Overview

This document demonstrates how to configure iSCSI bidirectional CHAP between ESXi 5.1 Update 1 and NetApp storage. This is a very simple document configuring only one ESXi host using 1 GB Ethernet NICs and no teaming, ether channel or sophisticated networking. This is done with my home lab folks. Normally you would use redundant 10GbE NICs, jumbo frames, a dedicated VLAN with no default gateway to prevent routing packets off that segment, multi-pathing, etc. The process would be the same if all of that were in place. You would also do this for every host in the cluster.
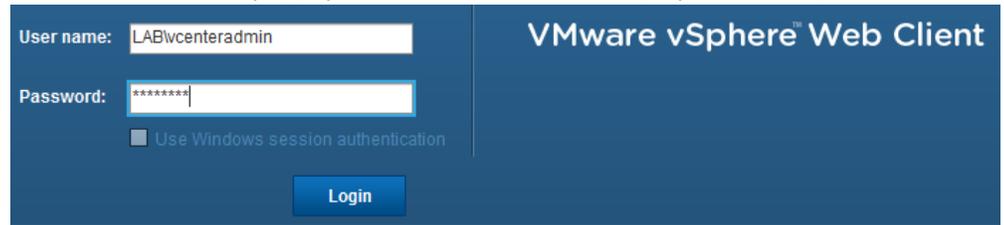
Versions in use for this document:

1) VMware vSphere vCenter 5.1 Update 1c Web Client
2) VMware ESXi 5.1 Update 1
   a. Note: The ESXi software iSCSI initiator will be used for this document
3) NetApp Data ONTAP 7.3.7P3 (this also works with Data ONTAP version 8x)
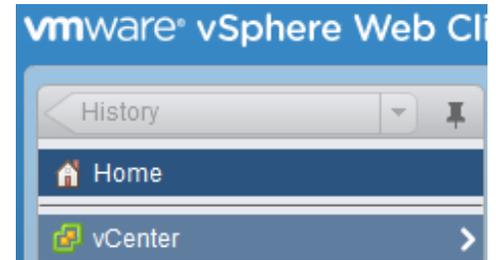
What you will need:

1) The iqn or nodenames for your ESXi hosts and your Storage controller.
   a. ESXi host iqn:
   b. Unless you have a bound iSCSI initiator in place already, you cannot get the iqn until you add the initiator on the ESXi host. If you do have one configured, the iqn can be found here:
      I. In vCenter: Select the ESXi host > Configuration tab > Storage Adapters. It should be listed under the WWN as iqn.1998-01.com.vmware(hostname><sn>.
      II. In vCenter Web Client: Home > vCenter > Hosts > select a host and click Manage > Storage > Storage Adapters. You should see the iqn under the Identifier field.
      III. From the ESXi command line:
         1. Get the iSCSI device first:
            > esxcfg-scsidevs -a | grep iSCSI
         2. Then get the iqn (in this case vmhba33 is the iSCSI device)
            > vmkiscsi-tool -I -l vmhba33
   c. NetApp storage controller – issue the following command on the controller:
      > iscsi nodename

2) The CHAP secrets for the ESXI hosts and your Storage controller. For the sake of simplicity in this document, we will use the iqn for the name and the secrets listed below. This will all make sense later.
   a. ESXi: MCHAPesxi5
   b. NetApp: MCAPntap7

3) Networking/vSwitch. You need a VMkernel Port that will carry the iSCSI traffic. Normally you would have dedicated NICs just for storage traffic (whether its iSCSI or NFS) but for this simple document I only have one NIC available for storage traffic so it will be a shared NIC with vMotion. vCenter will only present VMkernel Ports capable of carrying storage traffic so you can't break anything.

