

DATA CENTER

Technical Brief: How to Configure NPIV on VMware vSphere 4.0

Provides step-by-step instructions on how to configure NPIV on VMware vSphere 4.0 in a Brocade fabric. Leveraging NPIV gives the administrator the ability to extend all of Brocade's advanced features and apply storage best practices in a virtualized data center.

BROCADE

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INTRODUCTION TO NPIV

N_Port ID Virtualization (NPIV) is an extension to the Fibre Channel industry standard, which is available across the Brocade® Host Bus Adapter (HBA) product line and Brocade Storage Area Network (SAN) platforms. NPIV delivers significant advantages for running multiple Virtual Machines (VMs) and managing the workload across multiple physical servers. Storage Administrators now have the ability to control access to LUNs on a per Virtual Machine basis.

NOTE: The term “switches” is used in this document to reference Fibre Channel Brocade backbone, director, switch, and embedded switch platforms unless otherwise noted.

In a server virtualization environment, NPIV allows each VM to have a unique Fibre Channel (FC) World Wide Name (WWN), enabling multiple virtual machines to share a single physical HBA and switch port, a virtual HBA port, as shown in Figure 1. By providing a unique virtual HBA port, storage administrators can implement SAN best practices such as zoning for individual VMs. Administrators can also take advantage of SAN management tools, simplifying migration of VMs and their storage resources.

The benefits of deploying NPIV in your storage environment are real and available today:

- Maintaining fewer physical components reduces the number of points of failure, resulting in improved availability and network uptime.
- Less hardware, portable connections, and VM-level zoning all contribute to simplified SAN and server management.
- NPIV allows the SAN best practices that are available with physical servers to be used in virtual server environments.
- More granular security by restricting LUN access to individual Virtual Machines

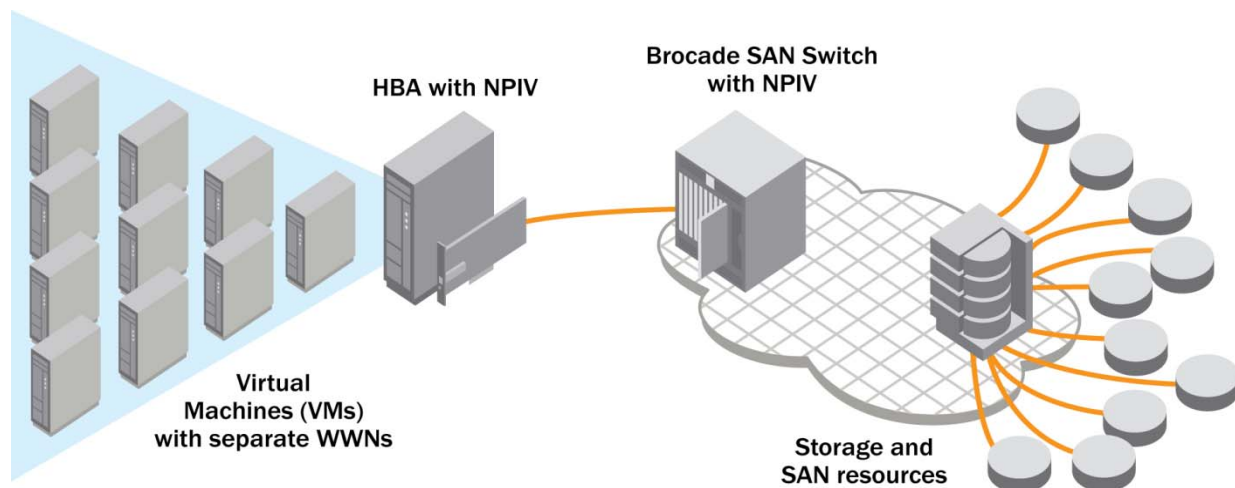


Figure 1. NPIV in the SAN

SERVER VIRTUALIZATION ADVANTAGES

A number of enhancements are being introduced into server virtualization products, such as VMware® vSphere 4.0, to augment existing support for Fibre Channel SANs, including NPIV and load balancing across FC ports.

Addressing and Access Control

Each FC port in a fabric has a World Wide Name assigned to it by the equipment manufacturer, which uniquely identifies each node. WWNs play a critical role in determining the visibility and accessibility of storage LUNs (partitions in storage arrays) by servers connected to the fabric. Zoning is the mechanism by which FC ports are grouped together to restrict interference, add security, and simplify management. Zoning utilizes WWNs to allow access to storage. A server can see and access only storage LUNs that share a common zone with that server.

