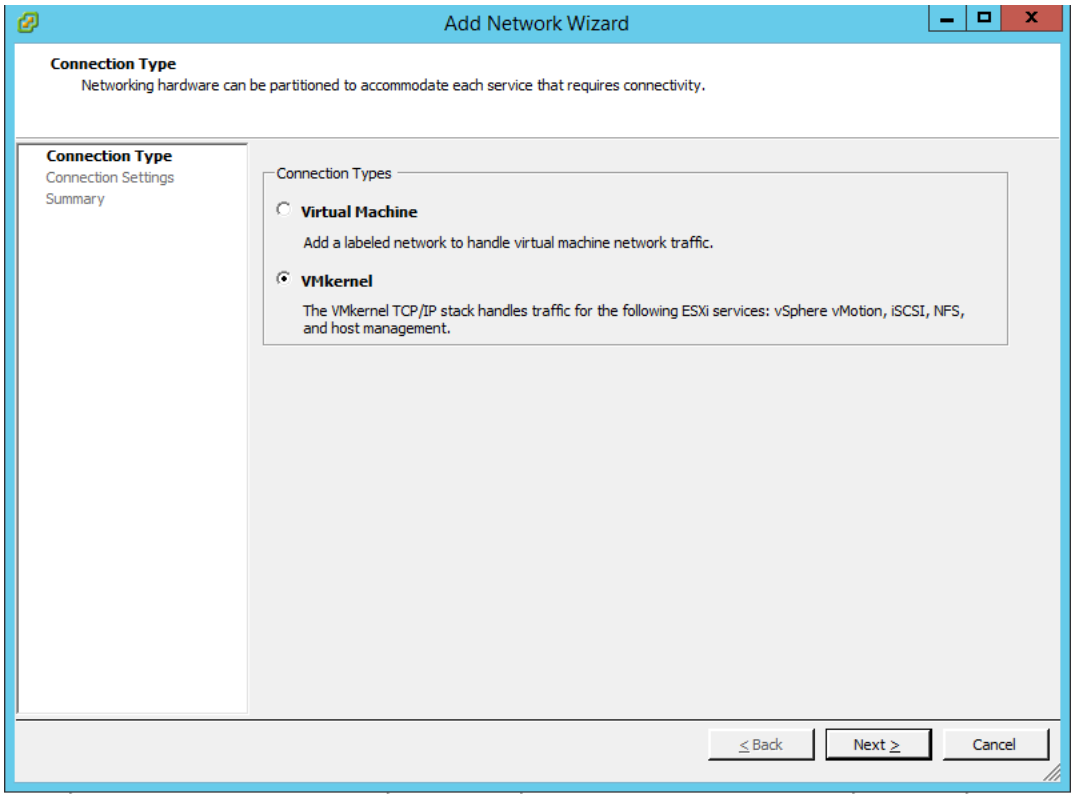
We will configure our vMotion network to co-exist with the VM network, on our fourth switch“vSwich3” click “Properties…”.



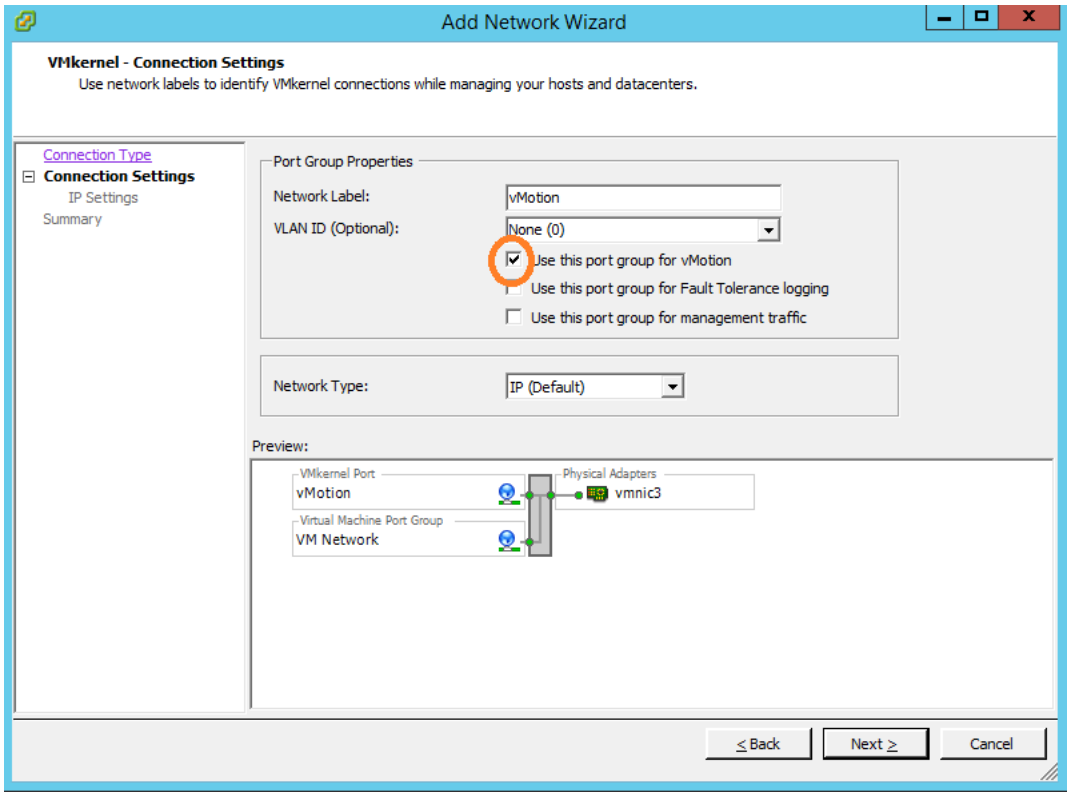
In the “Ports” tab click “Add…”



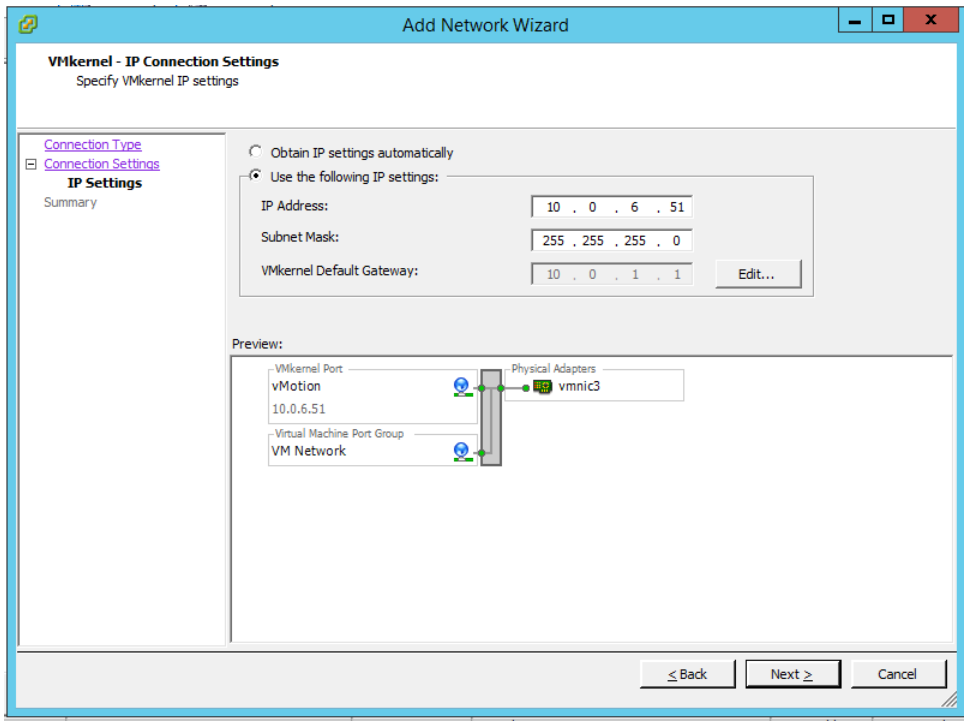
Select “VMkernel”



