

**DELL POWERVAULT MD32XX
DEPLOYMENT GUIDE FOR VMWARE
ESX4.1 SERVER SOFTWARE**

*PowerVault MD32xx
Storage Array*

www.dell.com/MD32xx



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<http://www.dell.com>

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TERMINOLOGY/GLOSSARY

VD == virtual disk

VM == virtual machine

NIC == network interface card

MPIO == Multi-Path I/O

SAS == Serial Attached SCSI

RDM == Raw Device Map

DVS == Distributed Virtual Switch

HA == high availability

DRS == Distributed Resource Scheduler

MRU == Most Recently Used

WWN == World Wide Name

INTRODUCTION

The Dell™ PowerVault™ MD32xx storage solution consists of either a standard or high availability configuration. The standard(simplex) configuration has a single controller with four SAS In ports. It can be deployed to support up to 4 hosts non-redundantly. The high availability(duplex) configuration has dual controllers with four SAS In ports per controller for a total of eight SAS In ports. The dual controller option can connect up to 4 fully redundant hosts. This document provides instructions to setup the MD32xx SAS storage solution for use with VMware® ESX4.1 Server™ software.

Generally, you can connect multiple hosts to a single local storage system. The actual number of hosts you connect varies depending on the type of storage device and topology you use.

When multiple hosts connect to the local storage unit, they access storage devices in the unshared mode. The unshared mode does not permit several hosts to access the same VMFS Datastore concurrently. However, a few SAS storage systems offer shared access to multiple hosts. This type of access permits multiple hosts to access the same VMFS Datastore on a LUN.

With the MD32xx this is accomplished with the use of Host Groups which in effect bypass the partition scheme, thus allowing multiple ESX hosts access to the same virtual disk.

Provisioning of storage on servers in a VM environment is a multi-step process starting with definition of the server names for host access. The SAS connection is then established from the storage subsystem. After which, detection and configuration are established as a two-way link with the associated ESX server(s), completing the SAS communication subsystem. The final step allocates the detected storage to the virtual machines (VMs), where all or part of the configured storage can be assigned to individual VMs. Connectivity between the storage array and the host server is provided by a Dell 6.0-Gbps SAS Host Bus Adapter (SAS 6Gb HBA).

IMPLEMENTING ESX4.1 ON THE MD32XX STORAGE ARRAY

This whitepaper addresses some of the new features in vSphere4 as well as showing examples of how to connect a vSphere4 environment to a Dell™ PowerVault™ SAS arrays.

This whitepaper goes into depth on configuration steps for connecting to a PowerVault™ SAS array.

NEW FEATURES IN VSPHERE4

MPIO – With ESX4.1 and vSphere4, customers can benefit from Multi-Path I/O from the ESX4.1 server and the SAS array. This allows for multiple connections to be concurrently used to allow for greater bandwidth. This is especially important for the PowerVault SAS

as each PowerVault member has multiple connections and now ESX4.1 can take full advantage of these connections.

Third Party MPIO Support – With ESX4.1 and vSphere4, VMware has provided an architecture that enables storage vendors to provide new and advanced intelligent integration.

Drivers for multi-path frameworks such as Microsoft Multi-Path IO (MPIO) and Linux Device Mapper (DM) are installed on host systems that access the storage array and provide I/O path failover.

SUPPORTED HARDWARE AND SOFTWARE

HARDWARE REQUIREMENTS

Refer to the following VMware website for a complete up-to-date list of the prerequisites for installing VMware ESX server.

http://www.vmware.com/pdf/vsphere4/r41/vsp_41_esx_server_config.pdf

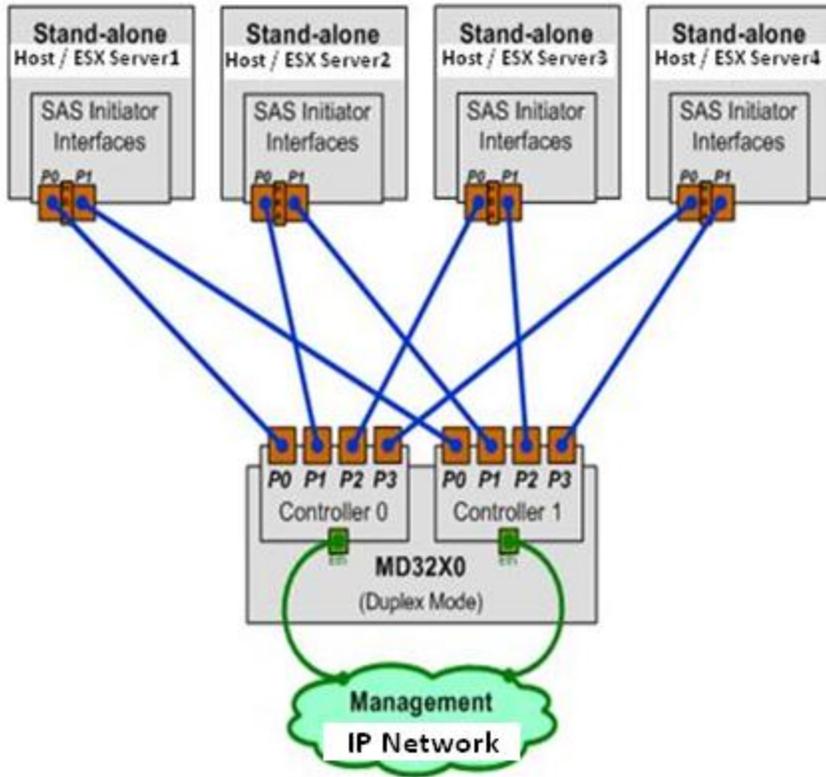
SUPPORTED OPERATING SYSTEMS FOR MD32XX ARRAY

ESX4.1 is the only supported VMware OS for MD32xx.

ARCHITECTURAL SETUP

The NIC ports serving SAS traffic on the ESX servers are teamed in order to re-route traffic in the event of an adapter failure.

SAS direct attached storage does not require a storage network to communicate with your host. All you need is a cable connected to the storage unit and a Dell HBA in your host. You will have a SAS HBA and a path (cable) to each controller. See below for example.



CONNECTIONS TO A MD32XX SAS ARRAY

Steps:

Prerequisite: The SAS HBA(s) are already installed in the ESX server. The cables have been connected to the Array, and both the server and the array are powered on.

1) To verify that the SAS 6Gb HBA is correctly installed login to vCenter and select the ESX host. From the *Configuration* tab select *Storage Adapters*. You should see the Block SCSI HBA listed. Under details you will see Dell 6Gb SAS HBA adapter. Scroll down if necessary, there will be no devices or paths listed until after you have configured the MD32xx array.

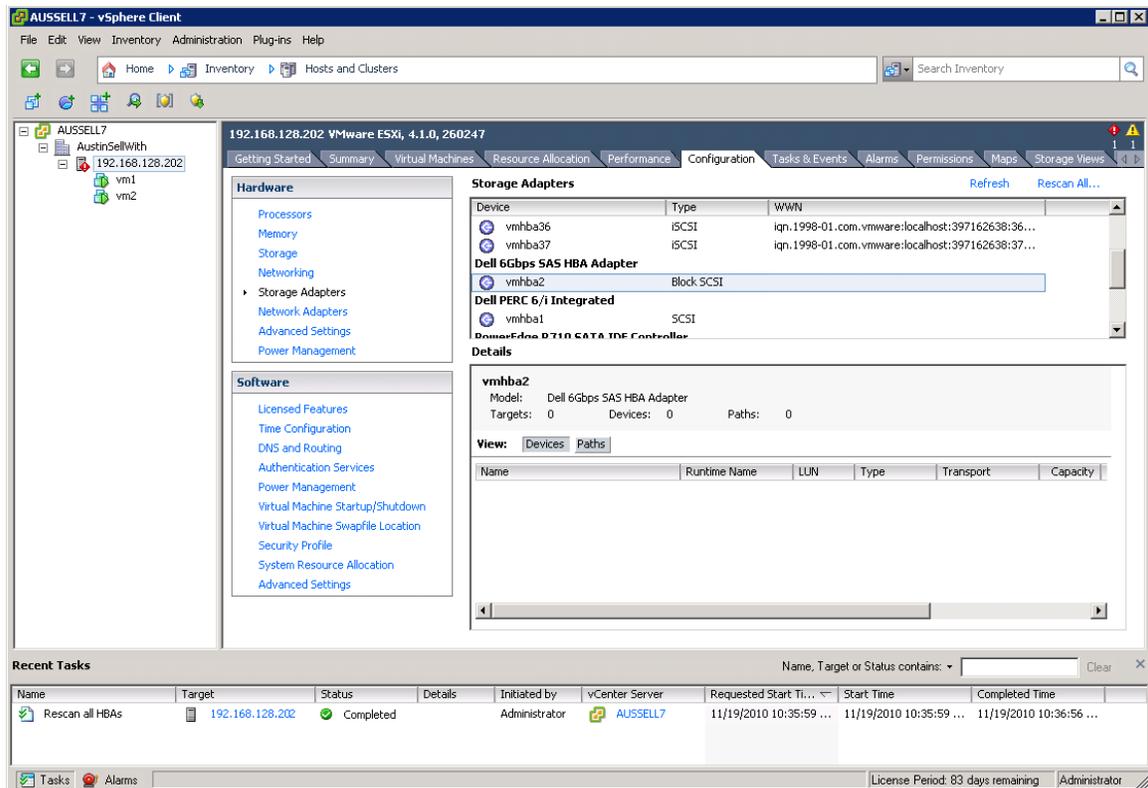


Figure 1 Viewing Dell 6Gb SAS HBA

POWERVAULT MD32XX STORAGE SETUP AND CONFIGURATION

Create virtual disks on MD32xx using steps described in:

[HTTP://SUPPORT.DELL.COM/SUPPORT/EDOCS/SYSTEMS/MD3200/MULTLANG/GSG/DAO_BCC/GSG.PDF](http://support.dell.com/support/edocs/systems/md3200/multlang/gsg/dao_bcc/gsg.pdf)

After opening the Modular Disk Storage Manager and selecting the MD32xx storage array to be configured, select the *Mappings* tab.

Note: in the examples to follow the Storage array is an MD32xx with virtual disks already configured using the *Configure Storage Array* selection under the Setup Tab. The new ESX host being added is named "VMware_host1".

From the *Mappings* tab

STEP1: MANUALLY DEFINE HOSTS BY HIGHLIGHTING THE STORAGE ARRAY NAME AND RIGHT CLICKING

Select Define -> Host

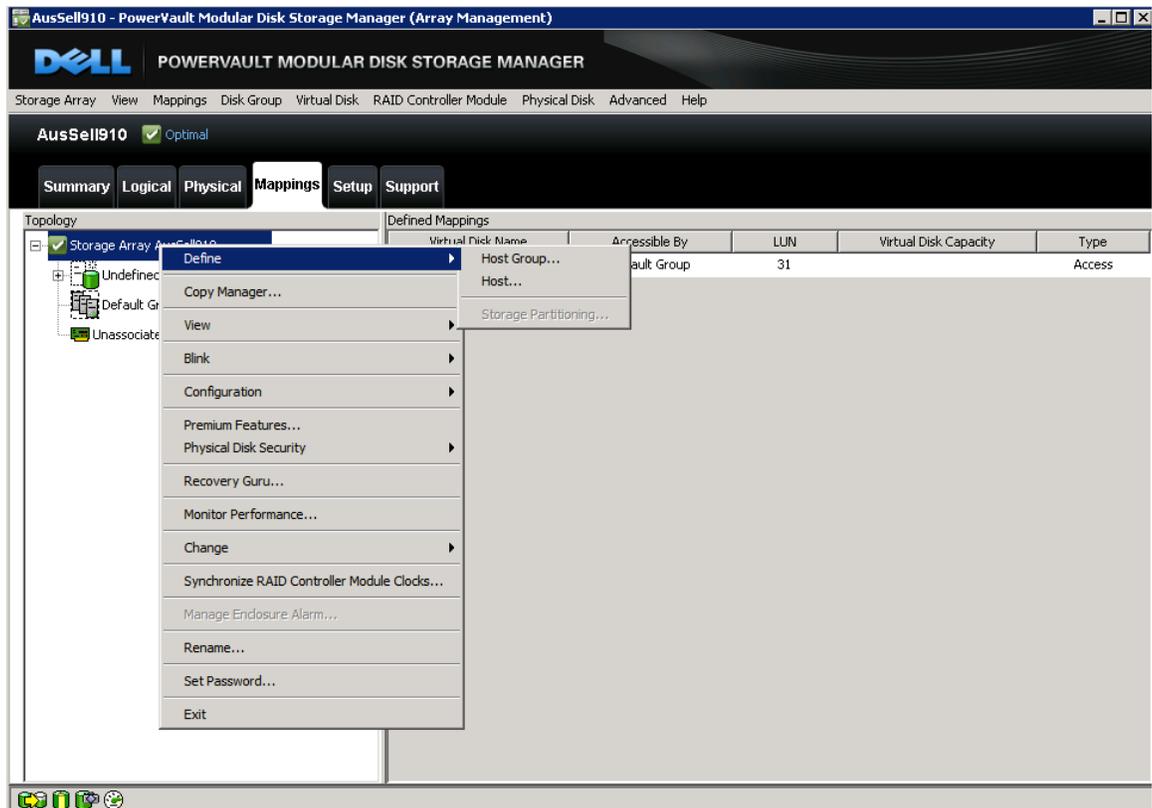


Figure 2 Defining the Storage Array Host Topology

STEP2: NAMING THE HOST

Select a name that matches the naming convention used for the environment that you are configuring. For example VMware_host1. Leave partitions enabled and select Next.