4) Optional: At least one iSCSI lun on the NetApp controller. You can always use the NetApp Virtual Storage Console (VSC) to create the lun after CHAP is configured. It's just nice to have one sitting there ready to be used for this document.
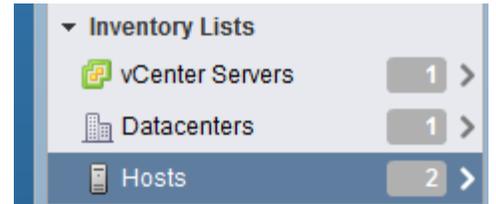
Enable the ESXi Software iSCSI Initiator

1) Launch Firefox and enter your web client URL. https://<your-vcenter-server>:9443/vsphere-client/#
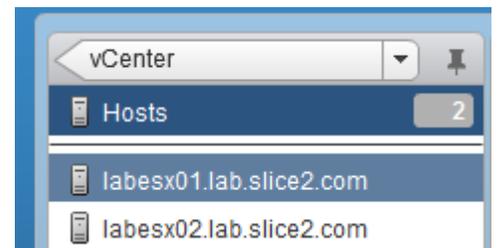
2) Login to the Web Client as a vCenter administrator.

| User name: | LAB\vcenteradmin |
| Password: | ******** |

☐ Use Windows session authentication

Login

VMware vSphere™ Web Client

3) On the left under Home, select vCenter.

vmware® vSphere Web Cli

History

🏠 Home

🔲 vCenter

4) Under Inventory Lists, select Hosts.

▼ Inventory Lists

🔲 vCenter Servers   1 >

🏢 Datacenters   1 >

🖥 Hosts   2 >

5) Select a host where you want to configure the iSCSI initiator.

vCenter

🖥 Hosts   2

🖥 labesx01.lab.slice2.com

🖥 labesx02.lab.slice2.com

6) Click the Manage tab and then the Storage tab. Notice there are only local disk adapters listed.

🖥 labesx01.lab.slice2.com   Actions ▾

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

Settings | Networking | **Storage** | Alarm Definitions | Tags | Permissions

Storage Adapters

Storage Adapters
Storage Devices
Host Cache Configuration

Storage Adapters

➕ 🖼 🔁 🔲 📄▾ ⌐ ☰   🔍 Filter ▾

Adapter	Type	Status	Identifier
631xESB/632xESB IDE Controller			
🔄 vmhba0	Block SCSI	Unknown	
🔄 vmhba32	Block SCSI	Unknown	
Smart Array P400i			
🔄 vmhba1	Block SCSI	Unknown	

7) Add the software iSCSI Initiator to the ESXi host by clicking the green + under Storage Adapters and selecting Software iSCSI adapter.
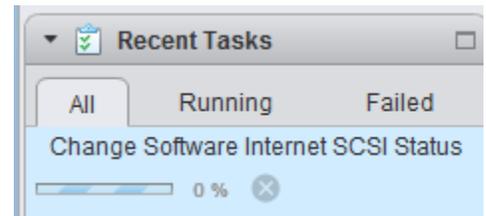
Storage Adapters

+ Software iSCSI adapter
Software FCoE adapter...

vmhba0
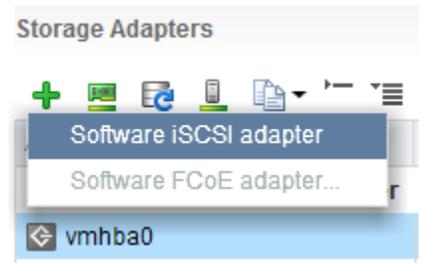
8) On the popup message that appears, click OK.

labesx01.lab.slice2.com - Add Software iSCSI Adapter

⚠ A new software iSCSI adapter will be added to the list. After it has been added, select the adapter and use the Adapter Details section to complete the configuration.

OK   Cancel
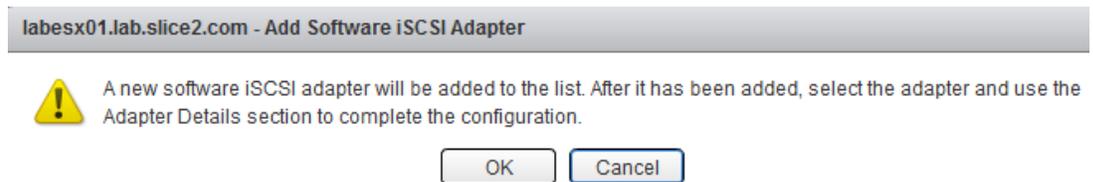
9) Over on the upper far right under Recent Tasks you will see the progress.