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

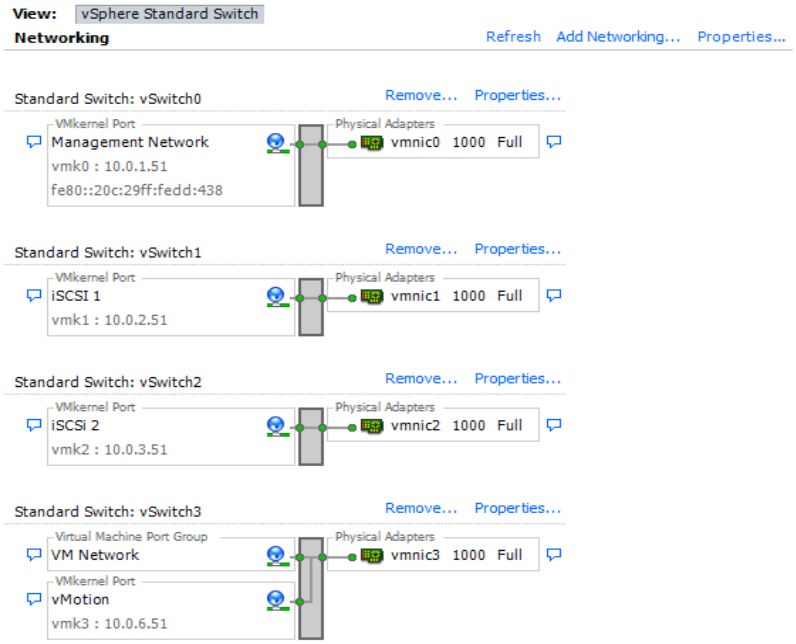


Input the vMotion IP address for ESXi-1 which is 10.0.6.51



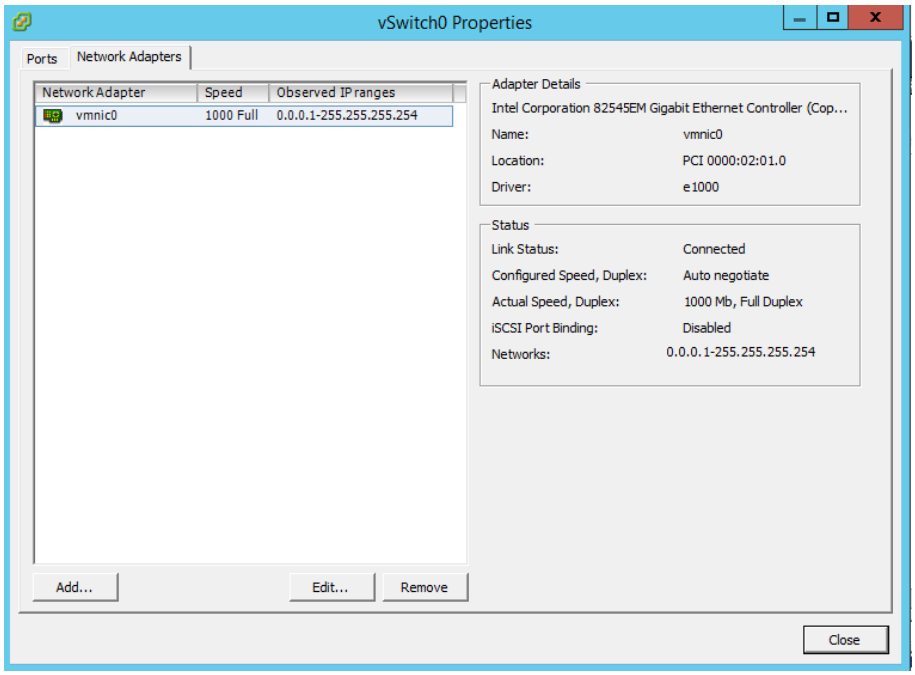
3.7 ESXi-1 Review network configuration

We are done , our network should be as follows:

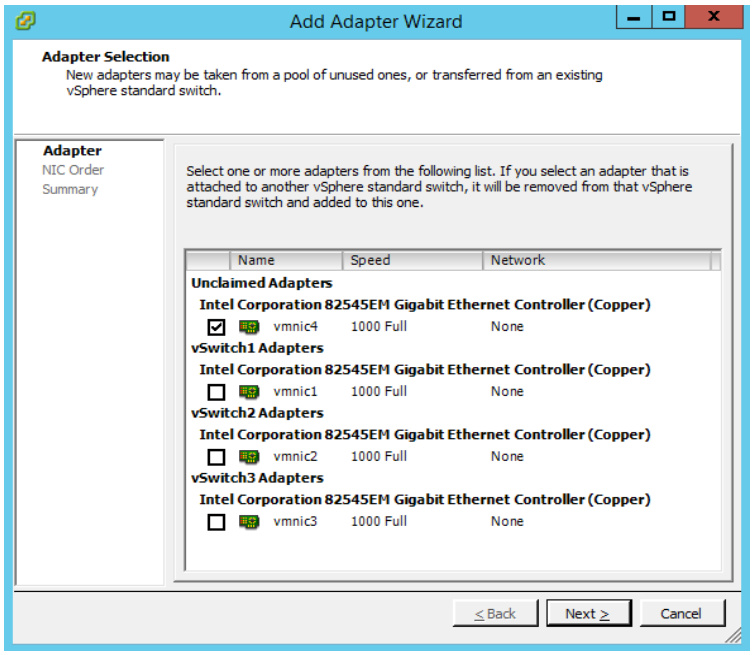


3.8 ESXi-1 Management network NIC Teaming (Optional)

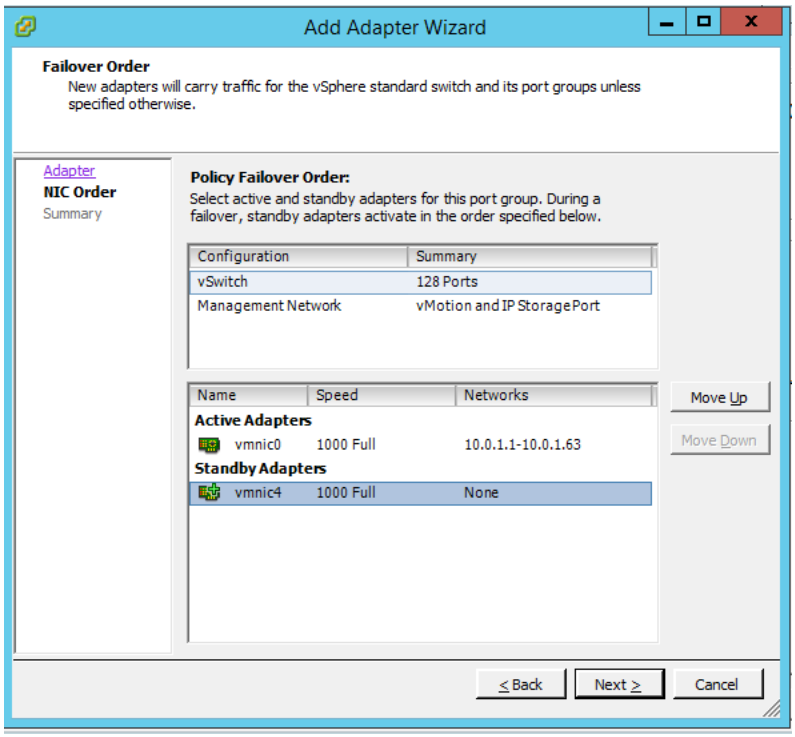
VMware recommends teaming the interface used for the Management network when setting up a High Availability cluster. This is optional but if we do not do it, it will give us a warning when setting up the HA cluster. To do this, open the "vSwitch0" properties and go to the "Network Adapters" tab, click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



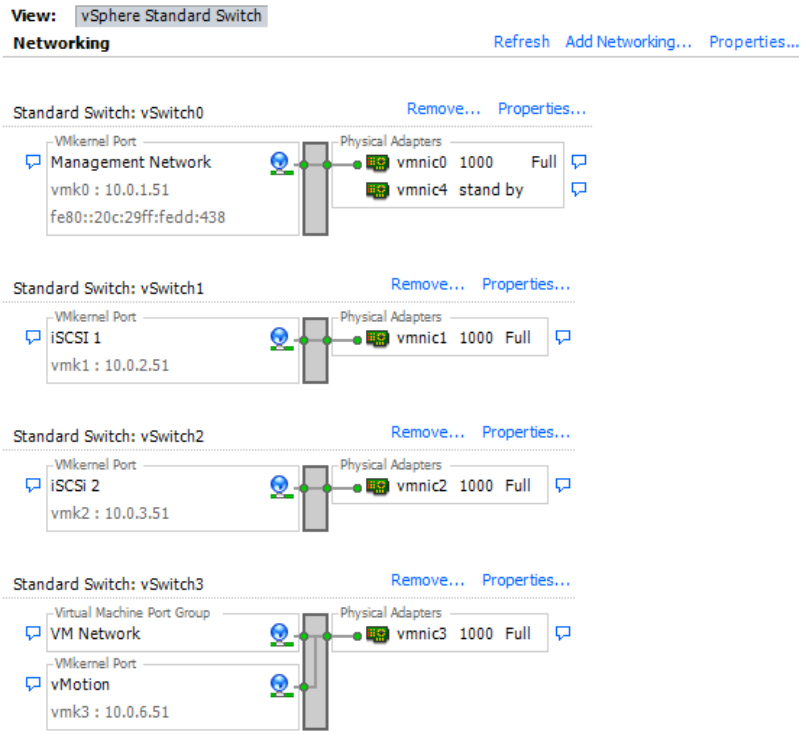
Select a standby nic interface to use



Move the interface down to set it up as standby

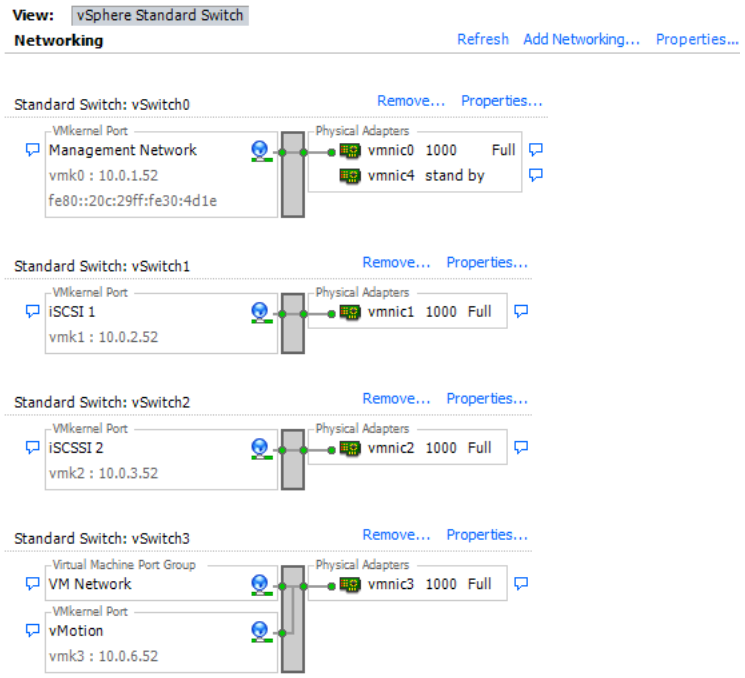


That is it, our network setup for ESXi-1 should look like this:



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.