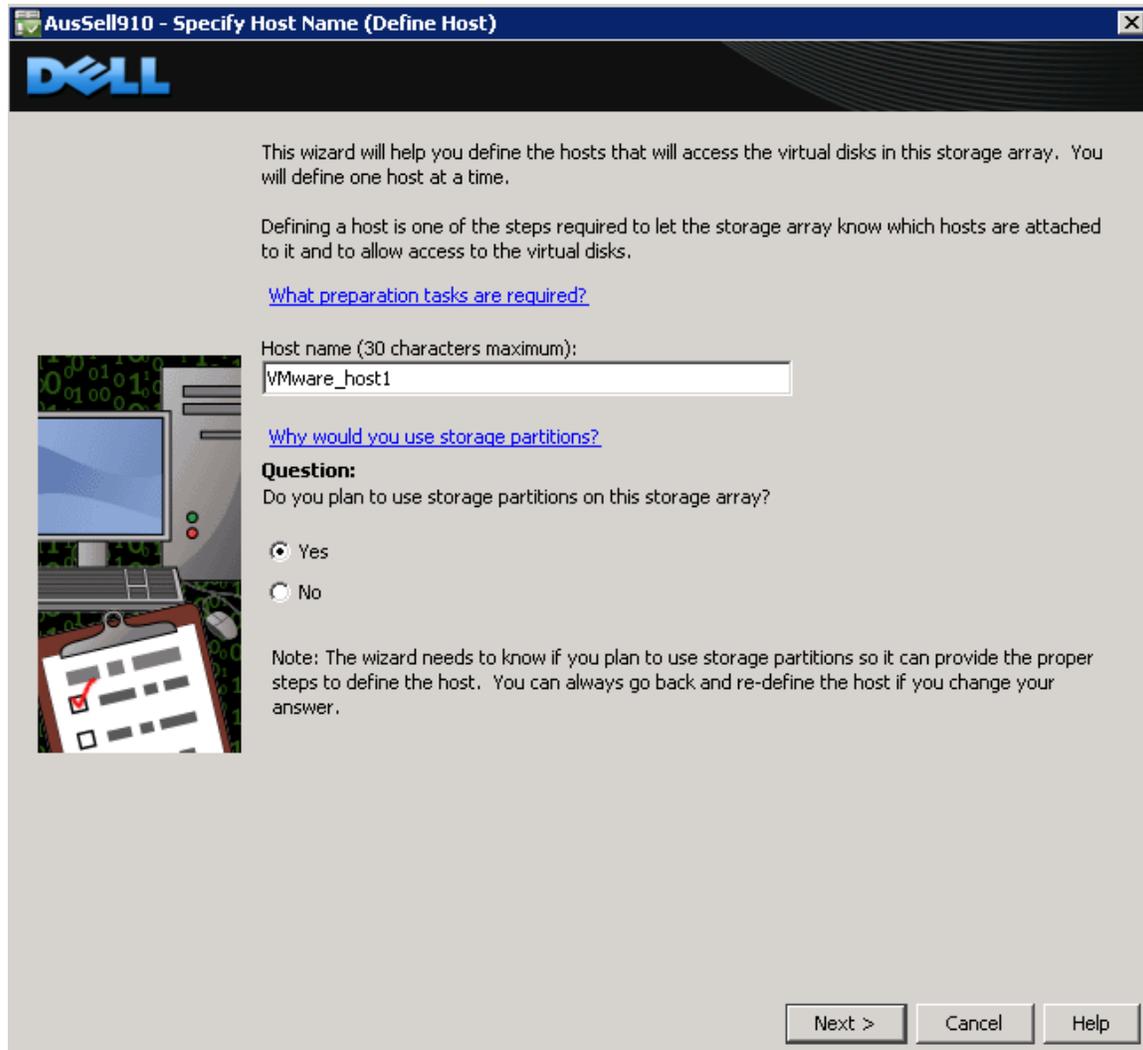


Figure 3 Naming the Host

STEP3: ADDING HOST PORT IDENTIFIERS

To add host port identifiers highlight the host that you just defined in the topology tree. Right click and select *Manage Host Port Identifiers*

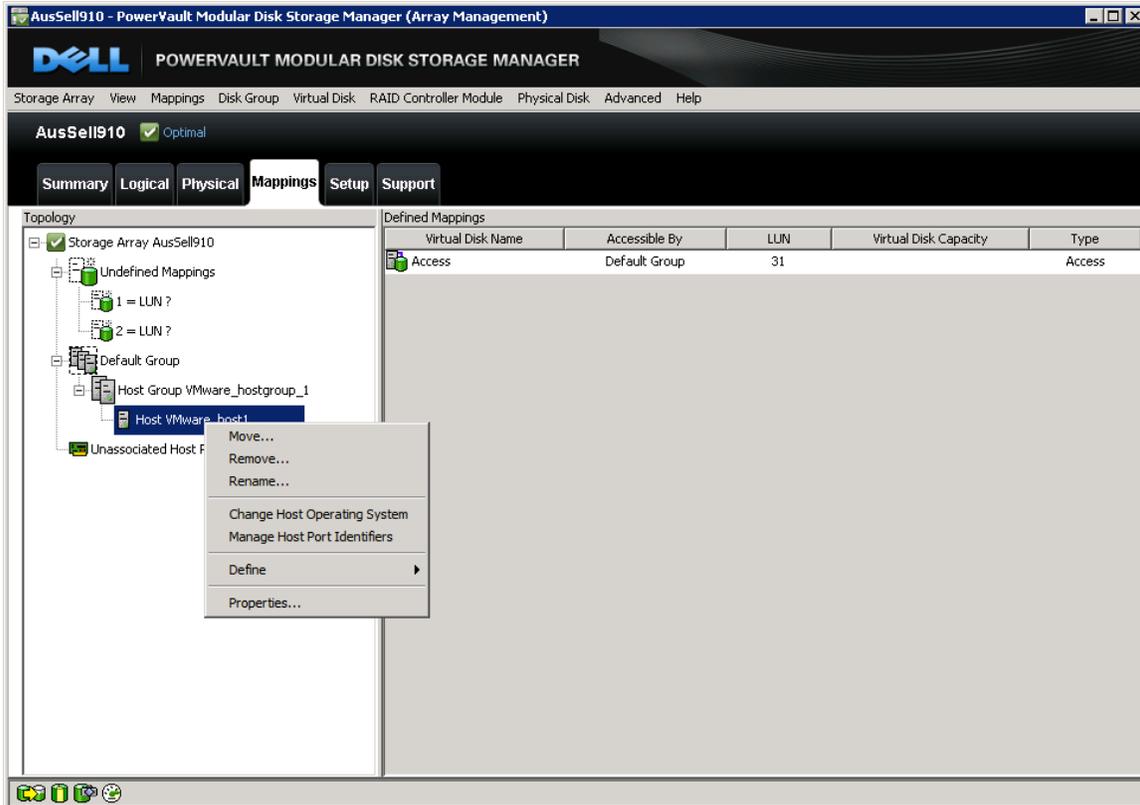


Figure 4 Adding Host Port Identifiers

In the Manage Host Port Identifiers window select *Add*

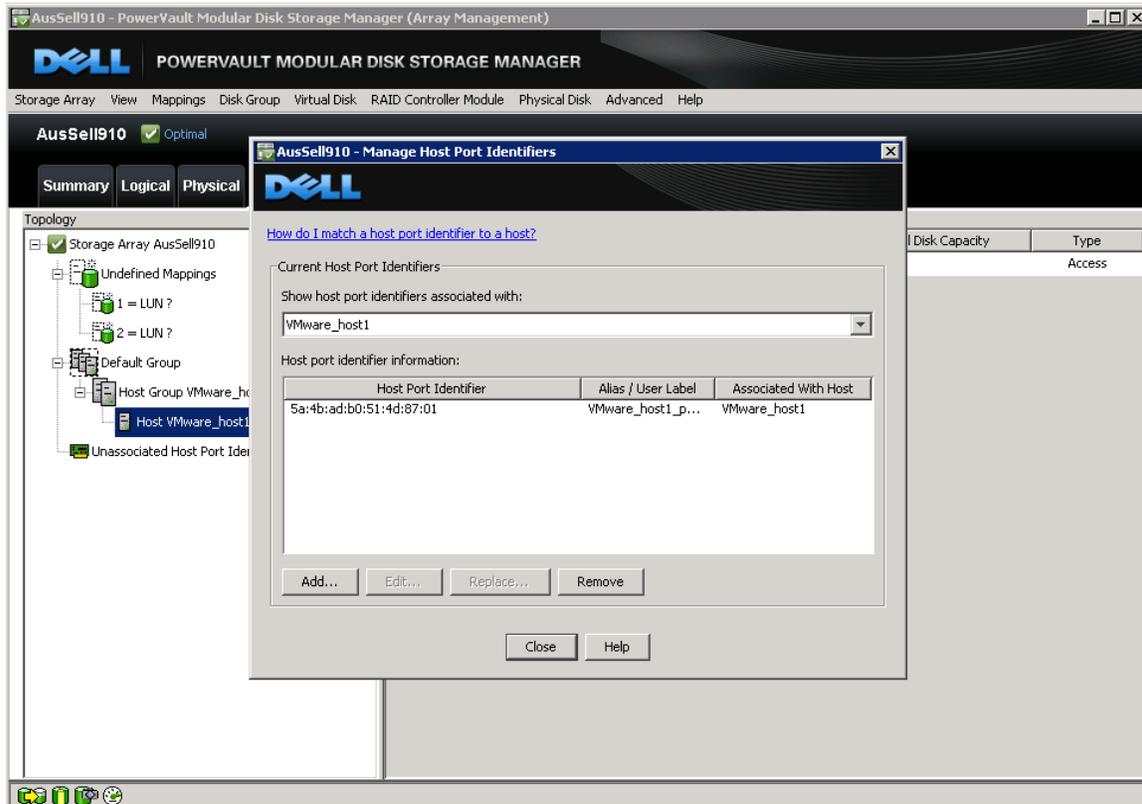


Figure 5 Managing a Host Port Identifier

STEP4: ENTER AN ALIAS FOR THIS HOST PORT IDENTIFIER AND THEN SELECT *ADD*

Use the pull down to select a Host Port Identifier.

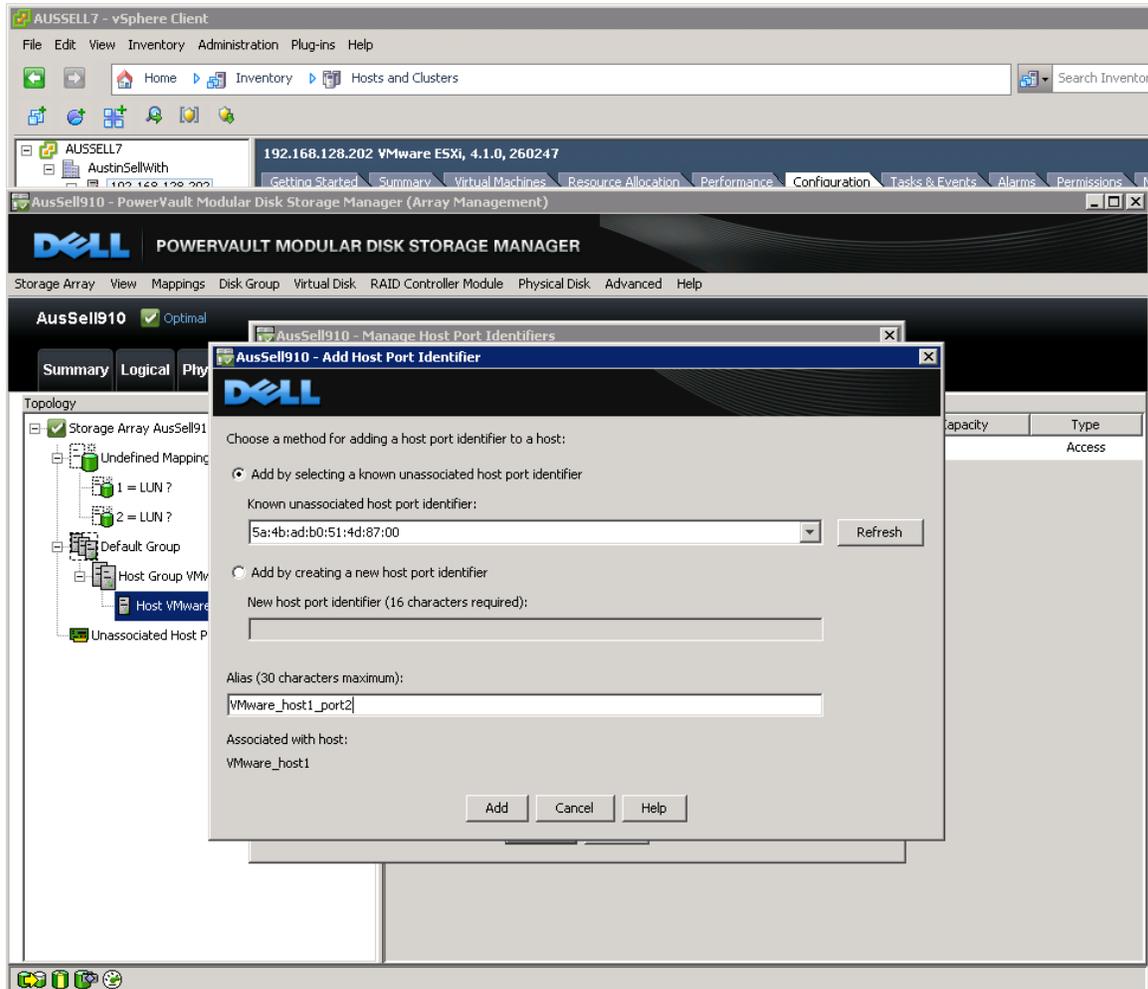


Figure 6 Creating Alias for a Host Port Identifier

STEP5: SELECTING HOST PORT IDENTIFIERS

Each port on the Dell 6Gb SAS HBA has a unique WWN that is used for the SAS connection. Using the pull down select the host port identifier. In this example because we are using both controllers there will be two Identifiers, one for each port on the HBA.