▼ 📋 **Recent Tasks**

All   Running   Failed

Change Software Internet SCSI Status

0 % ✕

10) When done the iSCSI initiator will appear under Storage Adapters. Select it and under Adapter Details select the Properties tab. The iqn in the iSCSI Name field is what you will need to configure bidirectional CHAP on the NetApp controller in the next section.
   a. iqn.1998-01.com.vmware:labesx01-09511f3c

Storage Adapters

Q Filter

Adapter	Type	Status	Identifier
631xESB/632xESB IDE Controller			
vmhba32	Block SCSI	Unknown	
vmhba0	Block SCSI	Unknown	
Smart Array P400i			
vmhba1	Block SCSI	Unknown	
iSCSI Software Adapter			
vmhba33	iSCSI	Online	iqn.1998-01.com.vmware:labesx0

Adapter Details

Properties Devices Paths Targets Network Port Binding Advanced Options

Adapter Status   Disable

Status	Enabled

General   Edit...

Name	vmhba33
Model	iSCSI Software Adapter
iSCSI Name	iqn.1998-01.com.vmware:labesx01-09511f3c
iSCSI Alias	
Target Discovery	Send Targets, Static Targets

Authentication   Edit...

Method	None

11) Select the Networking tab for your host. In my case, I'll use vSwitch1 for iSCSI traffic. It is shared with vMotion traffic. You will need one vSwitch that is capable of iSCSI port binding. This screen capture is for reference. There are no tasks to perform here.
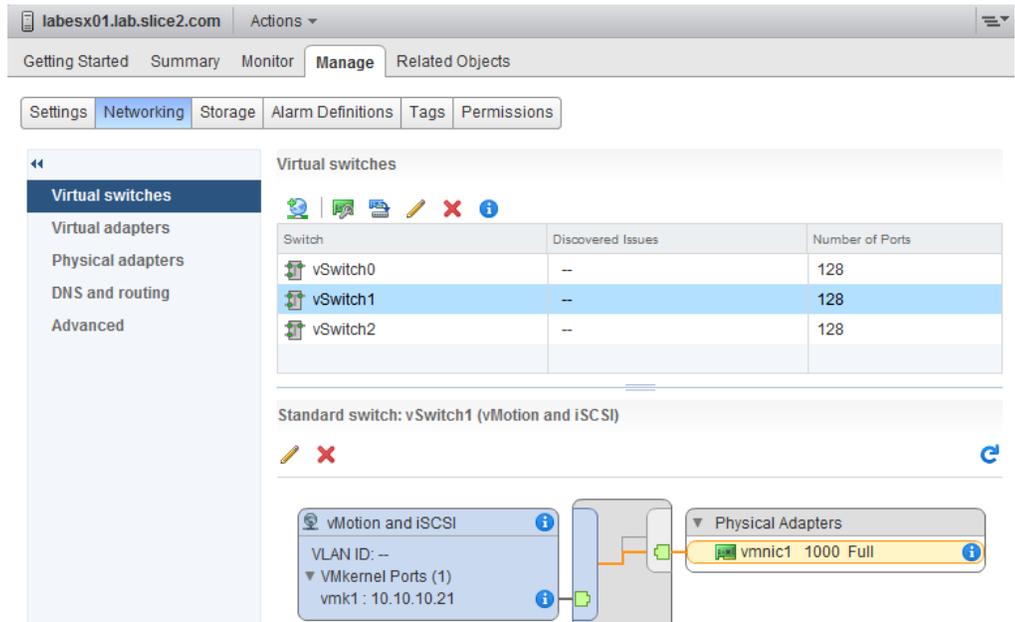
Configure the NetApp Controller

Note: If you already have your volume, lun and igroup mapping setup, skip to step 7 and 8 below. That's all you need to do. If not, this shows how to create a small volume, lun, igroup, map it and give it a lun ID.

1) Login to the NetApp Controller as an administrator user.
2) On the NetApp filer, create the volume that will hold the iscsi lun. This command assumes you have aggregate aggr1 already created. If not, use an aggregate that has enough room for your volume.
netapp> vol create MCHAPVOL aggr1 10g

3) Create the lun in the volume.
netapp> lun create -s 5g -t vmware /vol/MCHAPVOL/ESXi5_iSCSI_MCHAPlun_01

4) Create an igroup and add the ESXi host's iscsi nodename or iqn from above to it.
netapp> igroup create -i -t vmware ISCSI_MCHAP_ESXi5
netapp> igroup add ISCSI_MCHAP_ESXi5 iqn.1998-01.com.vmware:labesx01-09511f3c
netapp> igroup show ISCSI_MCHAP_ESXi5
ISCSI_MCHAP_ESXi5 (iSCSI) (ostype: vmware):
iqn.1998-01.com.vmware:labesx01-09511f3c (not logged in)