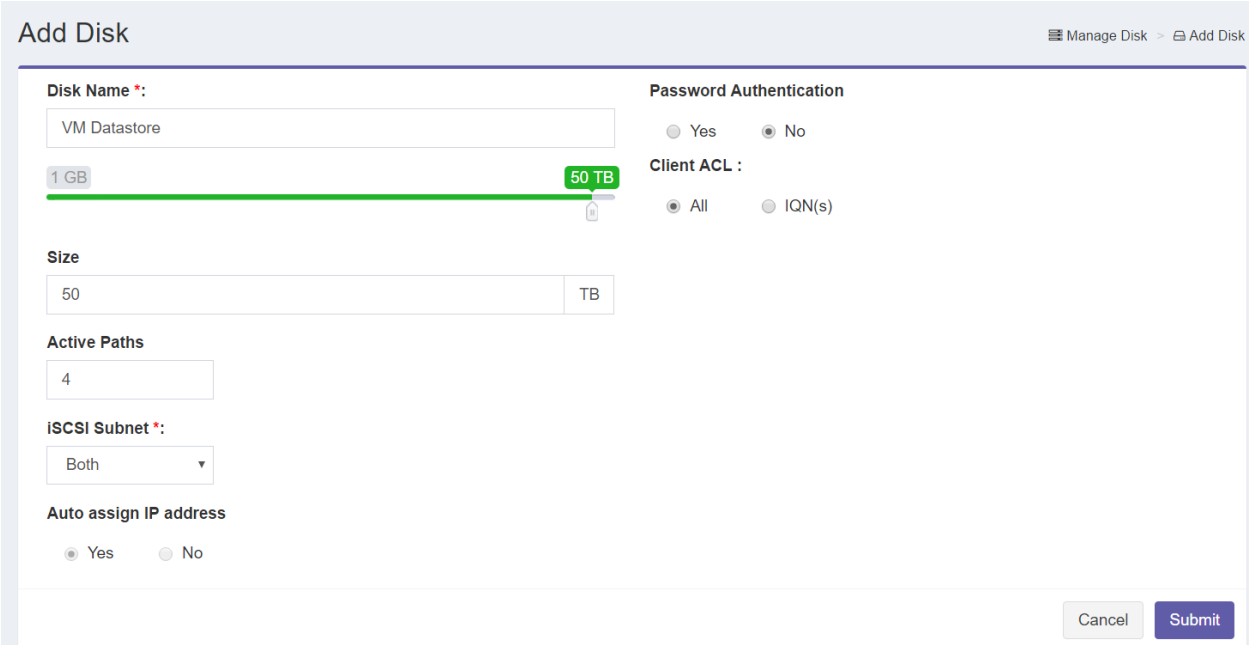
3.10 Alternative network configurations

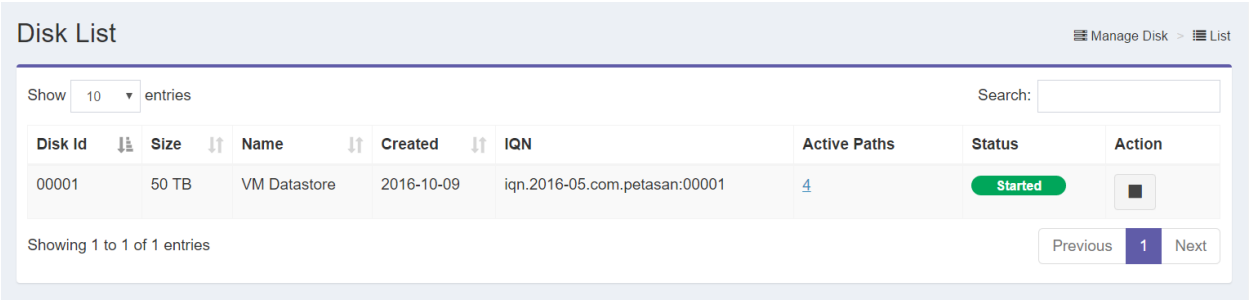
Obviously there are many different ways to setup our network. The one presented is chosen for clarity. In some deployments it may be more compact to use 3 or 2 vSwitches. As far as PetaSAN is concerned, the 2 iSCSI subnets must be on 2 separate physical networks.

4.Storage Setup

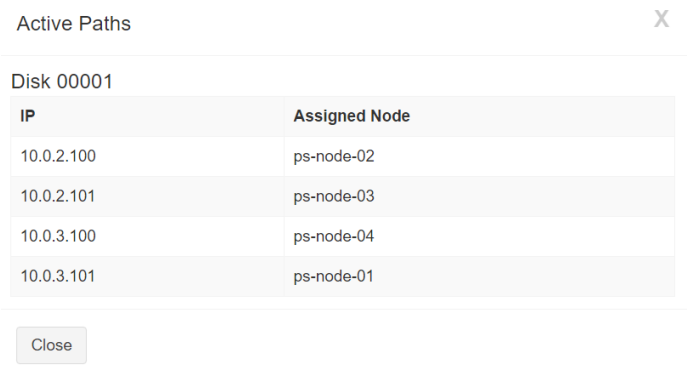
4.1 PetaSAN disk creation

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





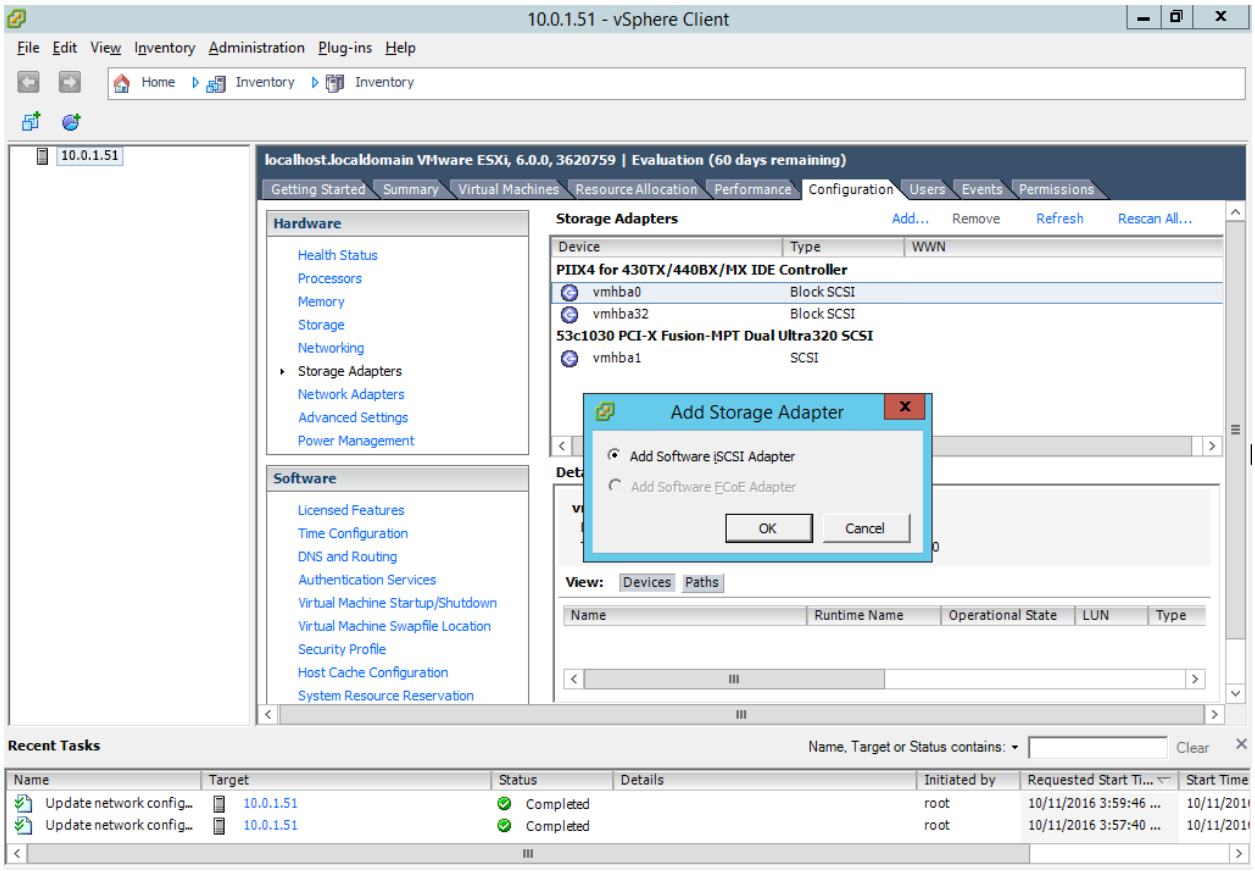
View the path details for the disk; it is enough to take note of the first ip, which we will later connect to