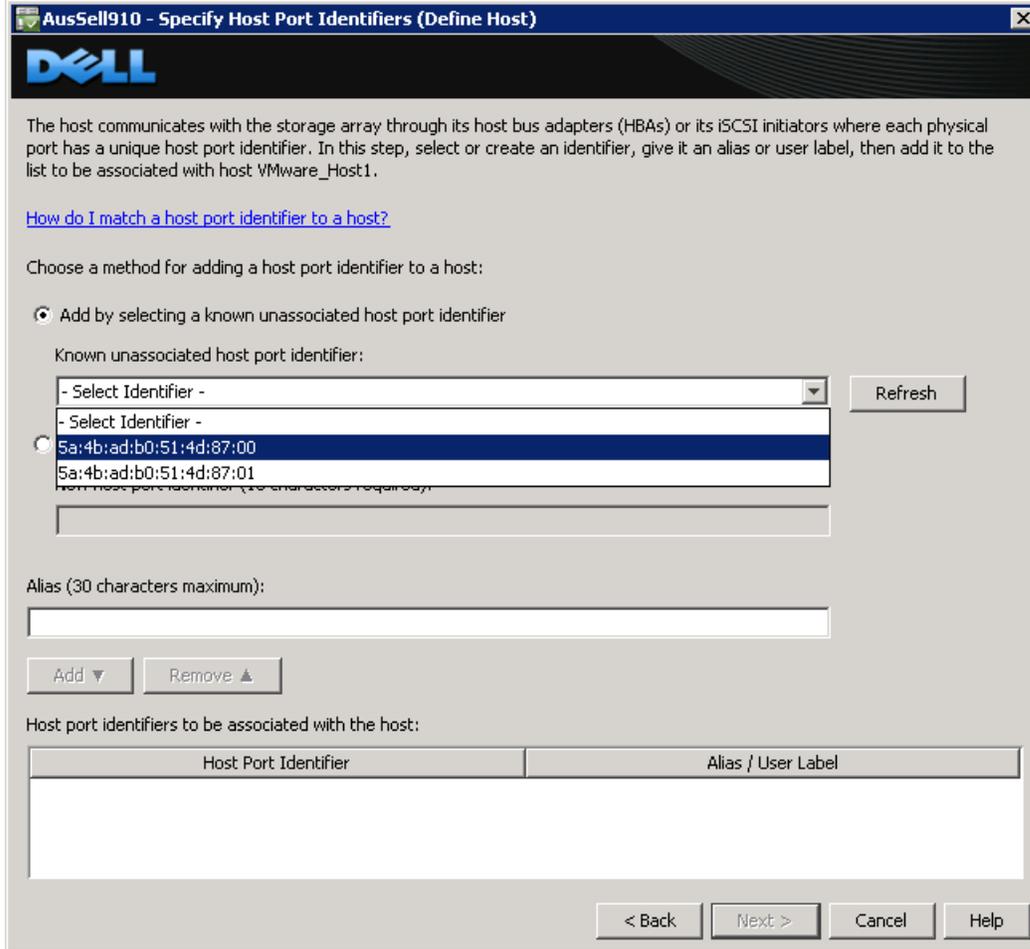


Figure 7 Selecting Host Port Identifiers

STEP6: ENTERING HOST PORT ALIAS

An alias is used in the topology tree to identify the port. Add a unique alias for this host port such as the one below, then select *Add*

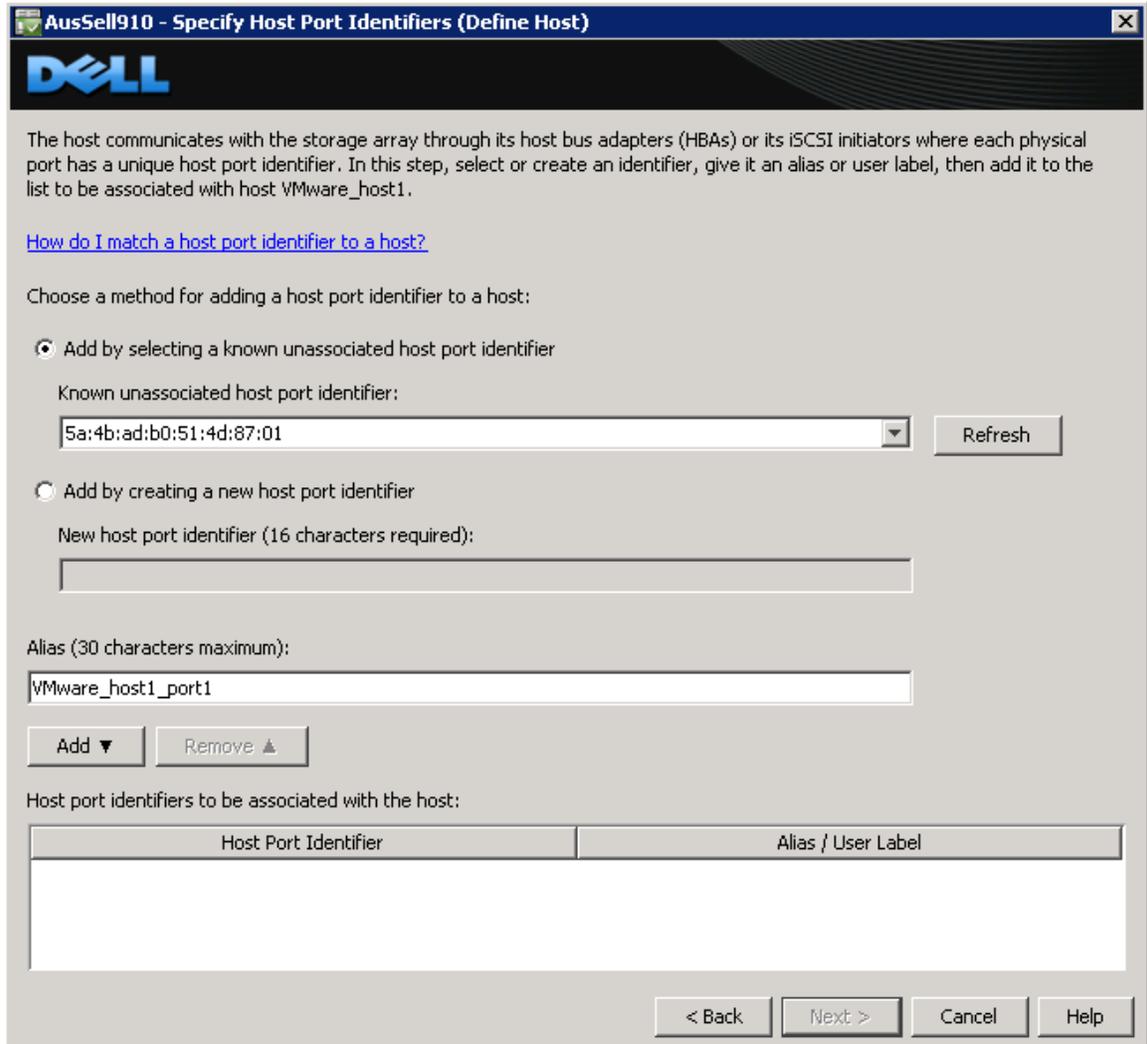


Figure 8 Entering Host Port Alias

The host port screen will be similar to the one below. Select *Next* to continue.