5) Map the lun to the iscsi-group and give it lun ID 01.
netapp> lun map /vol/MCHAPVOL/ESXi5_iSCSI_MCHAPlun_01 ISCSI_MCHAP_ESXi5 01

6) Obtain the NetApp target nodename.
netapp> iscsi nodename
iqn.1992-08.com.netapp:sn.84167939

7) Set the CHAP secrets on the NetApp controller.
netapp> iscsi security add -i iqn.1998-01.com.vmware:labesx01-09511f3c -s chap -p MCHAPesxi5 -n iqn.1998-01.com.vmware:labesx01-09511f3c -o MCAPntap7 -m iqn.1992-08.com.netapp:sn.84167939

Example: iscsi security add -i initiator -s chap -p inpassword -n inname -o outpassword -m outname

What does the command above mean?

iscsi – ontap command
security – prepare to define chap security
add – add iqn's and chap secrets

-i initiator – this is the iqn or initiator you want to configure for Mutual CHAP (Host iqn).

inpassword - is the inbound password for CHAP authentication. The storage system uses the inbound password to authenticate the initiator (Host passwd).

inname - is a user name for inbound CHAP authentication. The storage system uses the inbound user name to authenticate the initiator (Host iqn).

outpassword - is a password for outbound CHAP authentication. The storage system uses this password for authentication by the initiator (NetApp passwd).

outname -is a user name for outbound CHAP authentication. The storage system uses this user name for authentication by the initiator (NetApp iqn).

8) Verify the iSCSI security configuration.
netapp> iscsi security show
init: iqn.1998-01.com.vmware:labesx01-09511f3c auth: CHAP Inbound password: **** Inbound username: iqn.1998-01.com.vmware:labesx01-09511f3c Outbound password: **** Outbound username: iqn.1992-08.com.netapp:sn.84167939

Configure CHAP on the ESXi host

1) Back on the Storage tab, under Adapter Details, click the Network Port Binding tab and then click the green + to Add.

2) On this screen, vCenter will only list VMkernel adapters that are compliant with iSCSI port binding requirements. In my case, I'll select the only one listed and click OK.