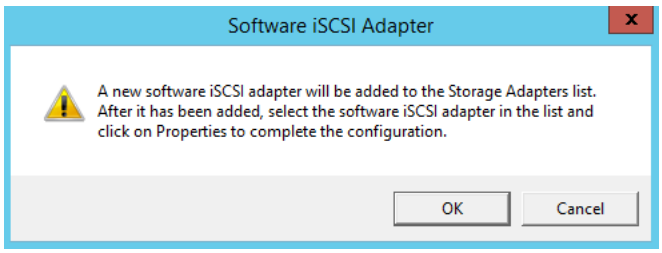
4.2 ESXi-1 Storage Adapter

4.2.1 Adding the iSCSI Adapter

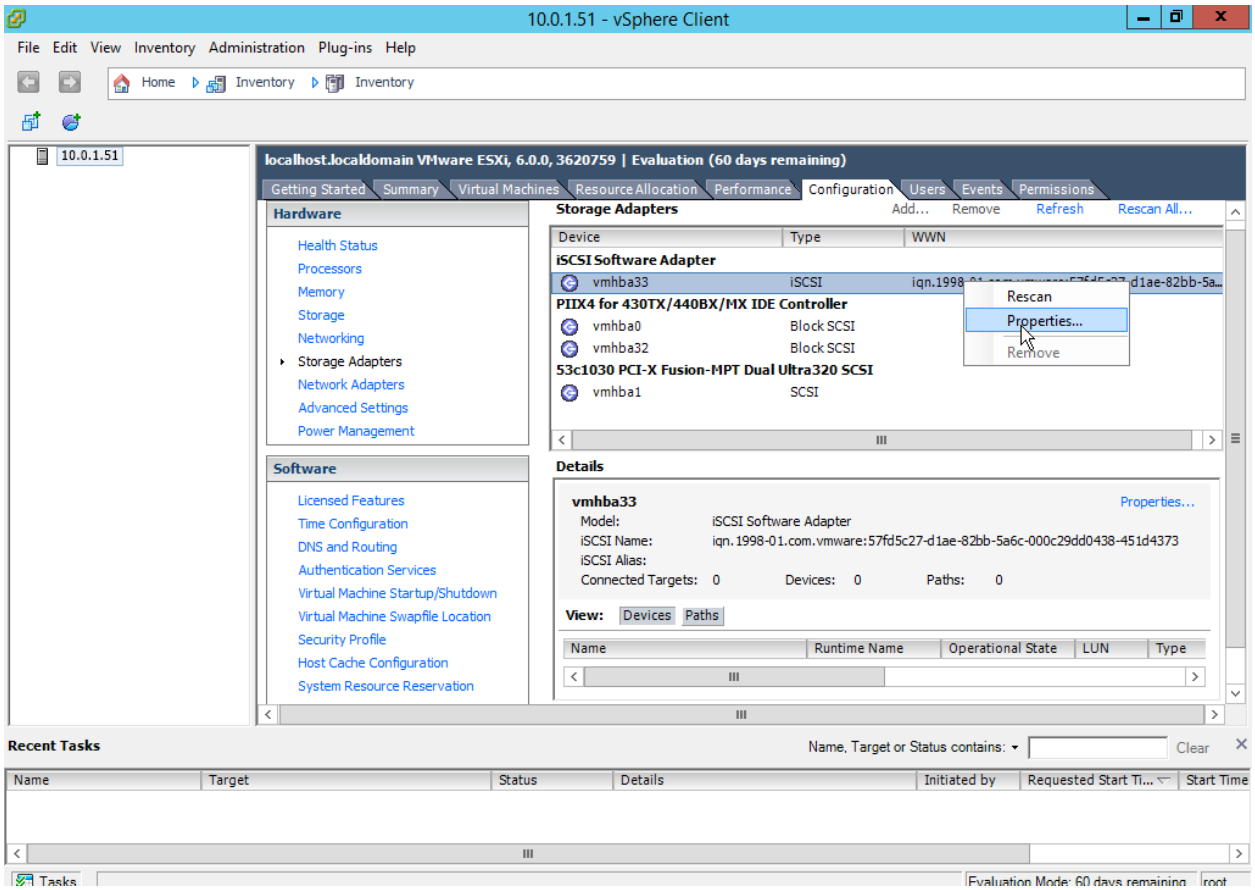
In vSphere Client, connect to ESXi-1, go to “Configuration” -> “Storage Adapter” and click “Add…”



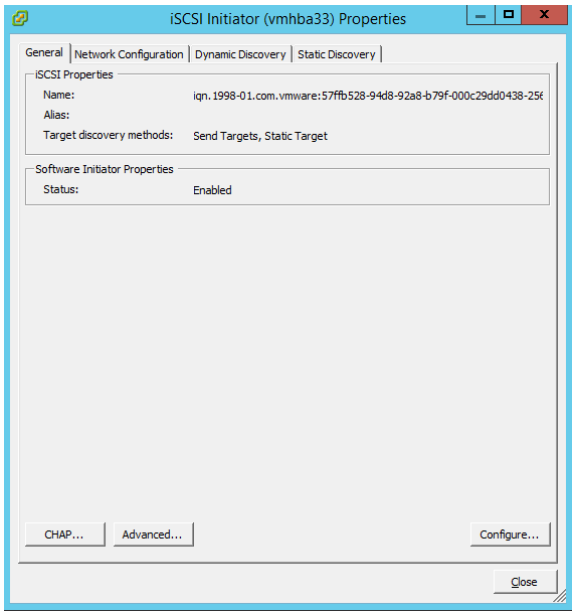
Confirm the message box



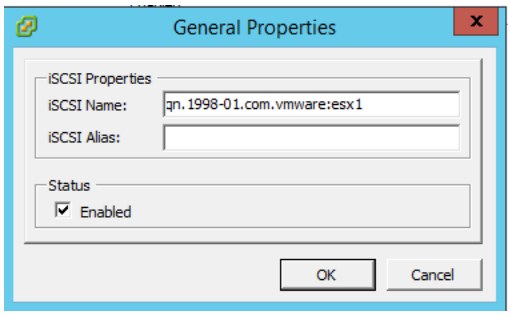
The iSCSI Software Adapter should be added to the list (in some cases, if it does not appear, reboot your ESXi server). Right click on it and select “Properties…”



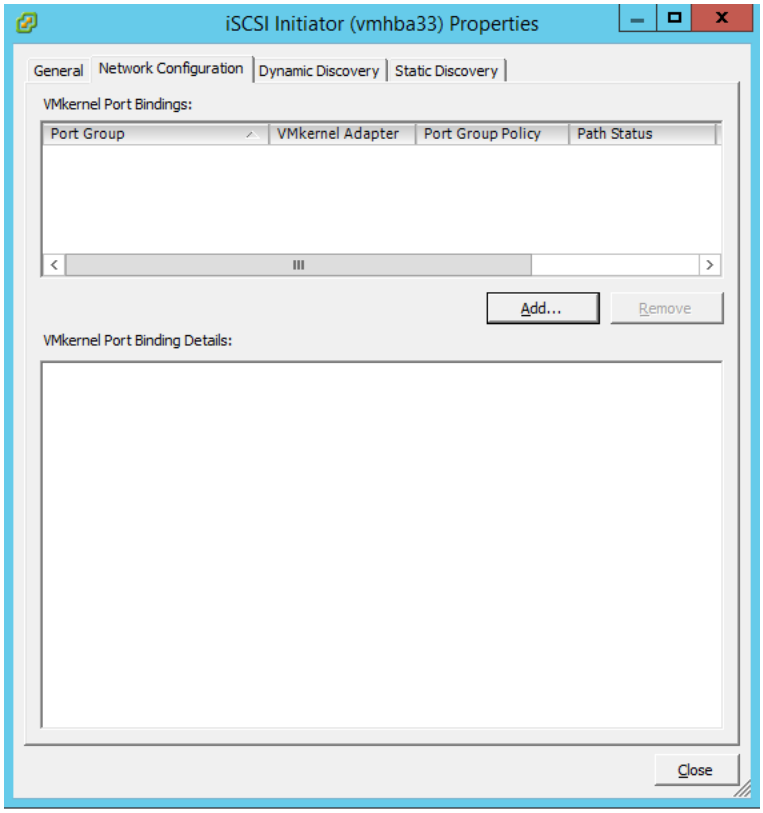
The “iSCSI Initiator Properties” dialog appears, select “Configure…”



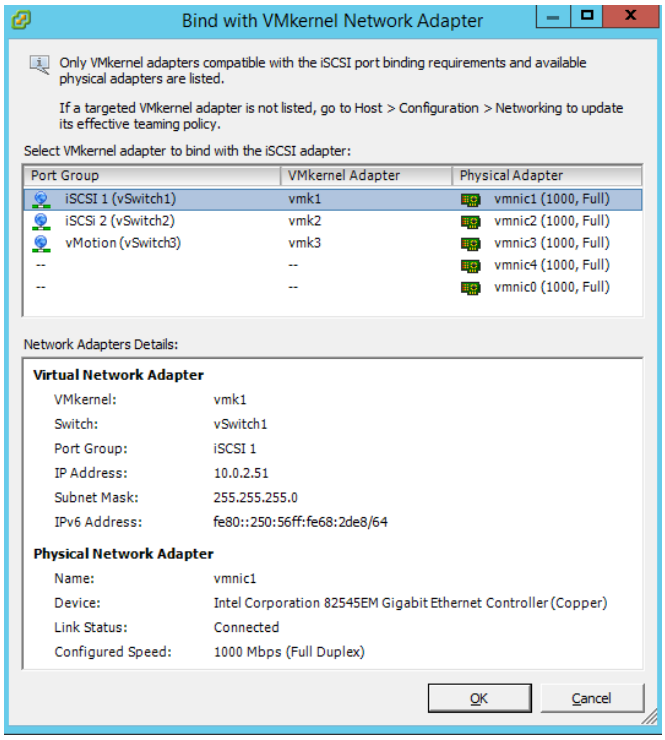
Specify the iSCSI Initiator name to identify the ESXi-1 server



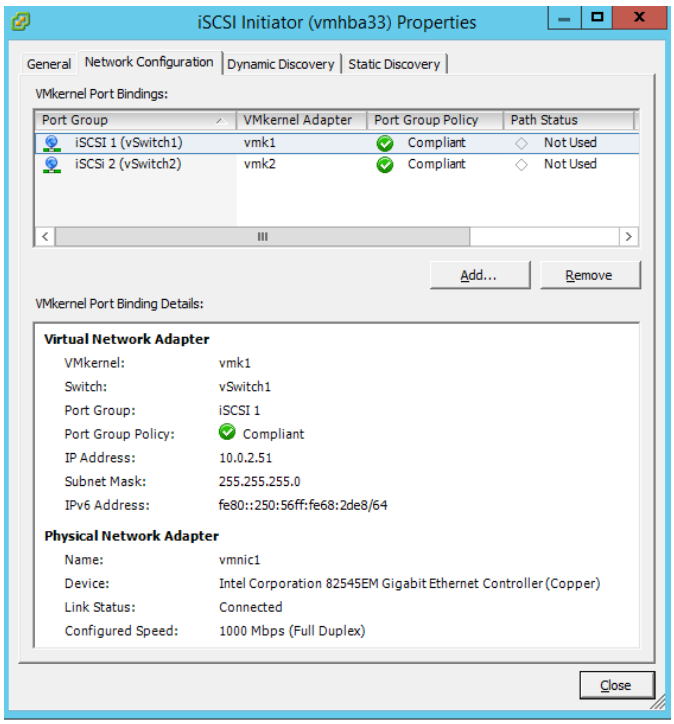
Go to the “Network Configuration” tab, Click “Add…”