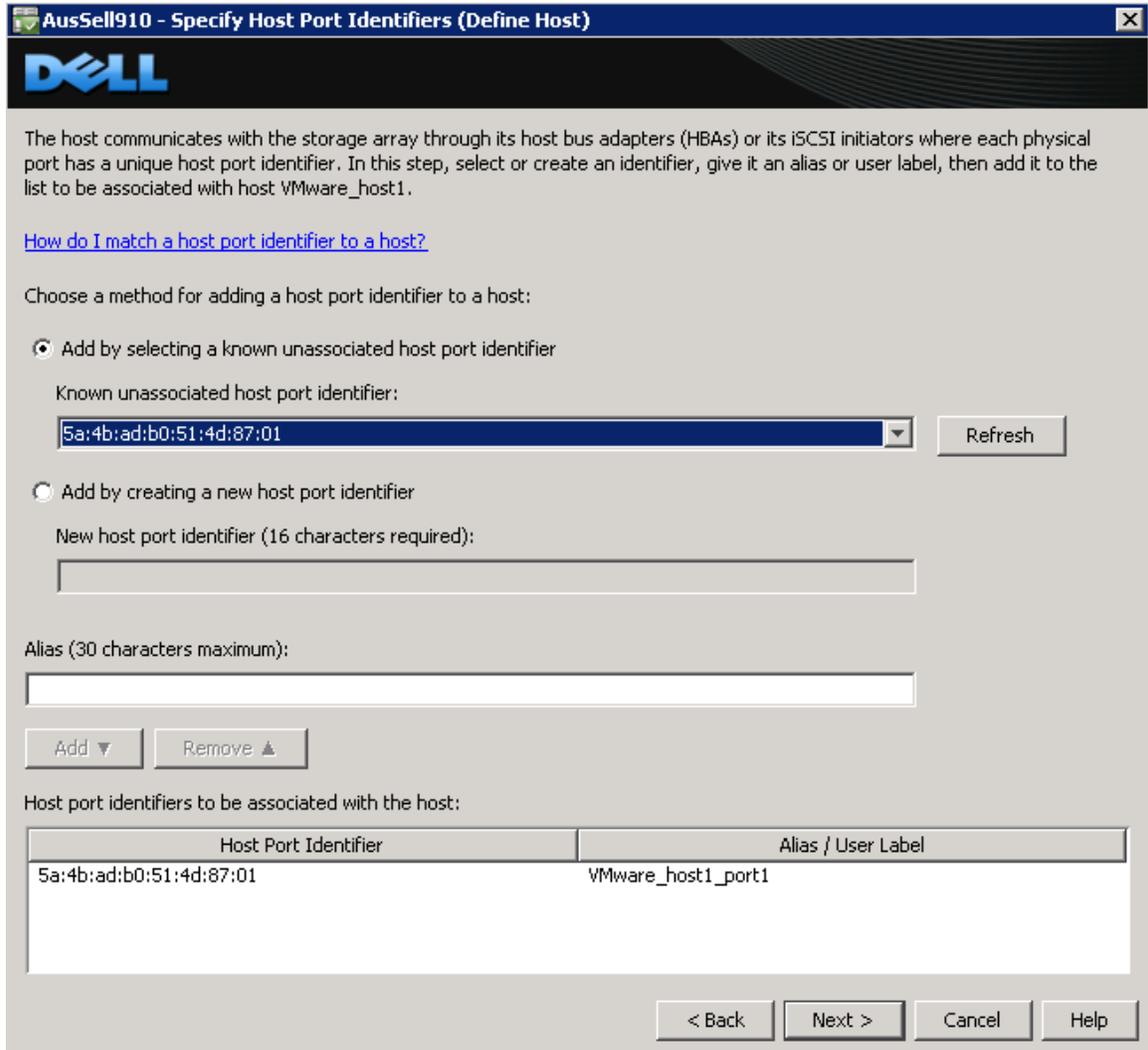


Figure 9 Host Port Identifier

STEP7: SELECT *VMWARE* AS THE HOST TYPE

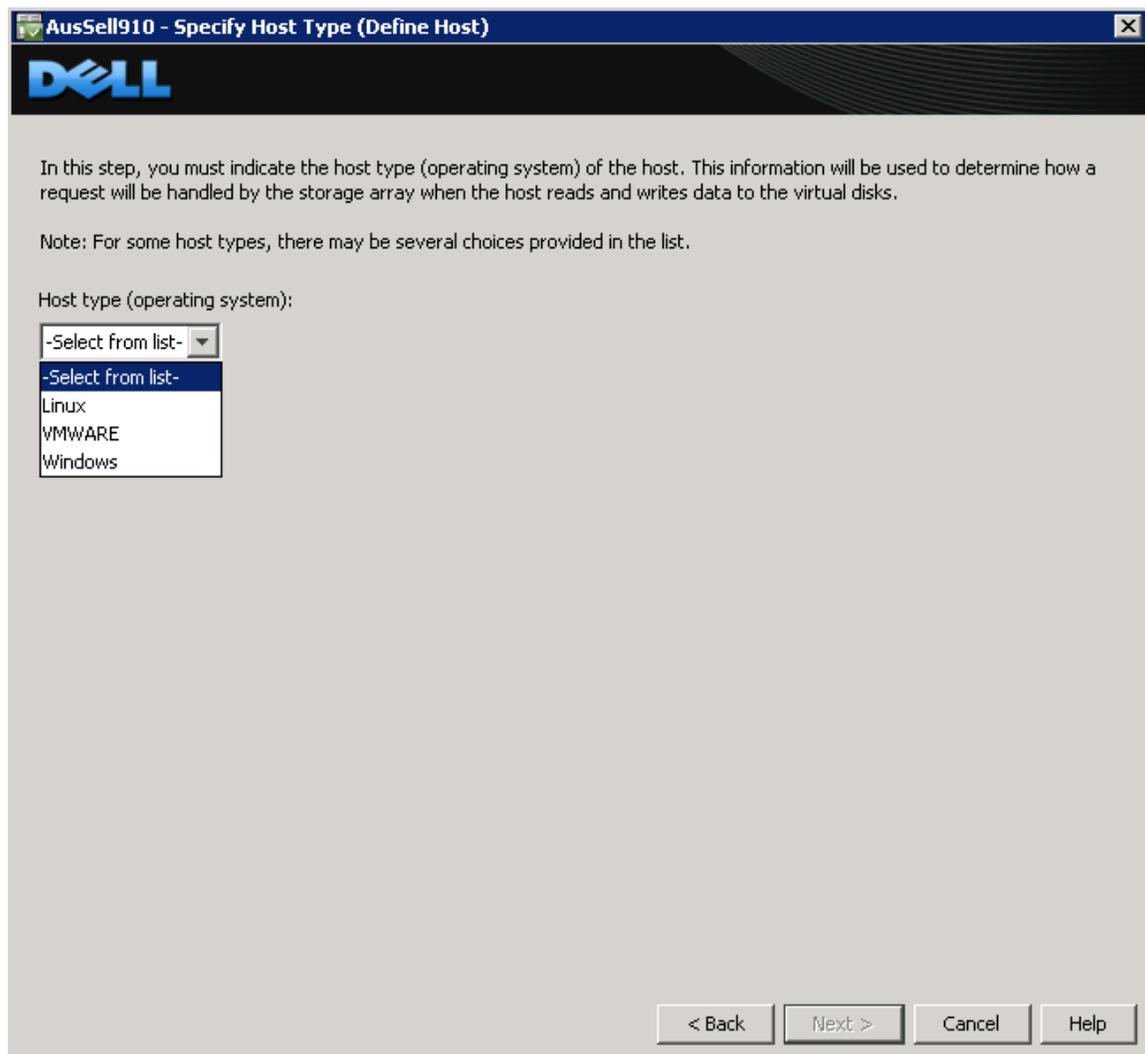


Figure 10 Selecting Host Type

If you intend to use advanced VMware features such as VMotion then this host will share access with other ESX servers and you will have to create a Host Group. We will create a host group for this example.

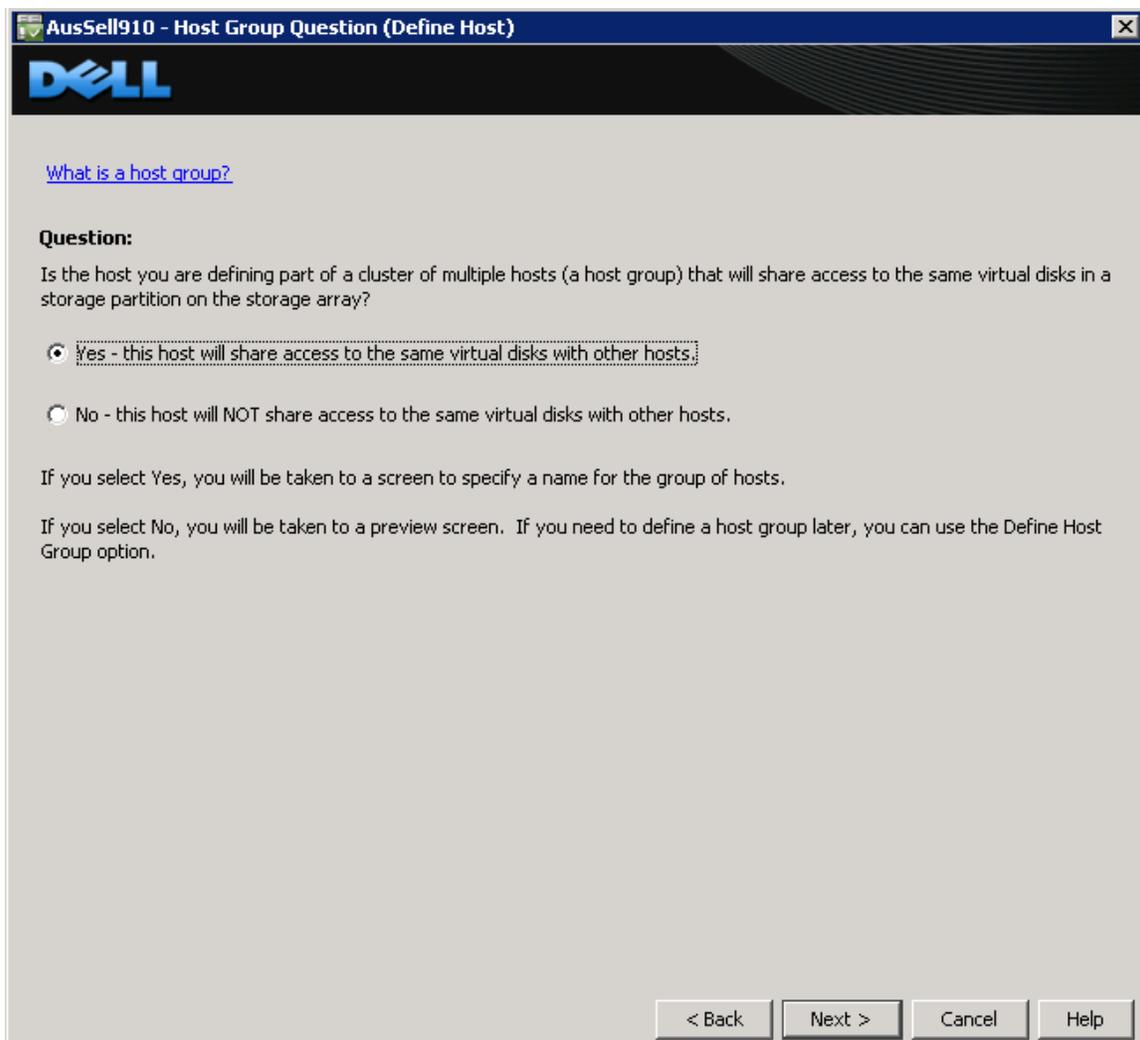


Figure 11 Host Group Question

STEP8: HOST GROUP NAME

Enter a host group name that is appropriate for your environment. For this example we used VMware_Group1

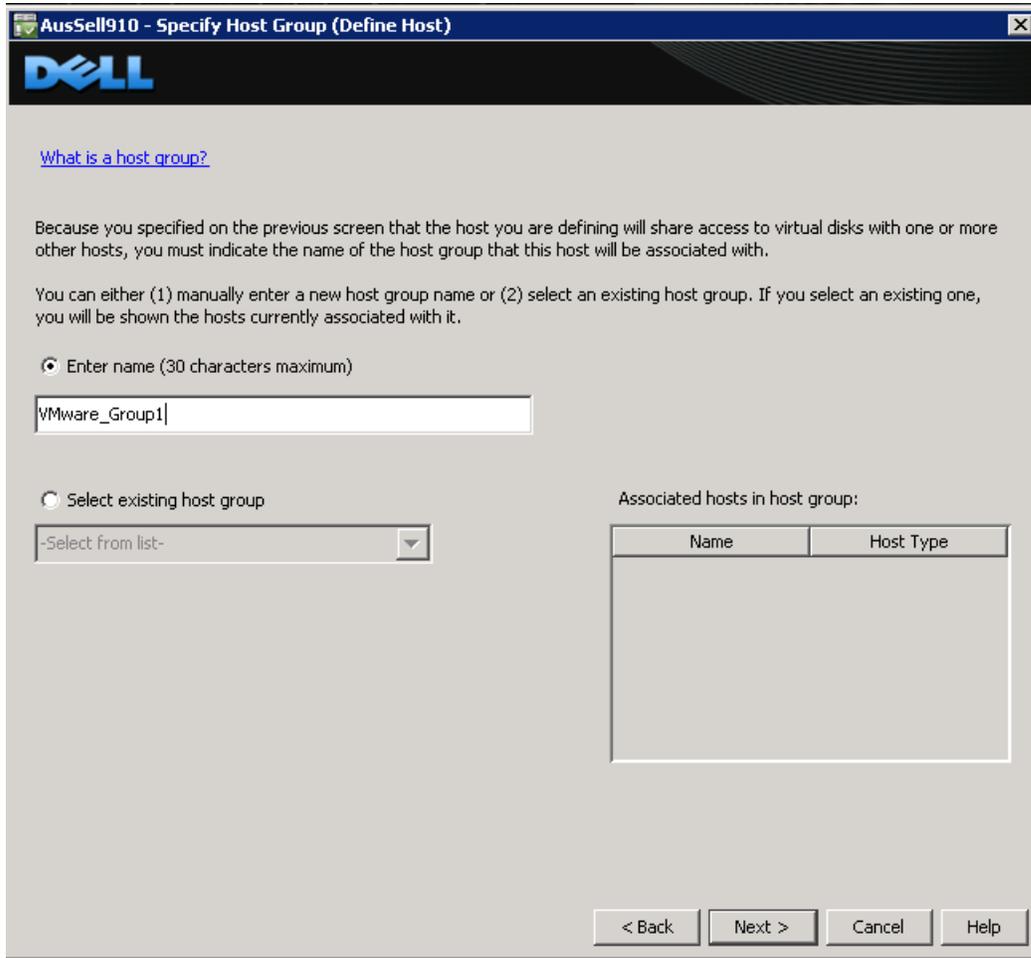


Figure 12 Host Group Name

STEP9: PREVIEW DEFINE HOST

If all of the information is correct for your environment select Finish.

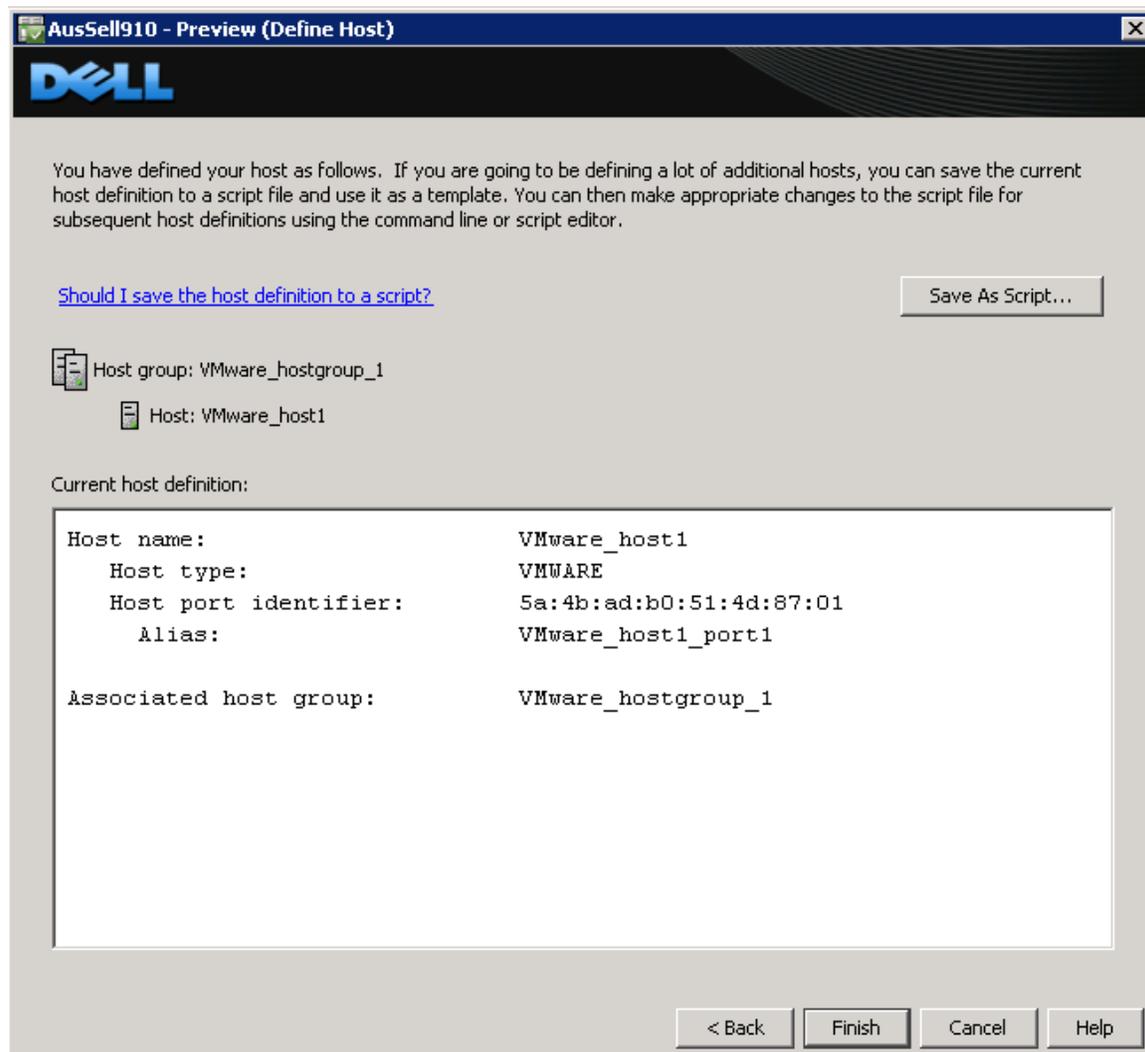


Figure 6 Preview (Define Host)

STEP10: CREATION SUCCESSFUL

Select No at this time. You can add additional Hosts after you have finished configuring the current host.