NPIV in a Virtualized Environment

The hypervisor leverages NPIV to assign individual WWNs to each Virtual Machine, so that each Virtual Machine (VM) can be recognized as a specific end point in the fabric. The benefits of this approach are as follows:

- **Granular security.** Access to specific storage LUNs can be restricted to specific VMs using the VM WWN for zoning, in the same way that they can be restricted to specific physical servers.
- **Easier monitoring and troubleshooting.** The same monitoring and troubleshooting tools used with physical servers can now be used with VMs, since the WWN and the fabric address that these tools rely on to track frames are now uniquely associated to a VM.
- **Flexible provisioning and upgrade.** Since zoning and other services are no longer tied to the physical WWN “hard-wired” to the HBA, it is easier to replace an HBA. You do not have to reconfigure the SAN storage, because the new server can be pre-provisioned independently of the physical HBA WWN.
- **Workload mobility.** The virtual WWN associated with each VM follows the VM when it is migrated across physical servers. No SAN reconfiguration is necessary when the workload is relocated to a new server.
- **Applications identified in the SAN.** Since virtualized applications tend to be run on a dedicated VM, the WWN of the VM now identifies the application to the SAN.
- **Quality of Service (QoS).** Since each VM can be uniquely identified, QoS settings can be extended from the SAN to VMs, as shown in Figure 2.

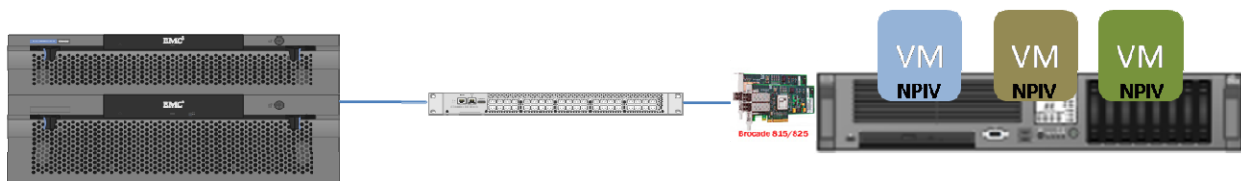


Figure 2. End-to-end QoS

REQUIREMENTS TO IMPLEMENT NPIV

There are a few requirements in both the software and hardware to enable NPIV:

- **Switches.** NPIV needs to be supported on the switch connected to the HBA. All Brocade FC switches currently support NPIV—specifically starting in Fabric OS® (FOS) 5.3.x or later, M-EOSc 8.1, and M-EOSn 9.6.0.
(See the “Troubleshooting” section to find out how to see if NPIV is enabled on the switch.)
- **HBAs.** HBAs must support NPIV as well. The following vendors and models of HBAs are supported:
 - **Brocade.** Any 4 or 8 Gbps FC HBA
 - **Emulex.** 4 Gbps HBA running firmware level 2.70a5 or later. All Emulex 8 Gbps HBAs running firmware 1.00a9 or later
 - **QLogic.** Any 4 or 8 Gbps HBA
- **Storage.** NPIV is completely transparent to storage arrays, so no specific support is required.

NOTES:

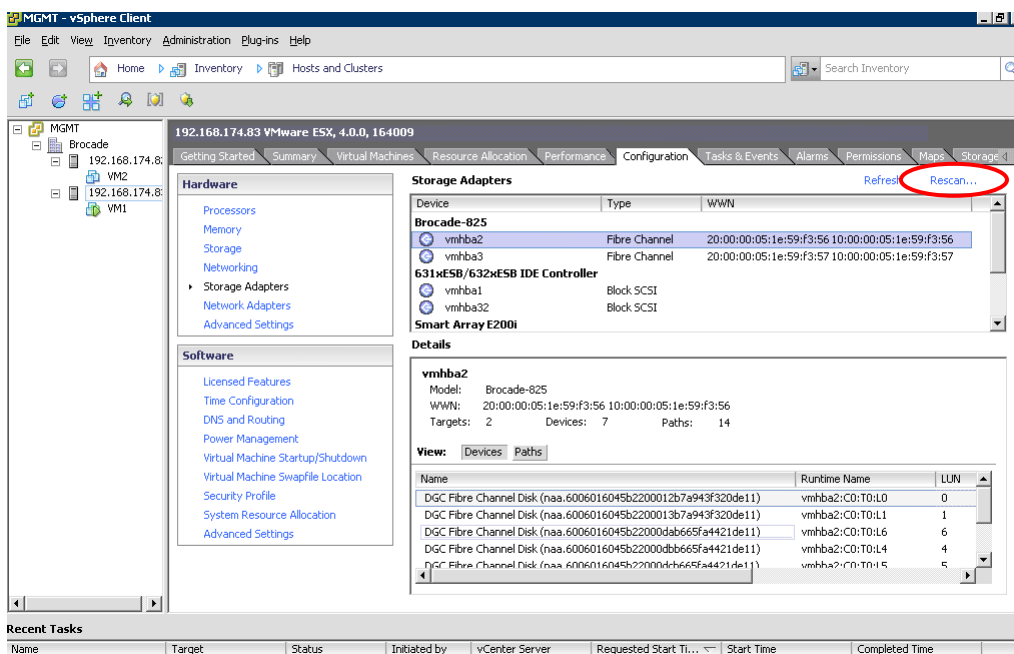
- NPIV can be used only with Raw Device Mappings (RDM) disks. VMFS disks do not support NPIV. For more information on RDMS, refer to the current Fibre Channel SAN Configuration Guide for ESX Server 4.0.
- To implement NPIV, the physical HBA WWPN on an ESX Server 4.0 host must have access to all LUNs that are to be accessed by VMs to allow you to VMotion across your physical hosts.
- If you deploy a VM from a template or a clone, the new VM does not retain the WWN.