3) Click the Rescan icon to refresh the storage devices (small server with green line under it).
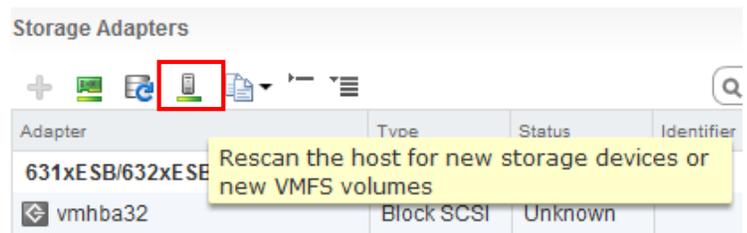
4) On the Storage tab, select your iSCSI Software Adapter. Under Adapter Details select the Targets tab, Static Discovery and then click Add.
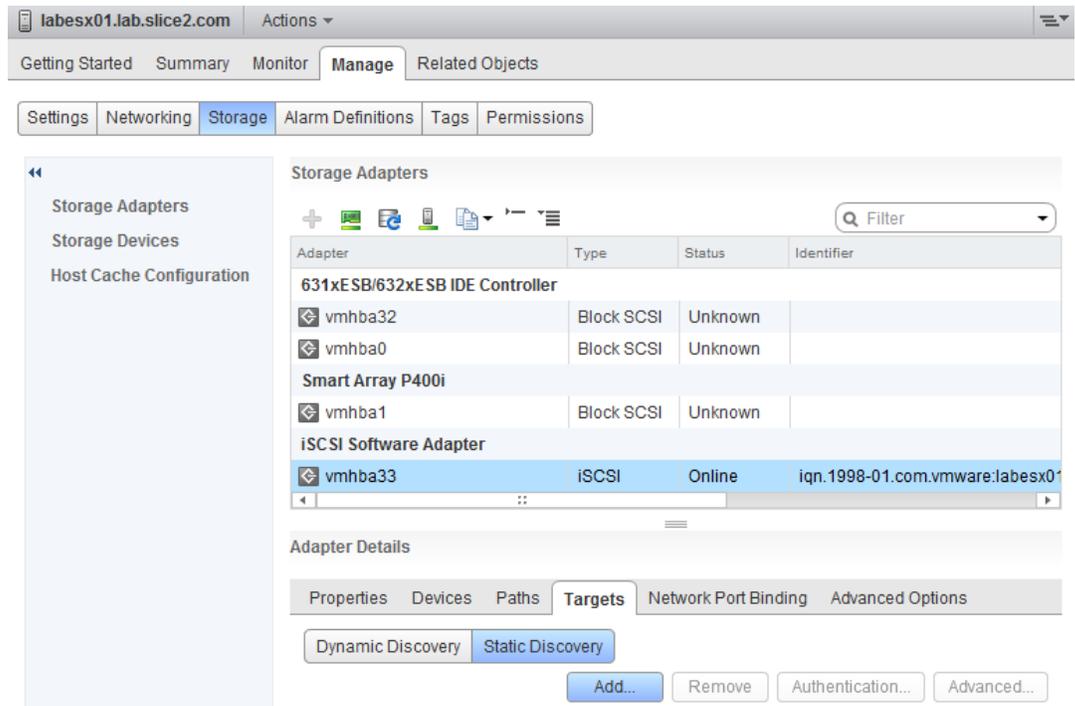
5) Enter the following:
   a. iSCSI Server: this is the fully qualified hostname for your NetApp controller.
   b. Port: leave the default port as 3260
   c. iSCSI Target Name: this is the iqn of your NetApp controller. Use the command "iscsi nodename" on the controller to get the iqn.
   d. Deselect Inherit settings from parent.
   e. Authentication Method: select Use bidirectional CHAP
   f. Outgoing CHAP: select Use initiator name and enter the ESXi CHAP secret.
   g. Incoming CHAP: enter the NetApp initiator name and enter the NetApp CHAP secret.
   h. Click OK when done.
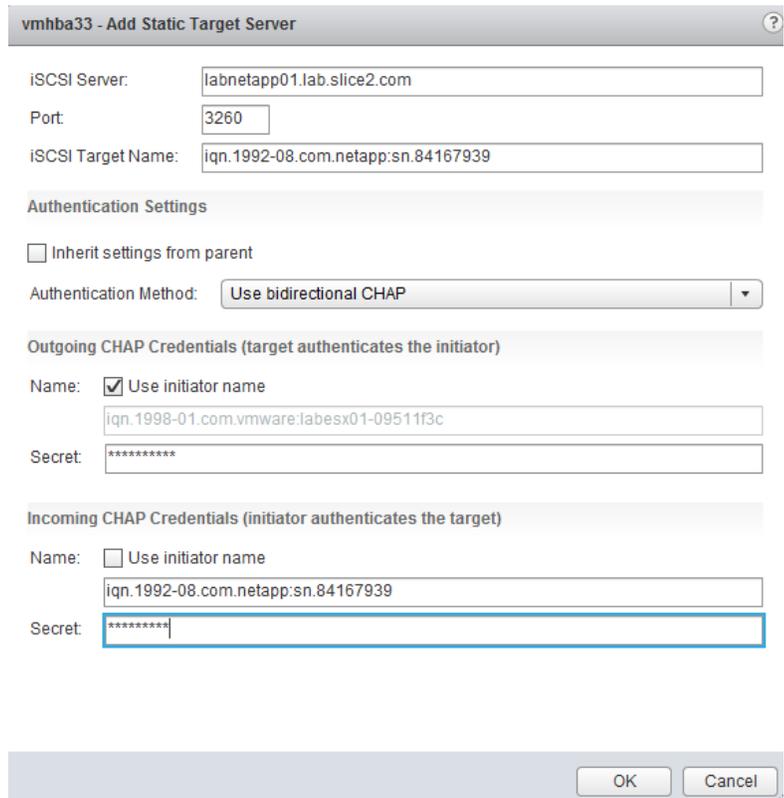
6) You will be asked to Rescan to refresh the storage devices (small server with green line under it).