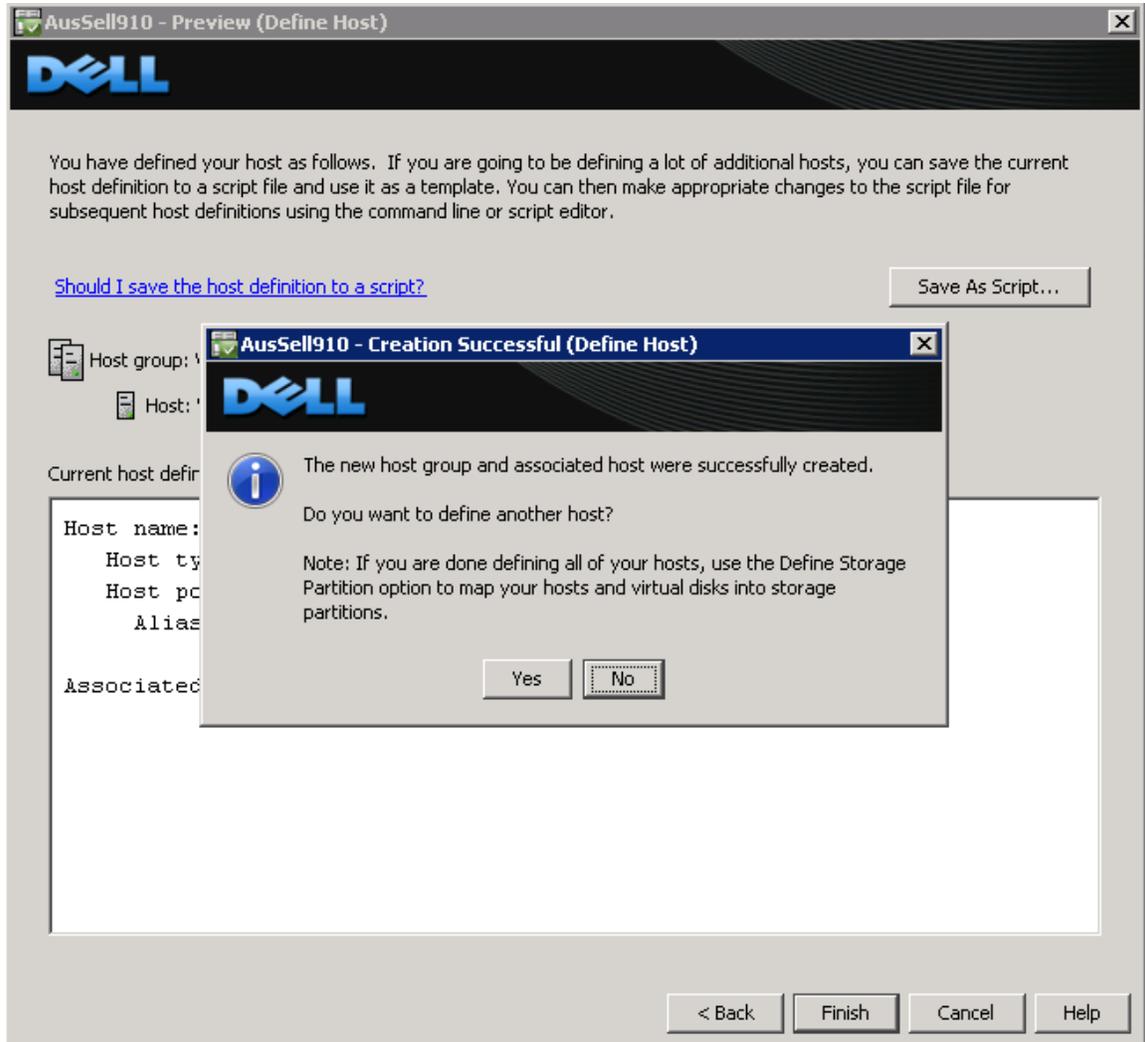


Figure 7 Topology Creation Successful

The topology is now defined with both Host Port Identifiers

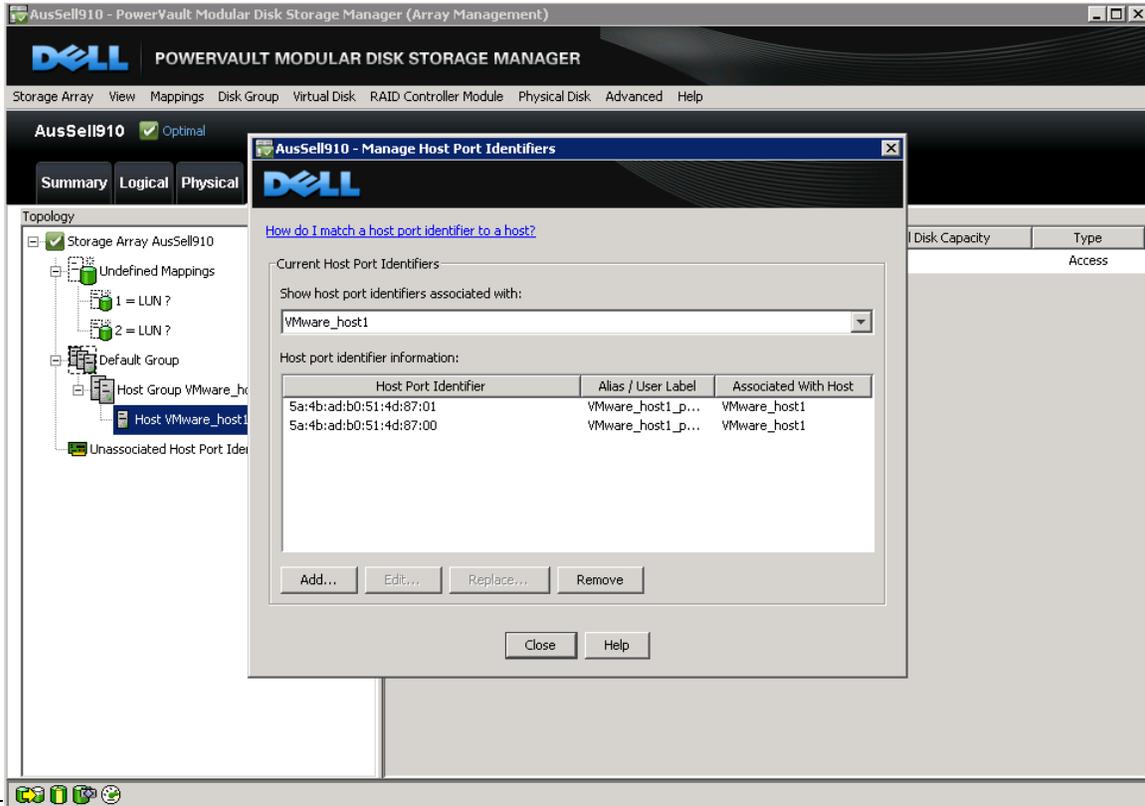


Figure 15 Topology Defined

STEP11: DEFINE MAPPINGS FOR LUNS

Note: In this example the Disk Groups and Virtual Disks have already been created using the wizard under the Setup Tab.

In the topology tree expand the *Undefined Mappings* and highlight one of the Virtual Disks. Right Click and select *Define Additional Mappings*.

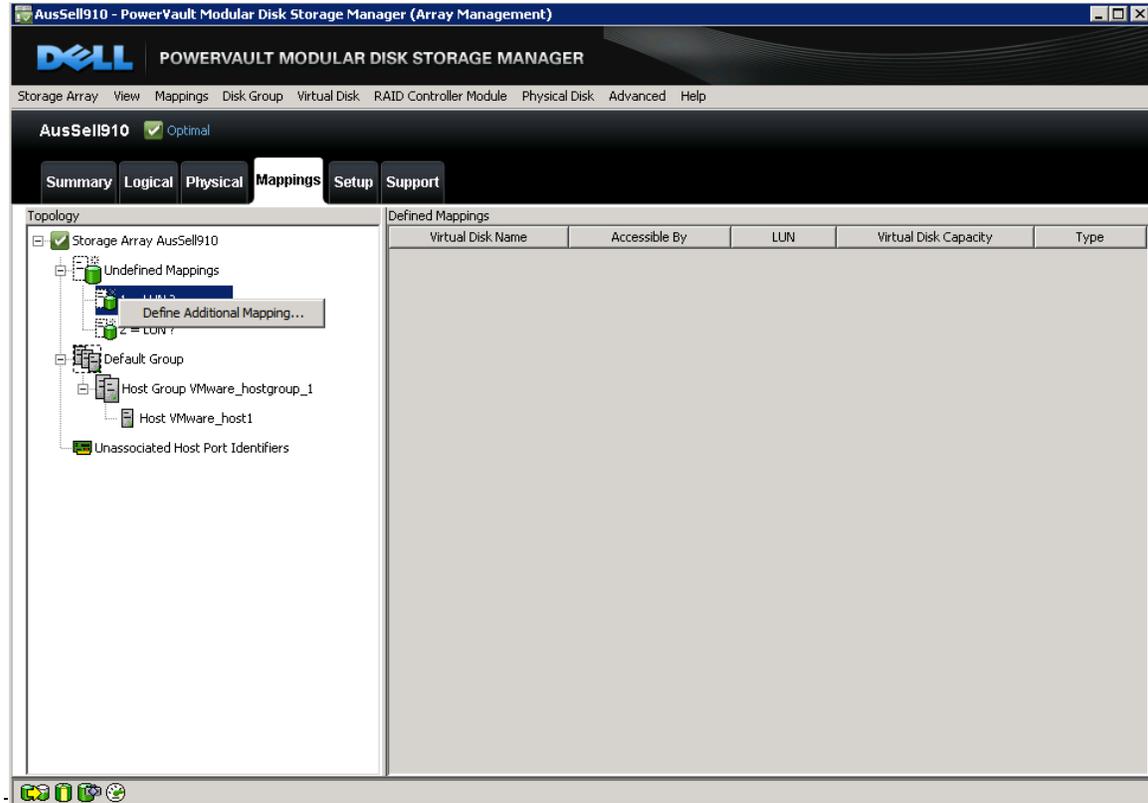


Figure 8 Selecting a Virtual Disk for mapping

Remember that the virtual disk is assigned to the host group and not the host. For this example we selected the host group that was defined in the previous steps.

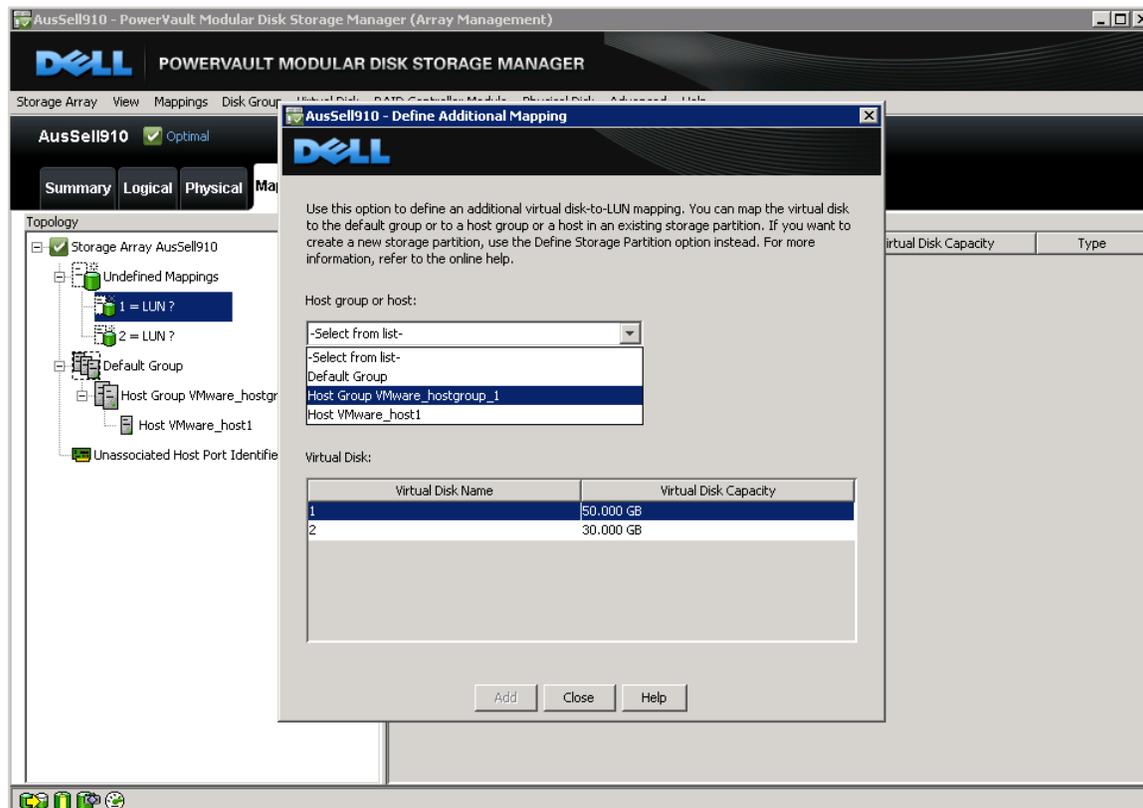


Figure 9 Selecting the Host Group

STEP 12: ASSIGN THE OTHER VIRTUAL DISK TO THE SAME HOST GROUP.