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

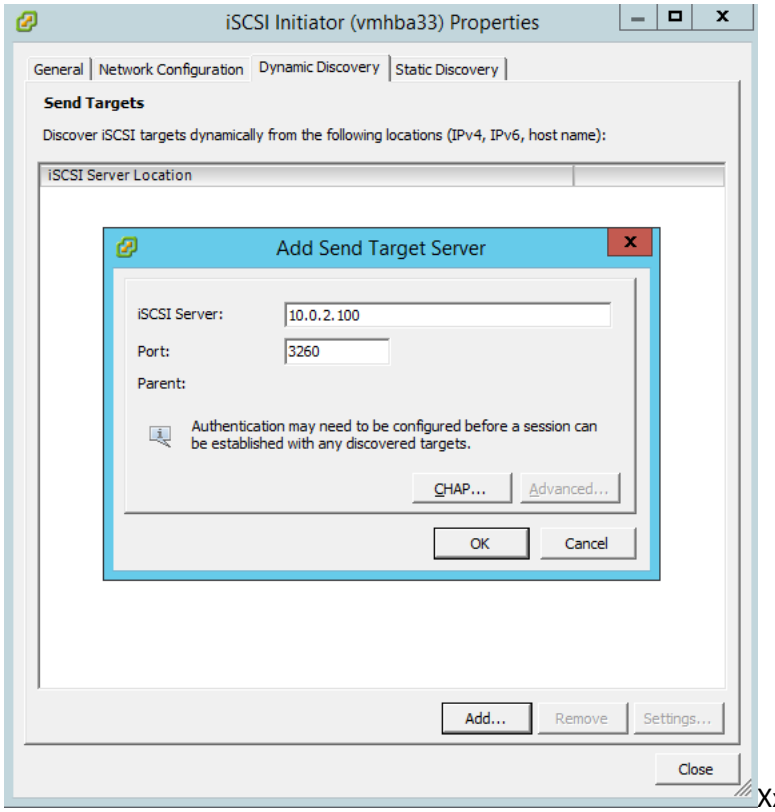


Repeat to add iSCSI 2



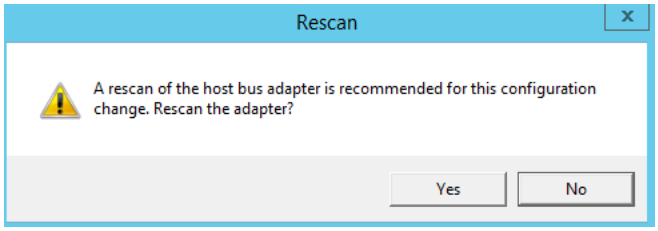
4.2.2 Discovering our disk

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.



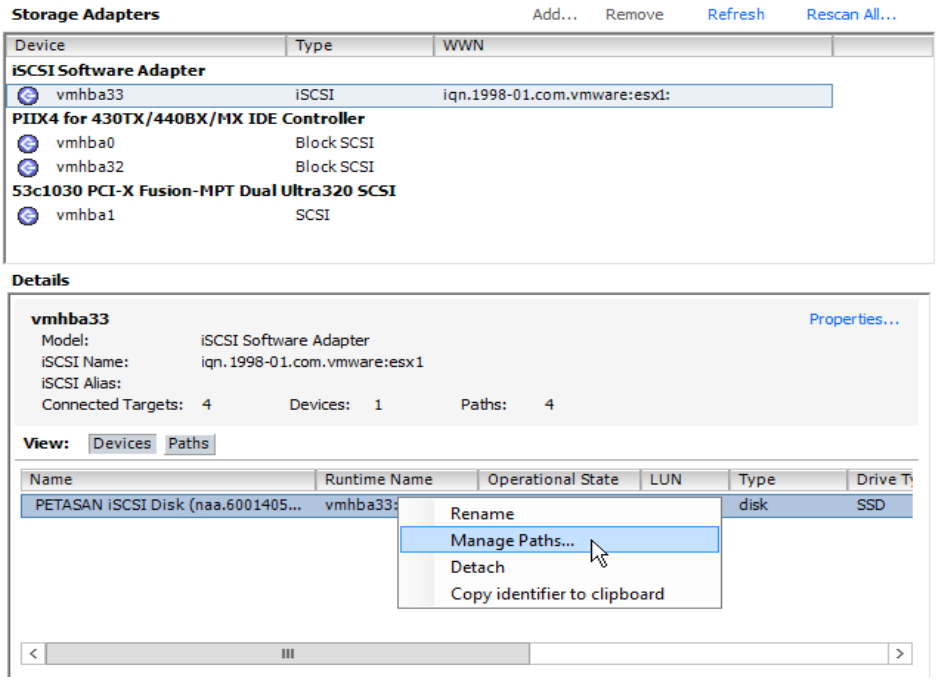
Xxx

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

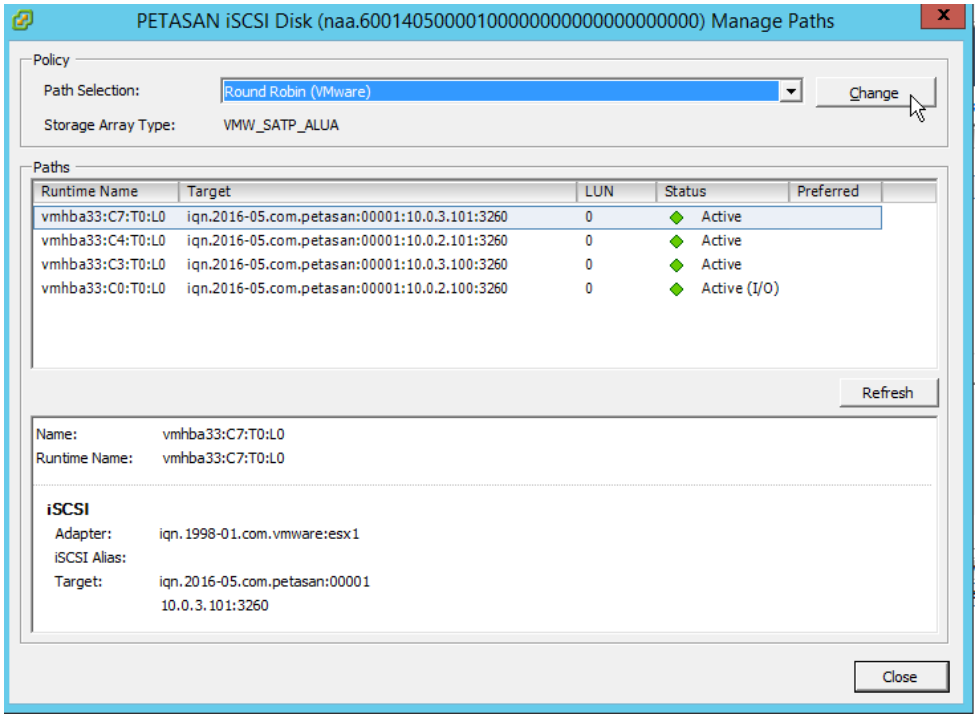


4.2.3 Path Policy Management

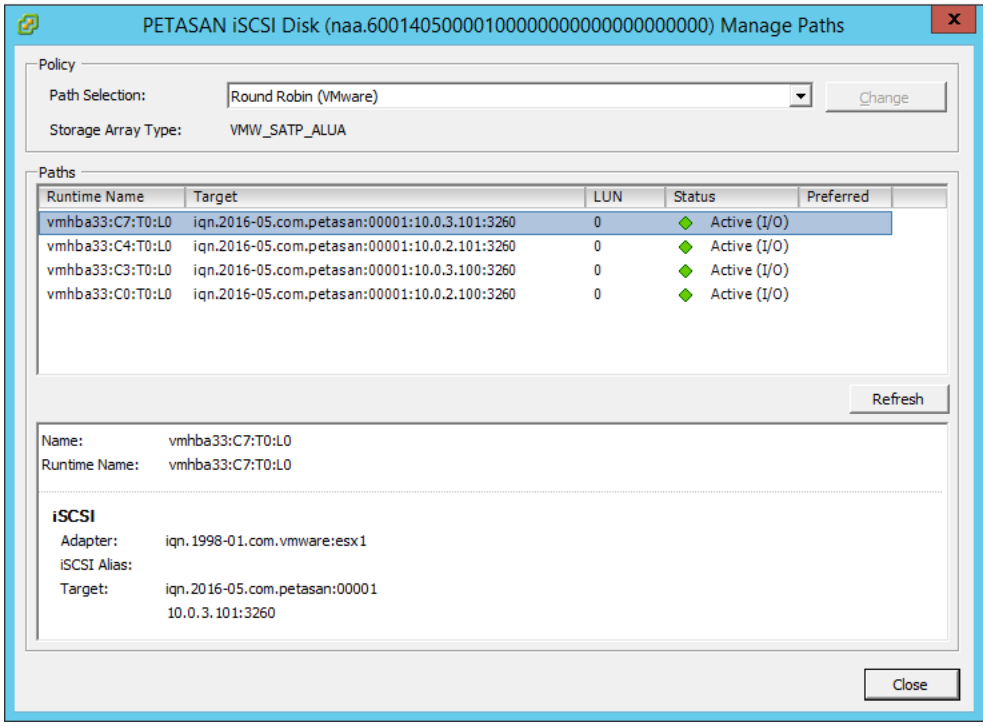
The PetaSAN disk should be detected and added to the list under “Devices”. Take note of the assigned device name starting with letters naa.xxx as will use it later for further optimization. Right click and select “Manage Paths…”



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



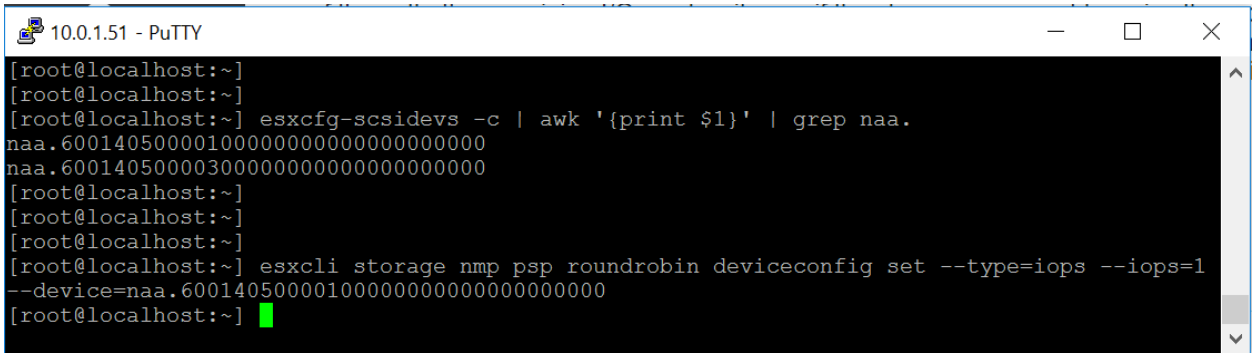
All paths should change to “Active (I/O)” status, click “Close”