Storage Adapters

Adapter	Type	Status	Identifier
631xESB/632xESE	Rescan the host for new storage devices or new VMFS volumes		
vmhba32	Block SCSI	Unknown	
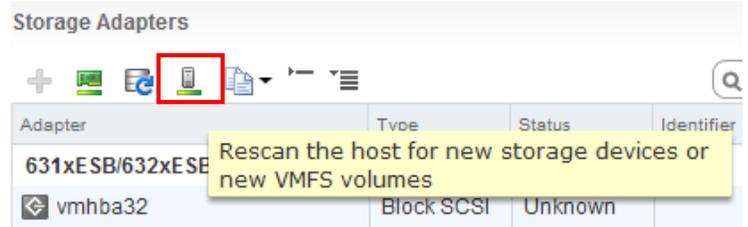
7) Under Adapter Details, on the Properties tab, in the lower right corner across from Authentication, click Edit.

Adapter Details

Properties Devices Paths Targets Network Port Binding Advanced Options

Adapter Status [Disable]

Status	Enabled

General [Edit...]

Name	vmhba33
Model	iSCSI Software Adapter
iSCSI Name	iqn.1998-01.com.vmware:labesx01-09511f3c
iSCSI Alias	
Target Discovery	Send Targets, Static Targets

Authentication [Edit...]

Method	None

8) Enter the following:
   a. Authentication Method: select Use bidirectional CHAP
   b. Outgoing CHAP: select Use initiator name and enter the ESXi CHAP secret.
   c. Incoming CHAP: enter the NetApp initiator name and enter the NetApp CHAP secret.
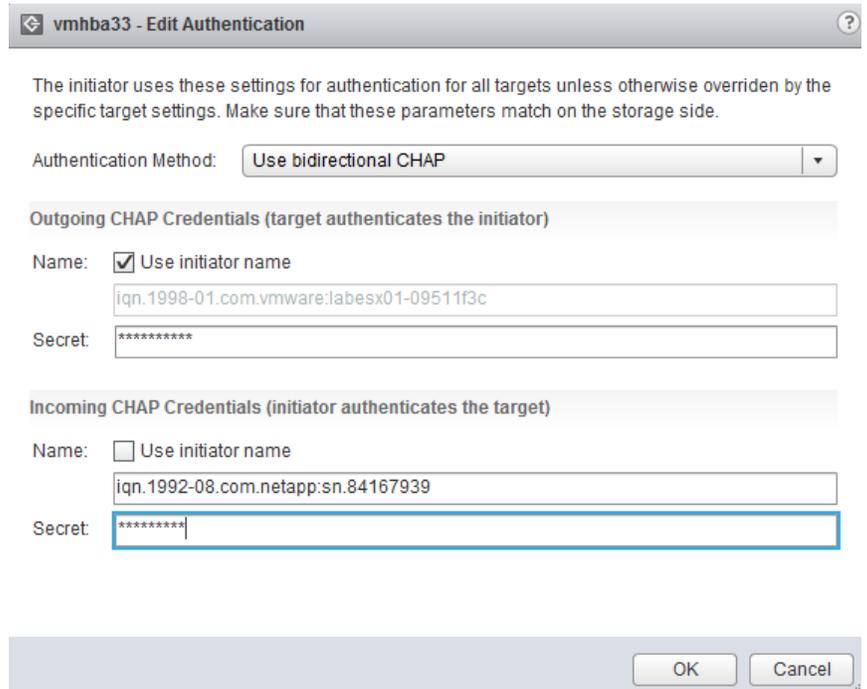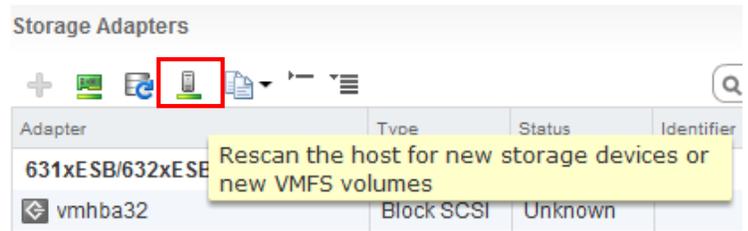   d. Click OK when done

vmhba33 - Edit Authentication

The initiator uses these settings for authentication for all targets unless otherwise overriden by the specific target settings. Make sure that these parameters match on the storage side.