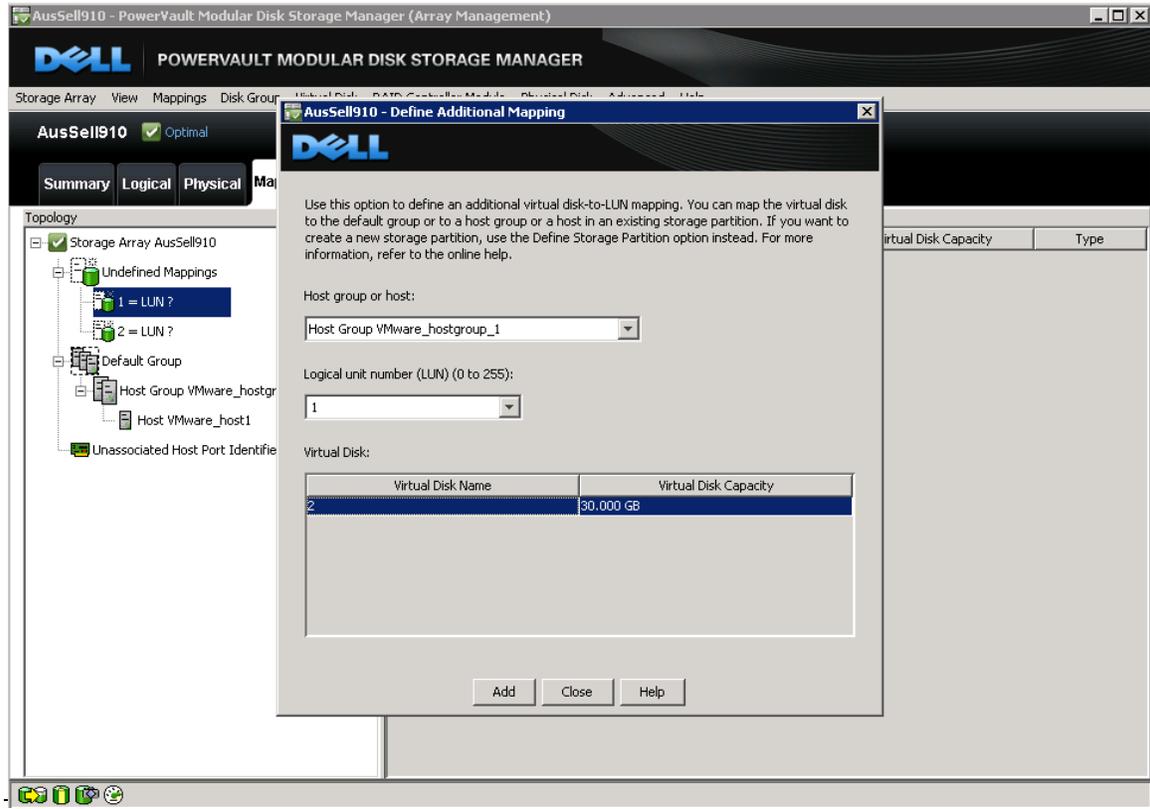


Figure 10 Assigning additional virtual disks

After the virtual disks are assigned notice that the host group and its associated hosts are no longer under the default group in the topology. This completes the configuration.

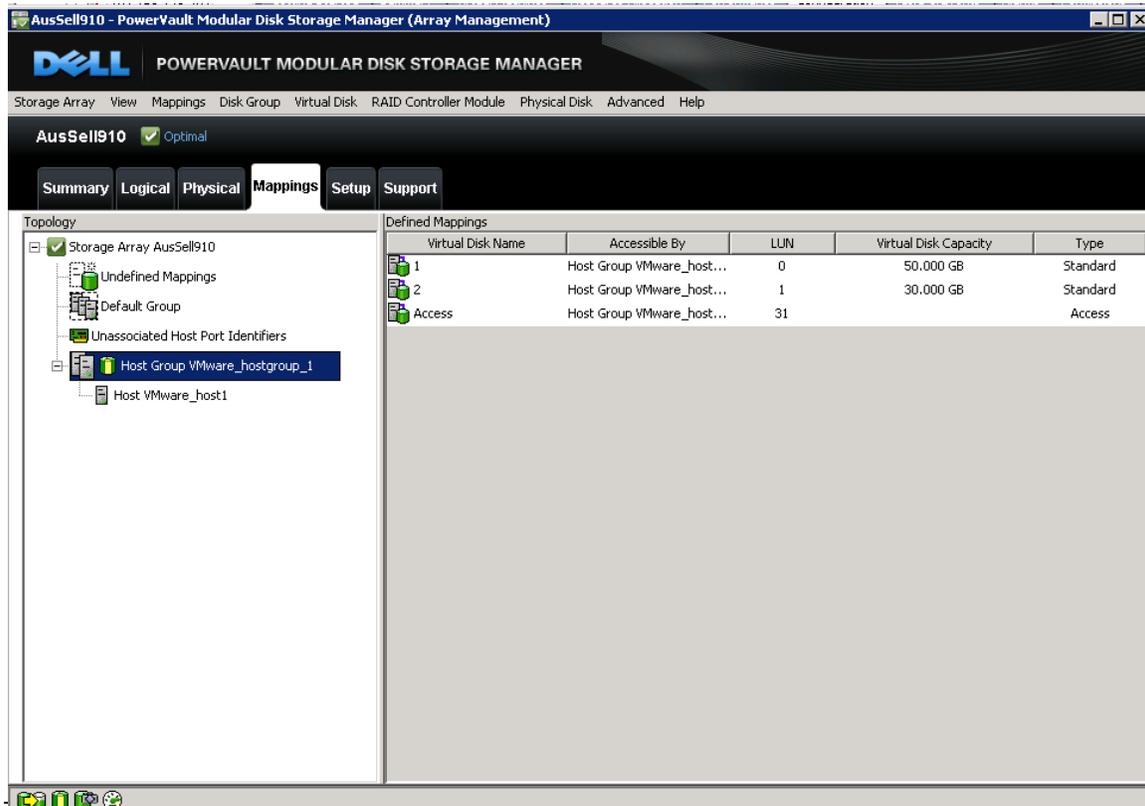


Figure 11 Completed Topology with Assigned Virtual Disks

CONNECT TO THE ESX SERVER/VCENTER USING VI CLIENT AND FOLLOW THE STEPS BELOW.

STEP1: GO TO THE CONFIGURATION TAB

Select *Storage Adapters*. Select the Block SCSI adapter (Dell 6Gb SAS HBA) and click *Rescan*. (Do not scan for New VMFS Volumes at this time)

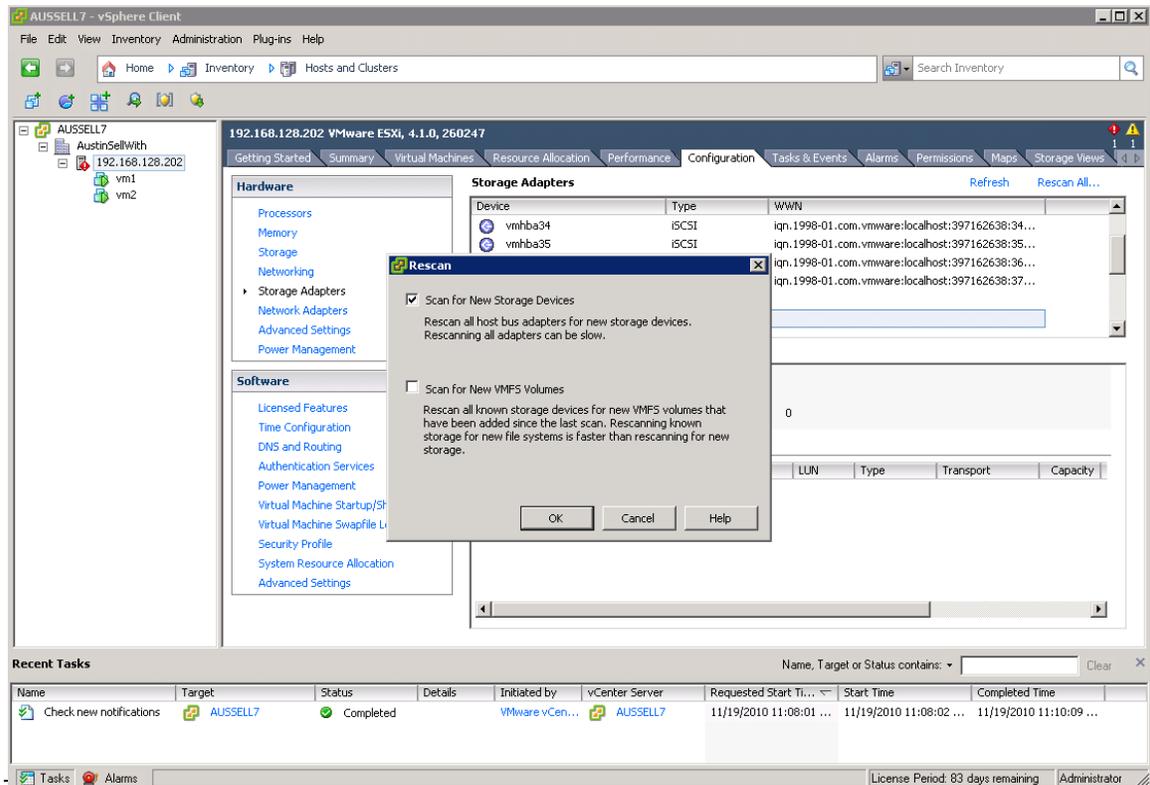


Figure 12 Rescanning for MD3200 LUNS

After the scan completes the newly created LUNs will be visible from the ESX server.

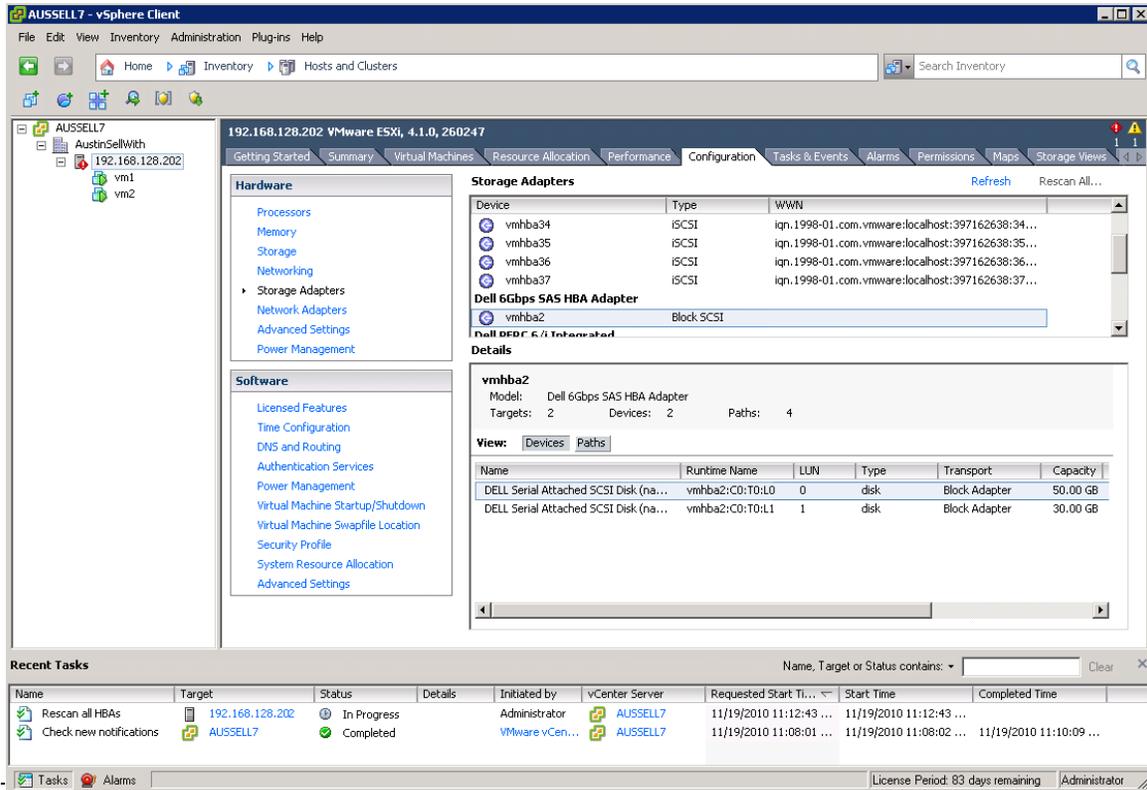


Figure 13 Viewing the new Devices

STEP2: SELECT THE PATH TAB TO VIEW THE AVAILABLE PATHS.

Depending on how many LUNs have been configured, verify there is, at least, one active and one standby path to each LUN. In this setup example, because we have both ports assigned, we can verify there are two active and two standby paths.