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.600140500001000000000000000000000

naa.600140500003000000000000000000000

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

To set the iops limit to 1 on the device naa.600140500001000000000000000000000 execute the following command:

esxcli storage nmp psp roundrobin deviceconfig set --type=iops --iops=1

--device=naa.600140500001000000000000000000000

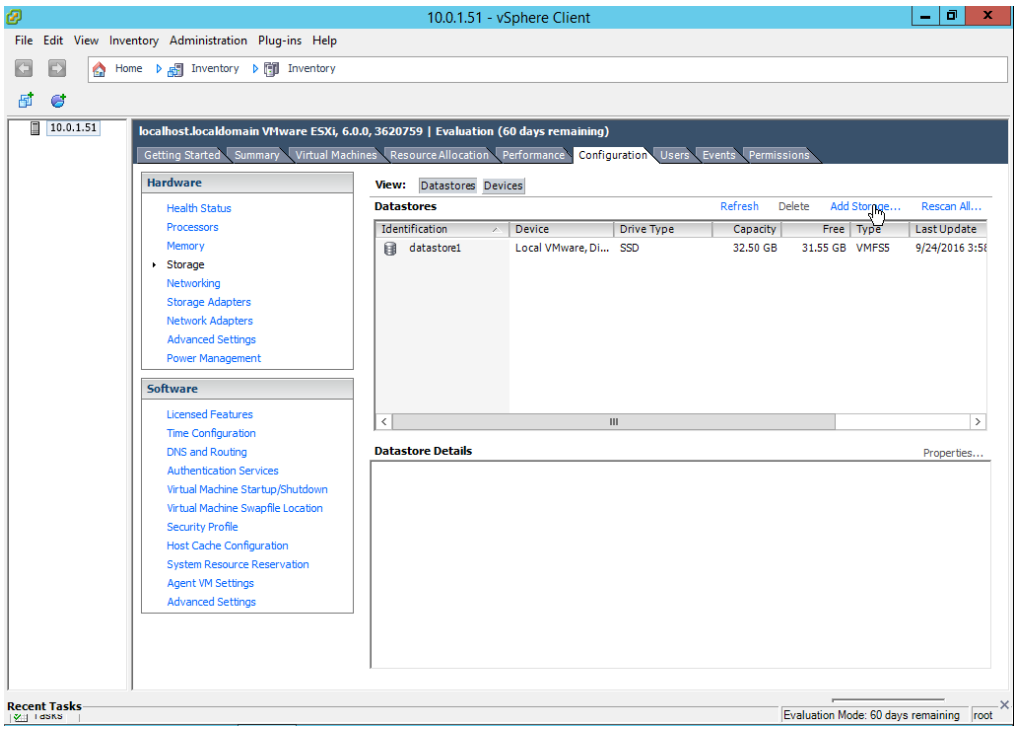
4.3 ESXi-2 Storage Adapter

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

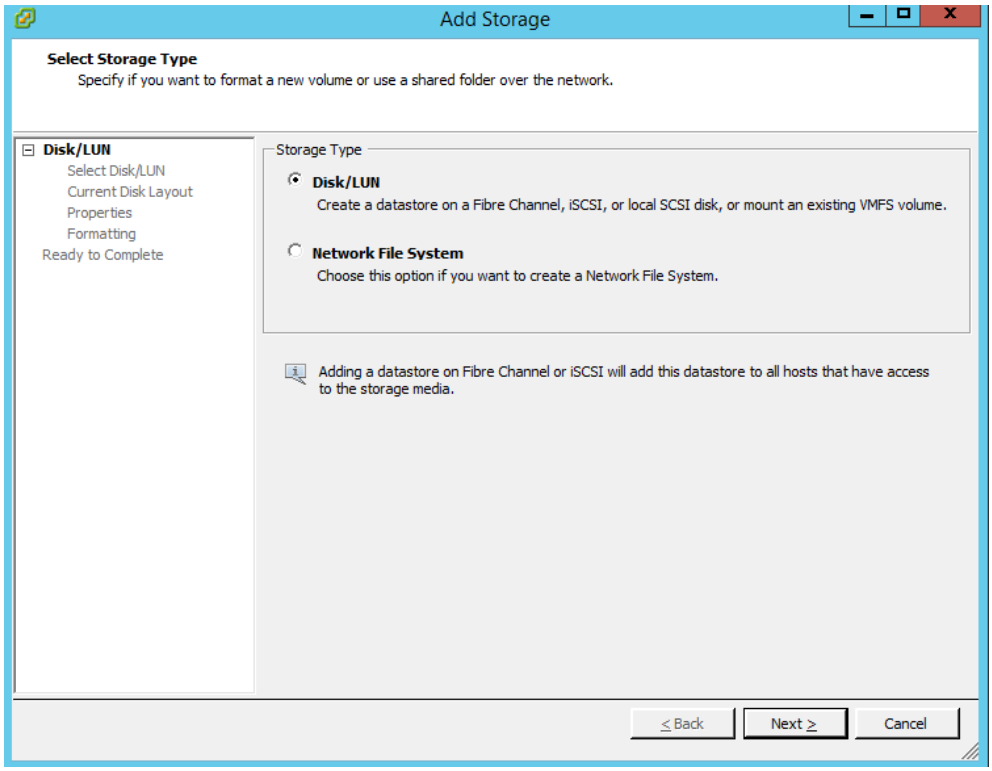
4.4 Adding a Datastore

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

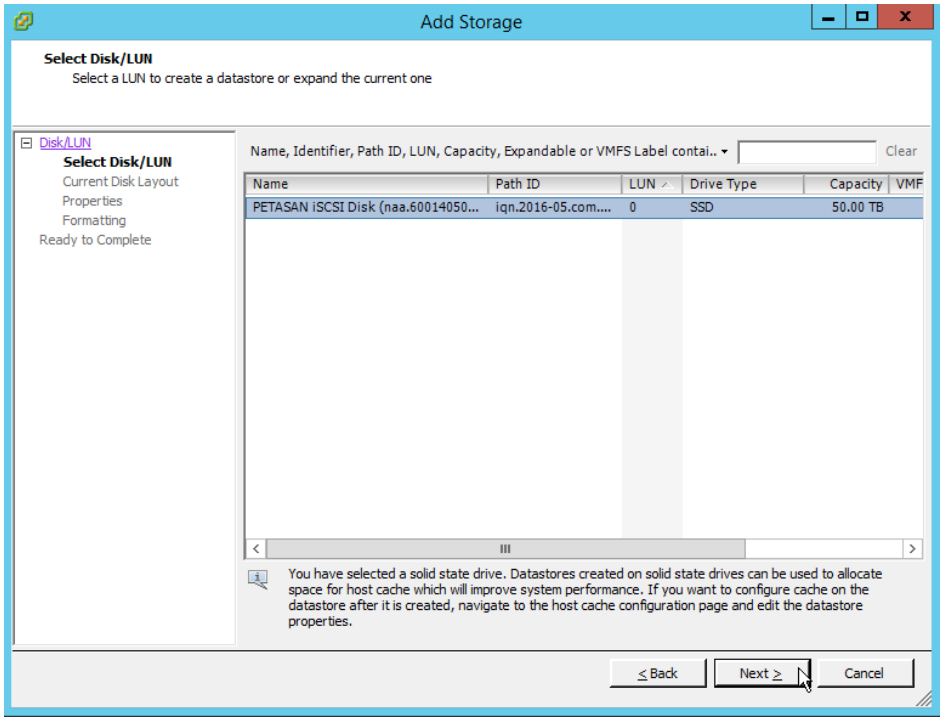
- *Note: These steps need to be done only from ESXi-1. Do not add the datastore from ESXi-2.*



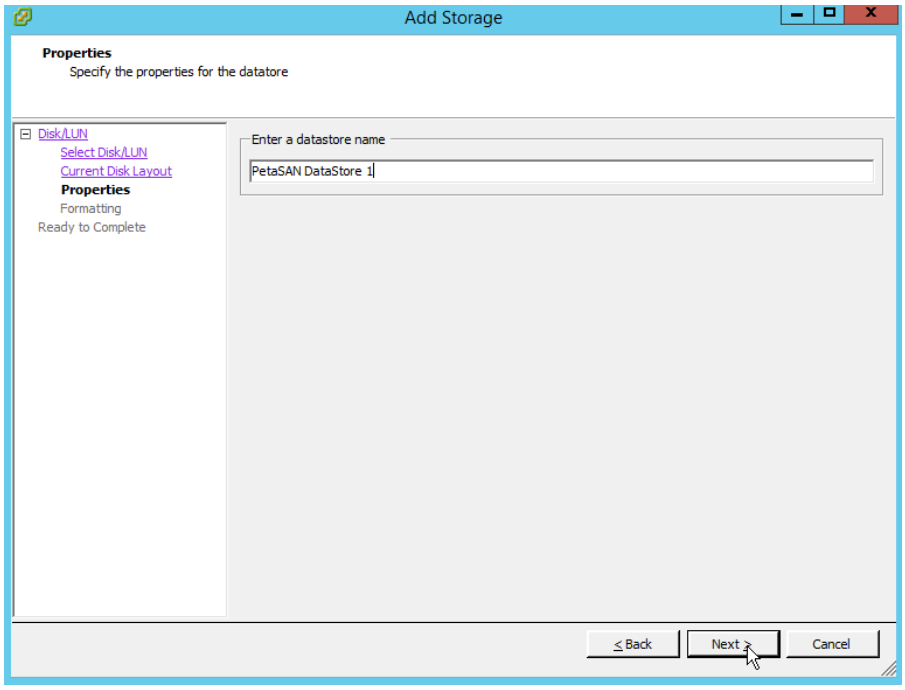
For storage type, leave the default selection of “Disk/LUN”