Authentication Method: [Use bidirectional CHAP ▼]

Outgoing CHAP Credentials (target authenticates the initiator)

Name: ☑ Use initiator name
iqn.1998-01.com.vmware:labesx01-09511f3c

Secret: **********

Incoming CHAP Credentials (initiator authenticates the target)

Name: ☐ Use initiator name
iqn.1992-08.com.netapp:sn.84167939

Secret: *********

[OK] [Cancel]

9) You will be asked to Rescan to refresh the storage devices (small server with green line under it).

Storage Adapters

Adapter | Type | Status | Identifier
631xESB/632xESE | Rescan the host for new storage devices or new VMFS volumes
vmhba32 | Block SCSI | Unknown

10) Select the Devices tab and the lun will be present.

Adapter Details

Properties | **Devices** | Paths | Targets | Network Port Binding | Advanced Options

Attach   Detach   Rename...

Q Filter

Name	Type	Capacity	Operational...	Hardware Acceler
NETAPP iSCSI Disk (naa.60a98...	disk	5.00 GB	Attached	Unknown

NETAPP iSCSI Disk
(naa.60a98000686f6167504a763433693830)
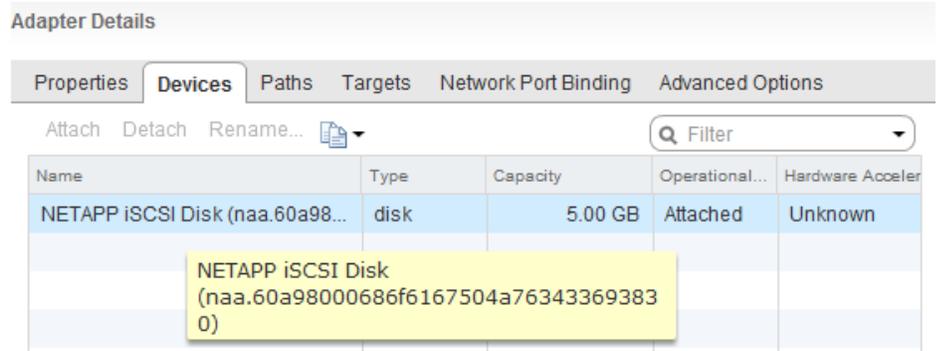
11) Click Actions > New Datastore. Run the Wizard and create your datastore using the new lun. And that's it.

labesx01.lab.slice2.com | Actions ▾

Getting Started   Summary

Actions – labesx01.lab.slice2.com

Enter Maintenance Mode
Exit Maintenance Mode

Settings | Networking | Storag

Connect
Power On

Storage Adapters
Storage Devices
Host Cache Configuration

Reboot
Shut Down
Disconnect
New Virtual Machine...
Deploy OVF Template...
New Datastore...
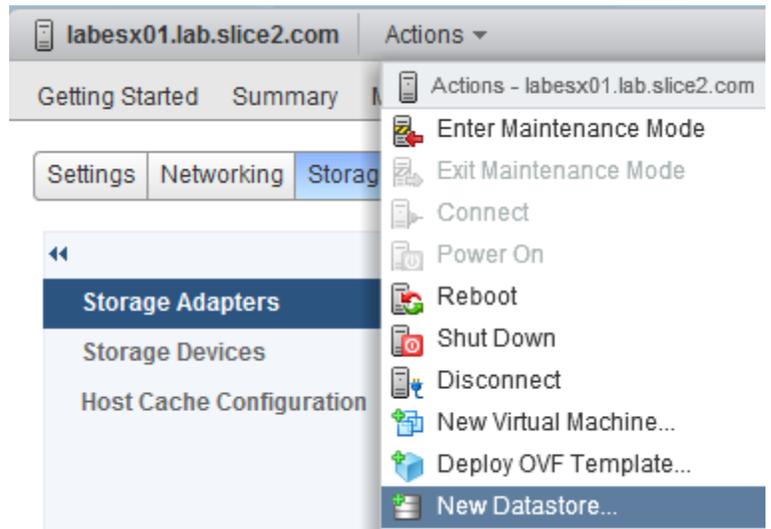
12) Note that you would normally do this for all hosts in your cluster because you want all hosts to have access to the lun and new datastore. This means enabling the iSCSI initiator on all ESXi hosts, select the iSCSI port binding, configure bidirectional CHAP, adding the ESXi nodenames to the iSCSI igroup on the NetApp controller and then running the iscsi security add command for each ESXi nodename in the cluster.