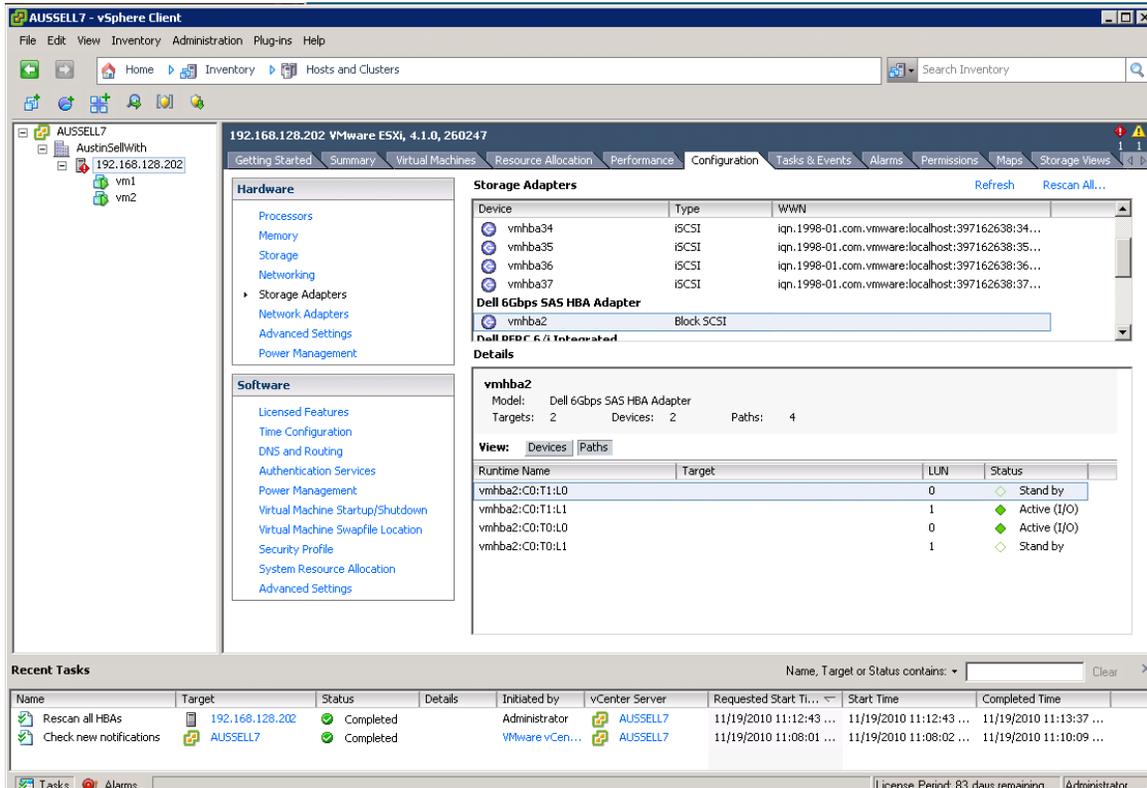


Figure 14 Viewing Paths

STEP3: CREATING A DATASTORE FROM THE MD32XX LUNS

This is the same as creating a Data Store with any local disk. Begin by selecting Storage under Hardware and then select *Add Storage*.

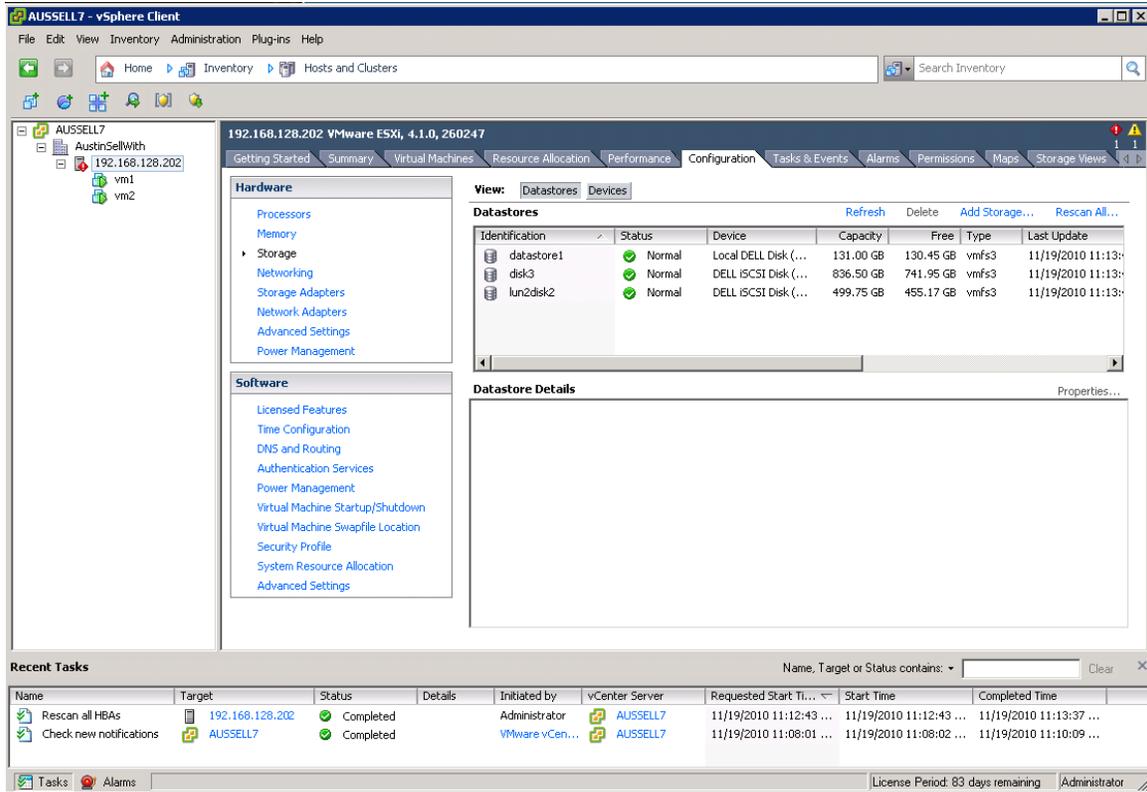


Figure 23 Creating a Datastore

Because SAS is considered a local SCSI disk the storage type is *Disk/LUN*

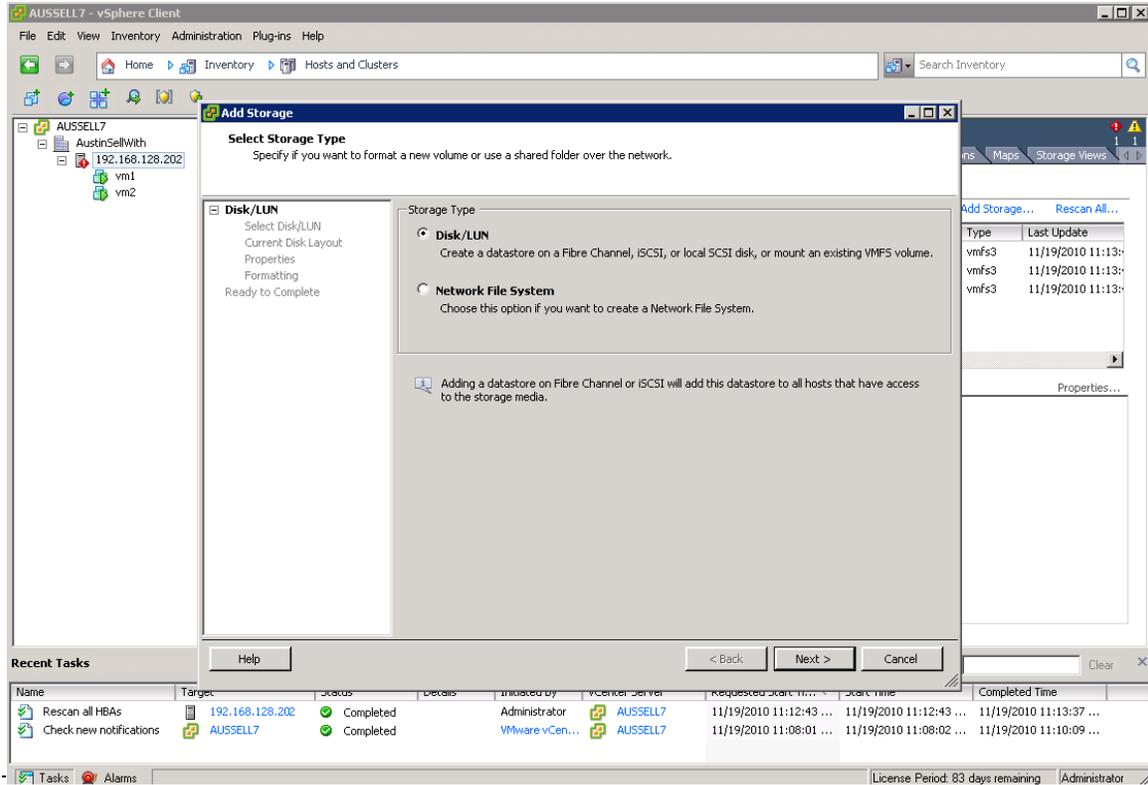


Figure 15 SAS as a Disk/LUN

STEP4: SELECT ONE OF THE LUNS FROM THE MD32XX TO CREATE A DATASTORE

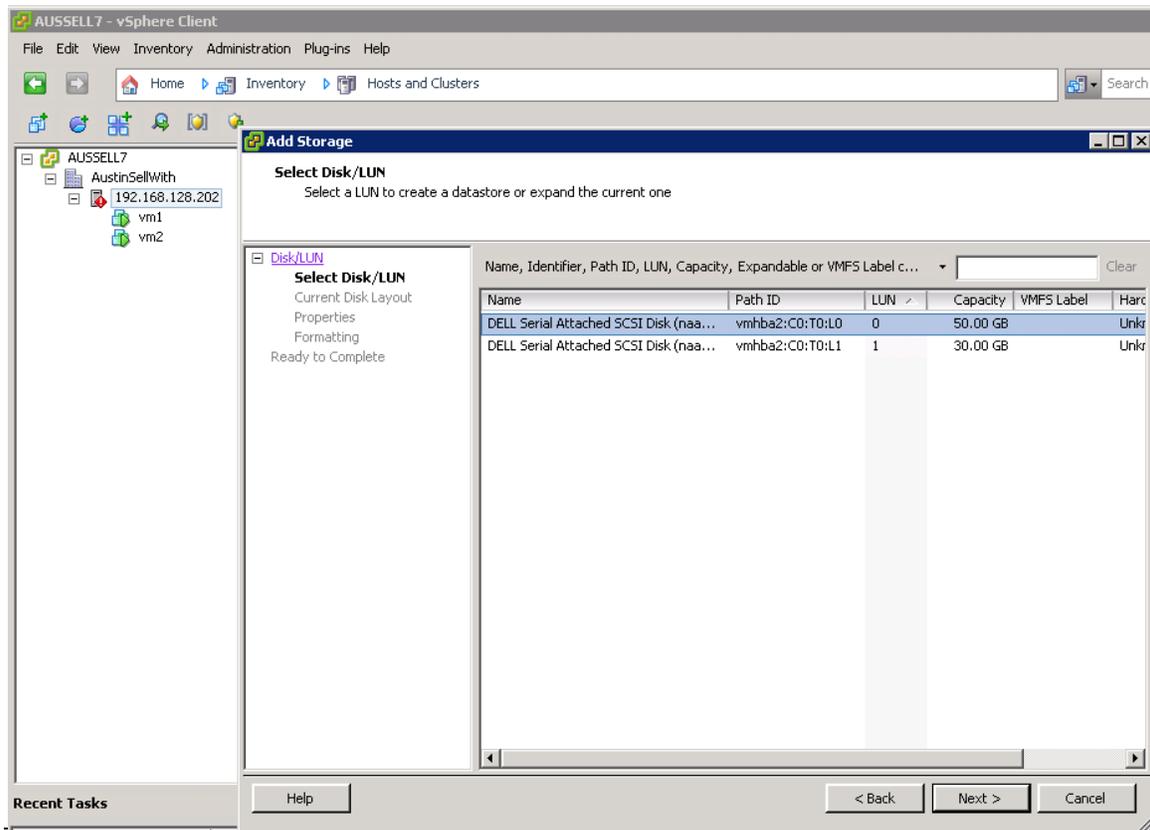


Figure 25 Selecting a LUN to create a Datastore

STEP5: SELECT *NEXT* TO CREATE A VMFS PARTITION

This screen displays the information about the disk layout.