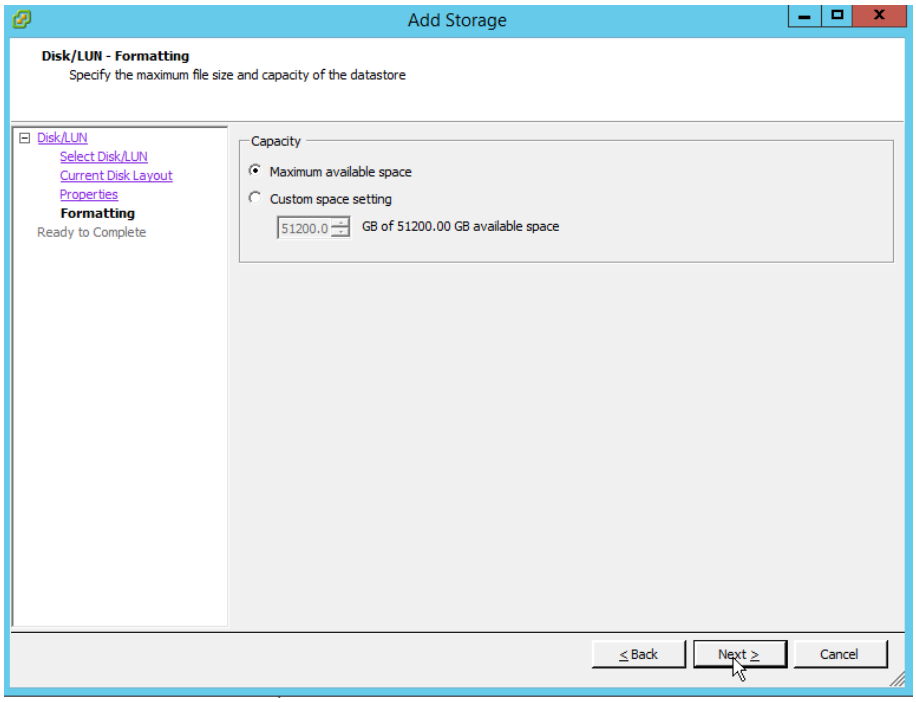
Select our PetaSAN disk then click “Next >”



Name the datastore “PetaSANDataStore 1”



Leave the default size of “Maximum available space”



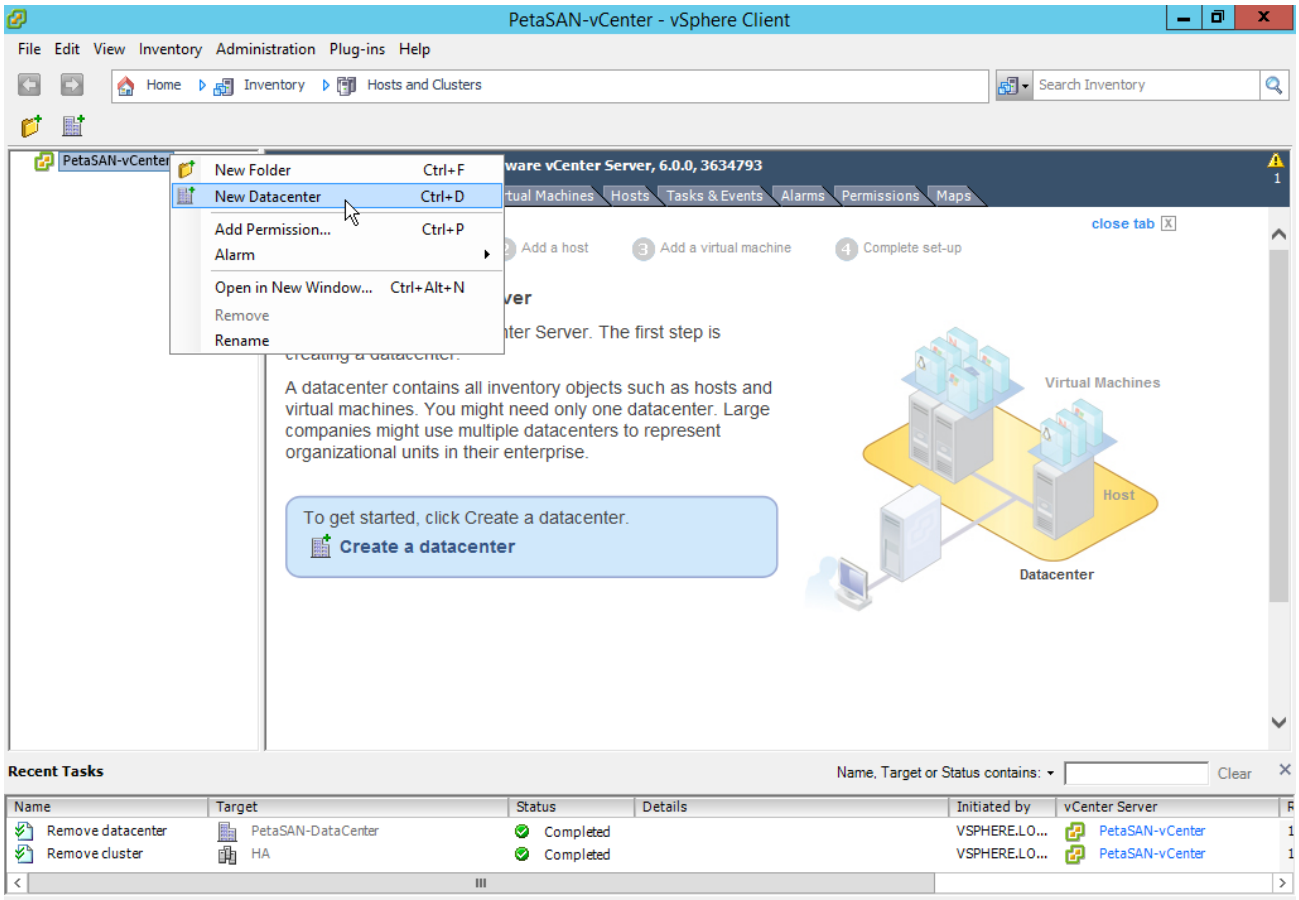
- *Note: For our disk size of 50TB, it will take a couple of minutes to format.*

4.5 Adding a second Datastore (Optional)

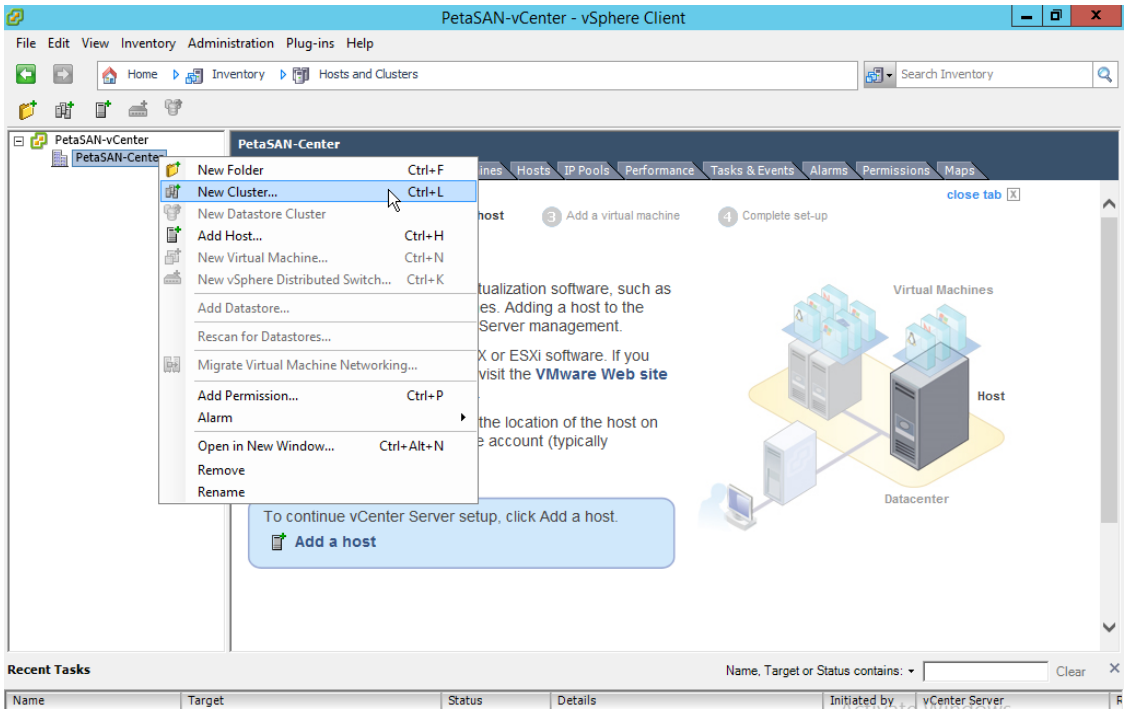
VMware recommends having more than one datastore when setting up a High Availability cluster. This is optional but if we do not do it, it will give us a warning when setting up the HA cluster. To do this, repeat the steps for adding a disk in PetaSAN, discovering it and specifying its path policy on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

6. Building the cluster

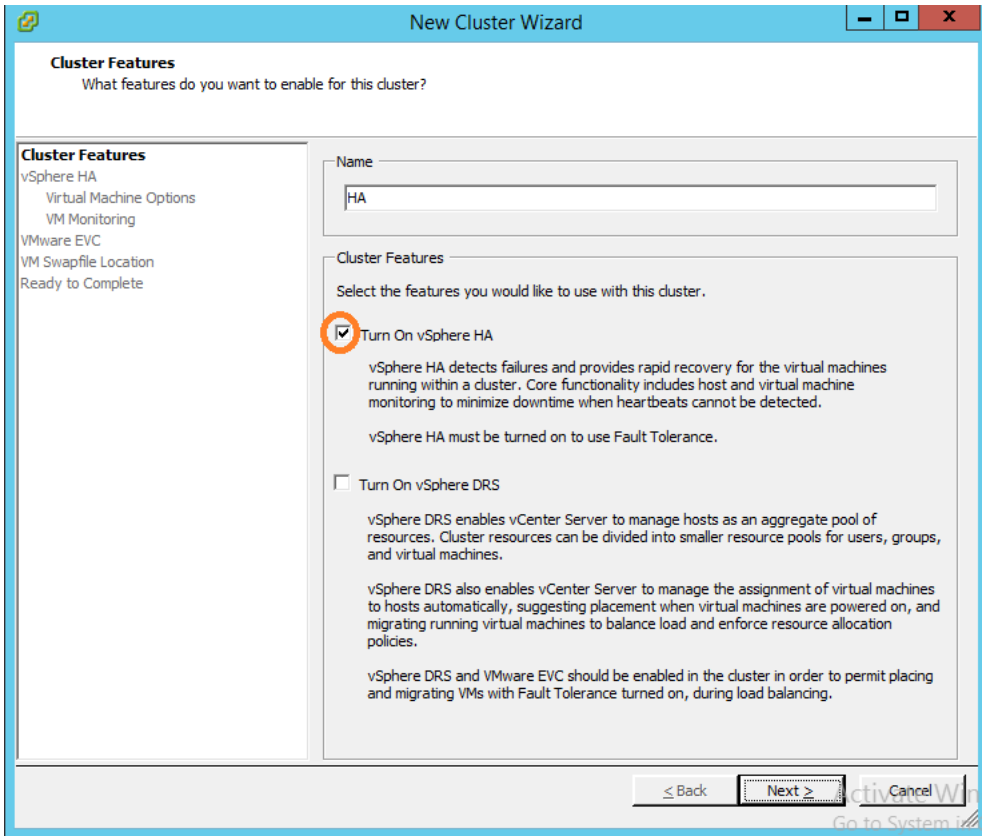
Log into vCenter and create a new datacenter.