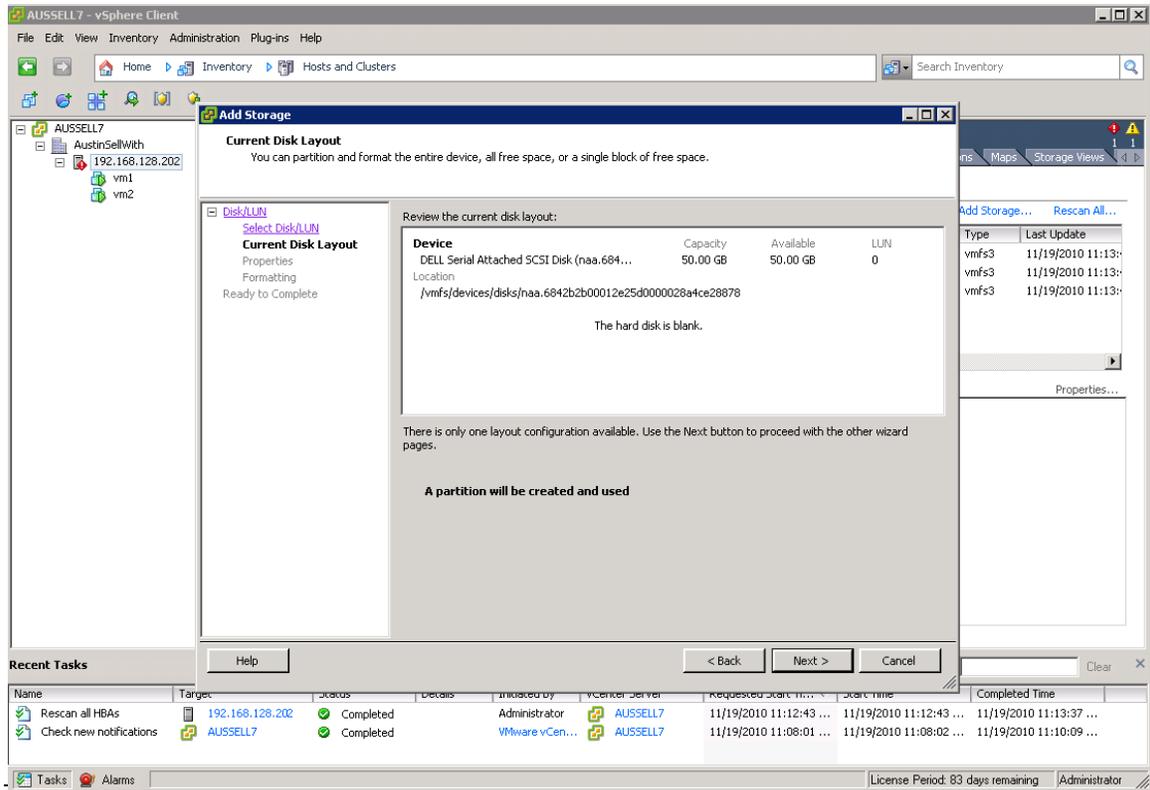


Figure 16 VMFS Partition

STEP6: ENTER A DATASTORE NAME AND SELECT *NEXT*

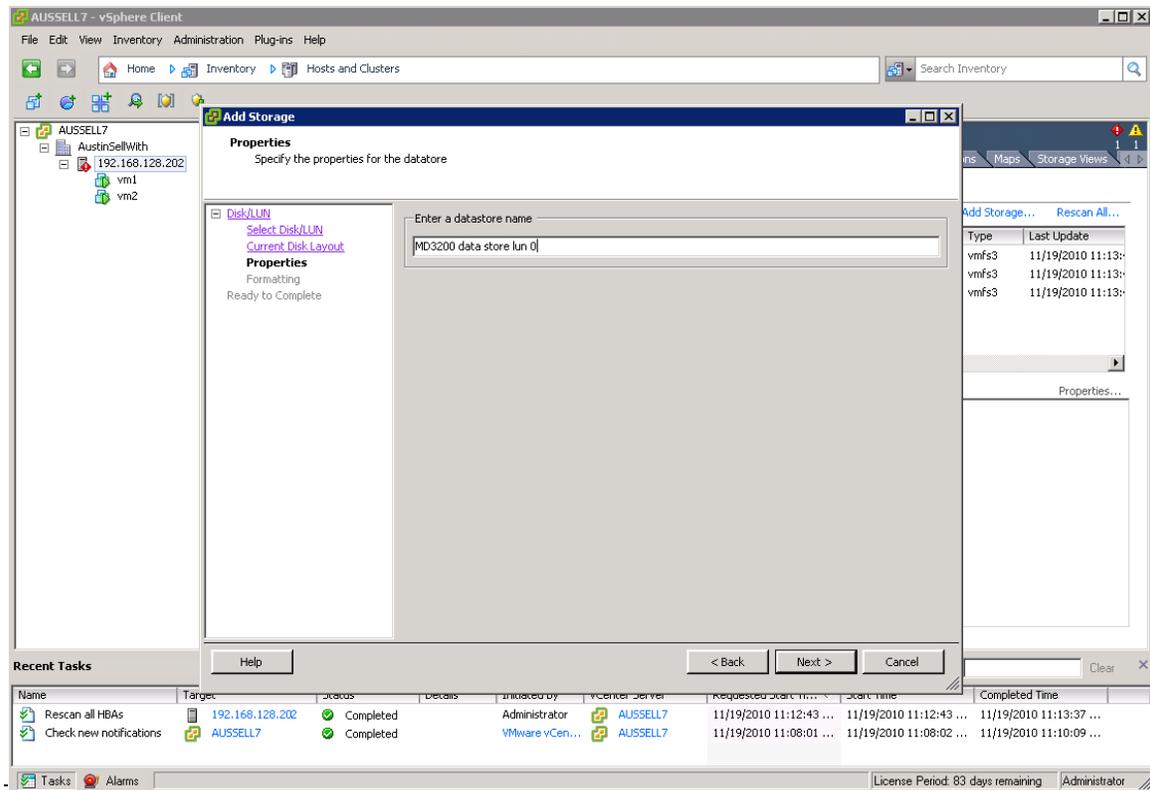


Figure 17 Datastore name

STEP7: ADJUST THE MAXIMUM FILE SIZE AS NEEDED.

For this example we used the maximum capacity. Select *Next* when finished.

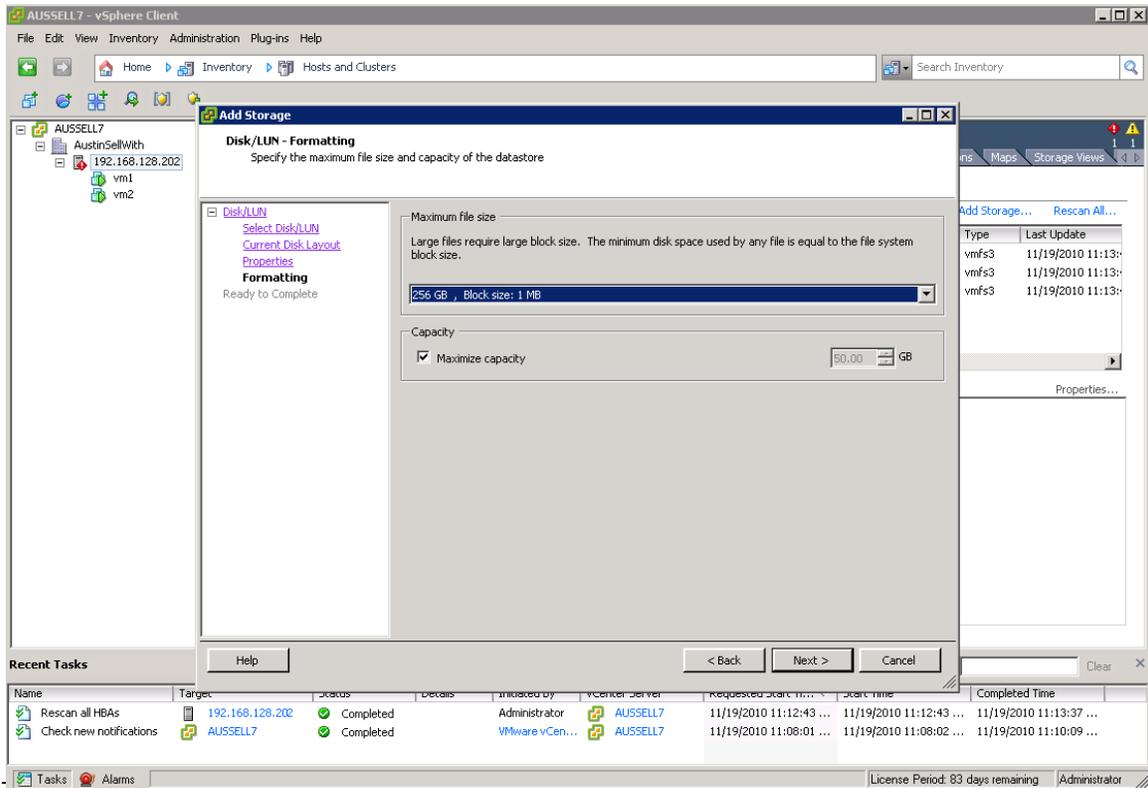


Figure 18 Maximum File Size

STEP8: REVIEW THE DISK LAYOUT AND CLICK *FINISH* TO ADD STORAGE

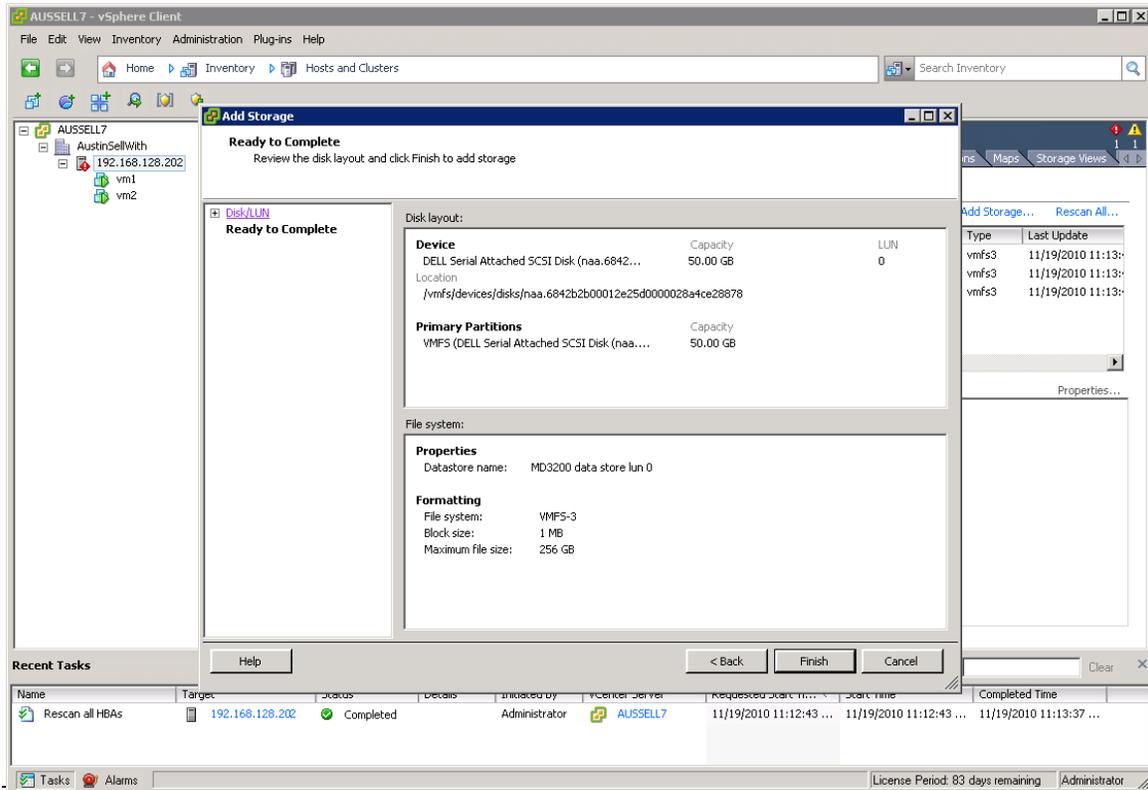


Figure 19 Disk Layout

The new storage is completed and ready to use with VMs.

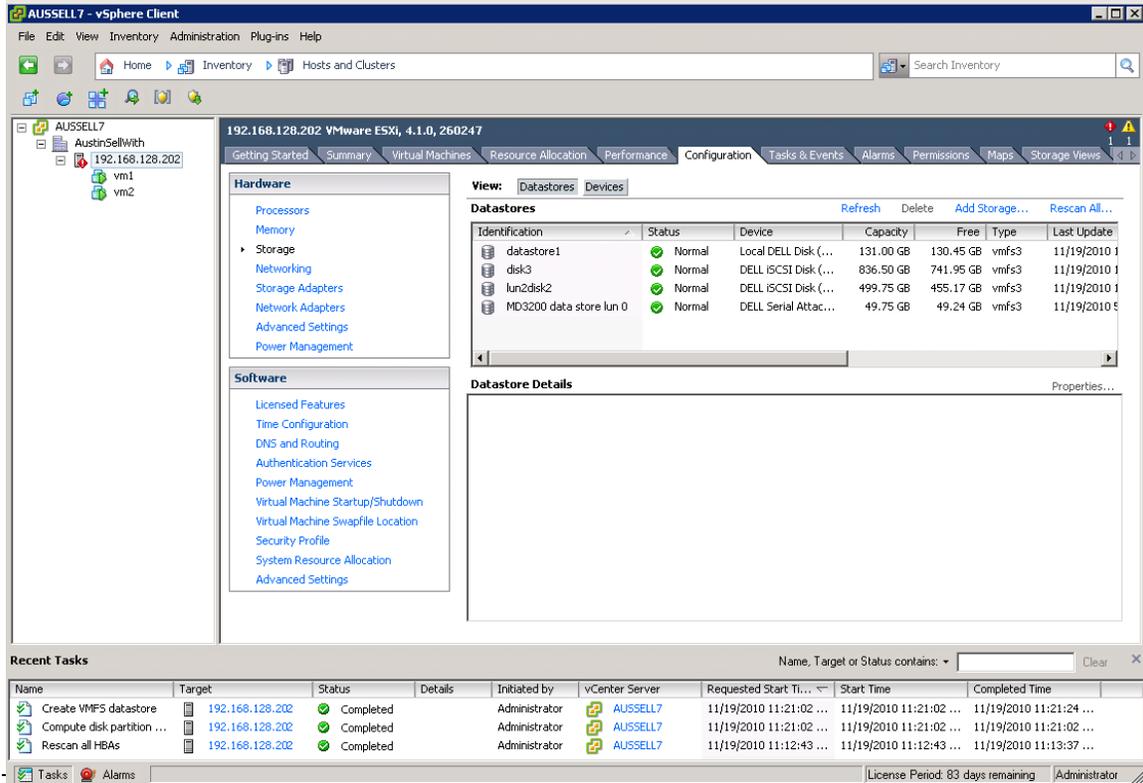


Figure 30 Configuration Completed

CLUSTERING WITH ESX4.1 / CREATING DRS CLUSTERS

Refer to the following VMware website for a complete up-to-date list of the prerequisites for clustering with ESX4.1 server.

http://www.vmware.com/pdf/vsphere4/r40/vsp_40_mscs.pdf

CONTACT INFORMATION

HTTP://SUPPORT.DELL.COM/SUPPORT/TOPICS/GLOBAL.ASPX/SUPPORT/PRODUCT_SUPPORT/PRODUCT_SUPPORT_CENTRAL?C=US&CS=555&L=EN&S=BIZReferences

VMware vSphere 4.1 Documentation:

http://www.vmware.com/support/pubs/vs_pages/vsp_pubs_esxi41_e_vc41.html

Dell/VMware alliance home page:

<http://www.dell.com/vmware>