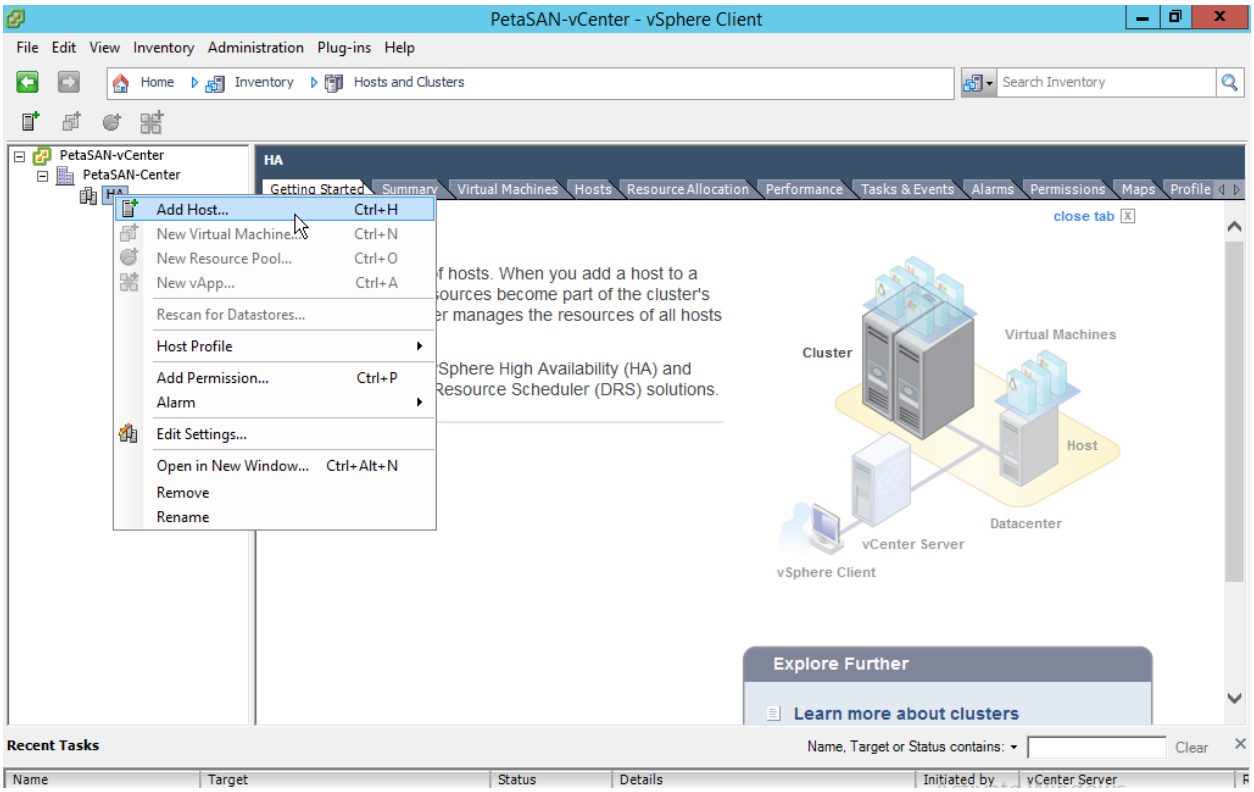
Under the new datacenter, create a new cluster



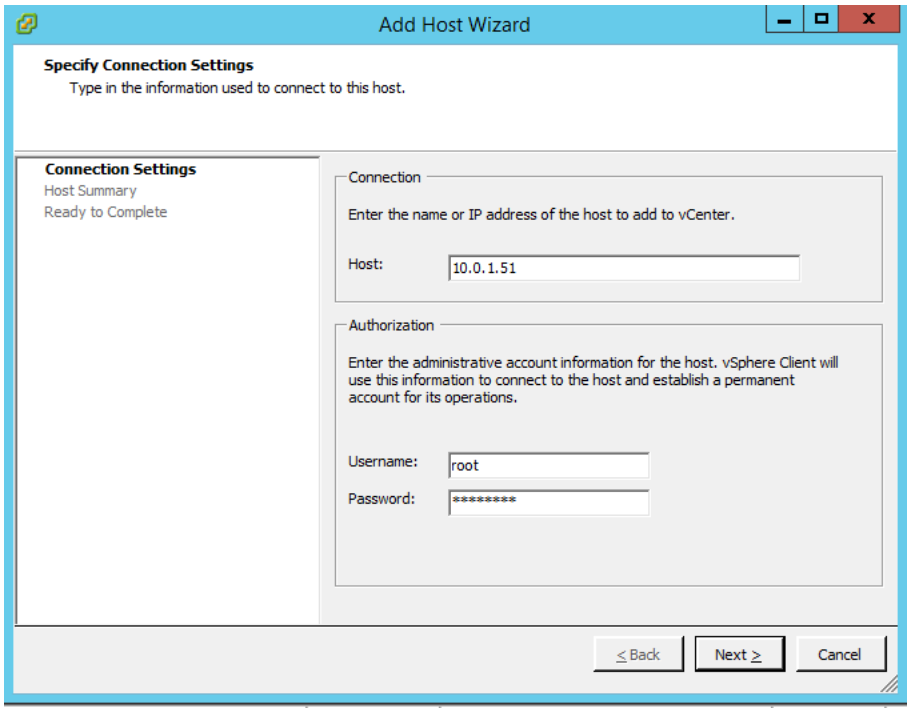
Specify the name “HA” for the cluster name, select “Turn On vSphere HA”



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…”

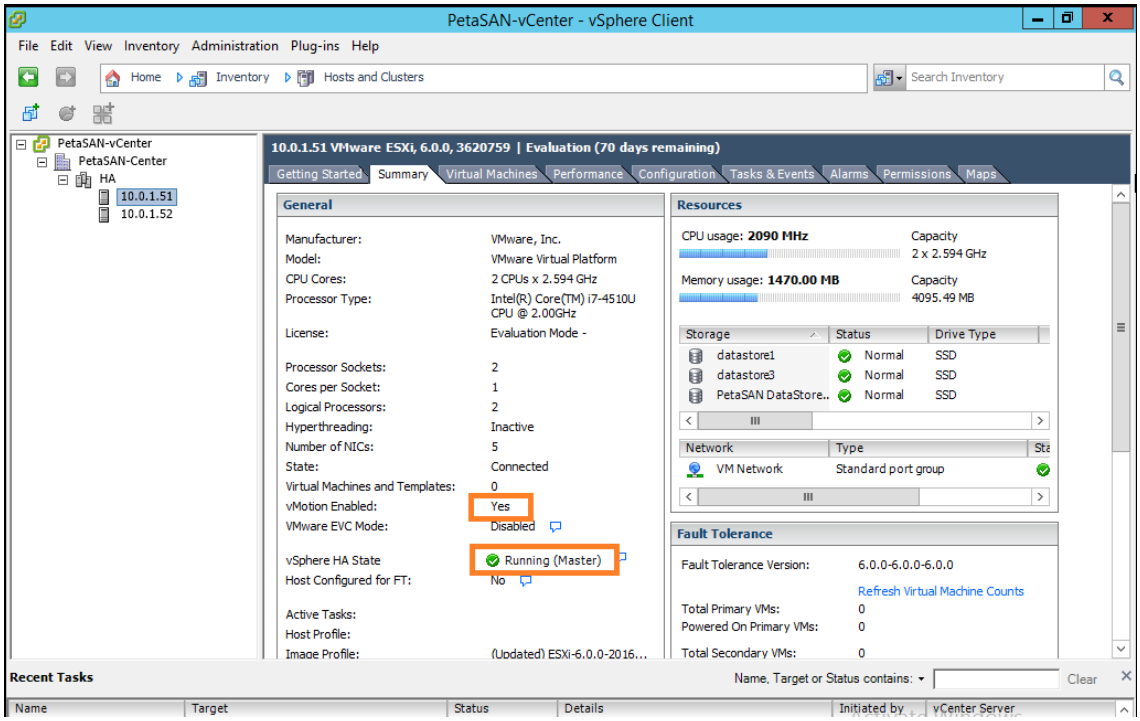


Enter the Management IP for ESXi-1 and its root username and password.



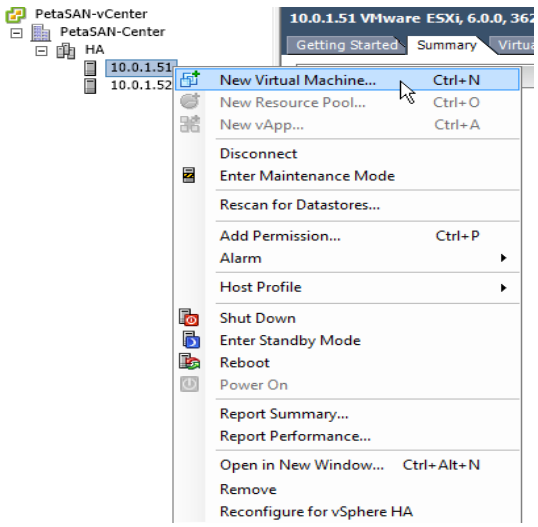
Click “Next >” several times accepting the default values until the wizard finishes. Repeat the same steps to add ESXi-2.

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.