Preparing to Set Up NPIV for the Storage Administrator

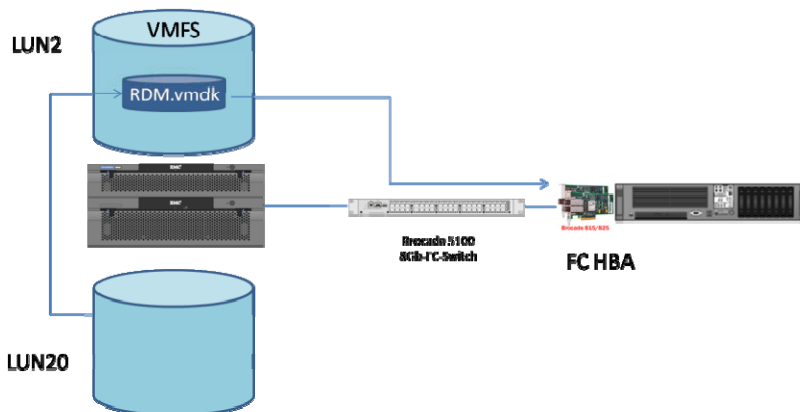
LUNs for VMFS datastores and RDM disk are already created, zoned, and LUN-masked to the vSphere 4.0 physical HBA or CNA ports. You can confirm that you have disks available for VMFS datastores or RDM disks as follows:

1. In the vSphere client, select the physical host from the tree menu on the left.
2. Select **Configuration**.
3. Select **Storage Adapters** from the tree menu on the left.

4. Select the Fibre Channel port to display the available LUNs in the Details list below. (If the storage has just been zoned and the LUNs masked, then click Rescan to prompt the host to query for its available LUNs).



At least one VMFS datastore has been created. This is required because the pointer to the RDM datastore resides in VMFS. With an RDM, a physical LUN is presented to a VM as a .vmdk-file. From an ESX Server perspective, the VM is still accessing the vmdk-file, even though this file is actually a pointer that redirects all SCSI traffic to the raw LUN.



At least one free RDM disk is available to be assigned to a Virtual Machine.

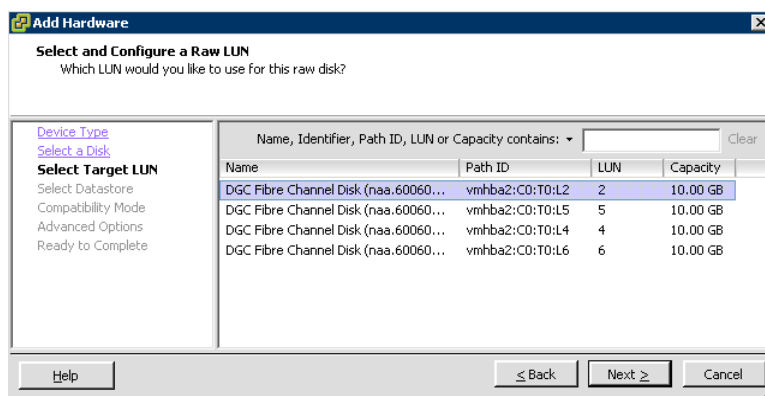
Server Administrator Tasks

NOTE: Do not power on the VM for this procedure; the VM needs to be shut down.

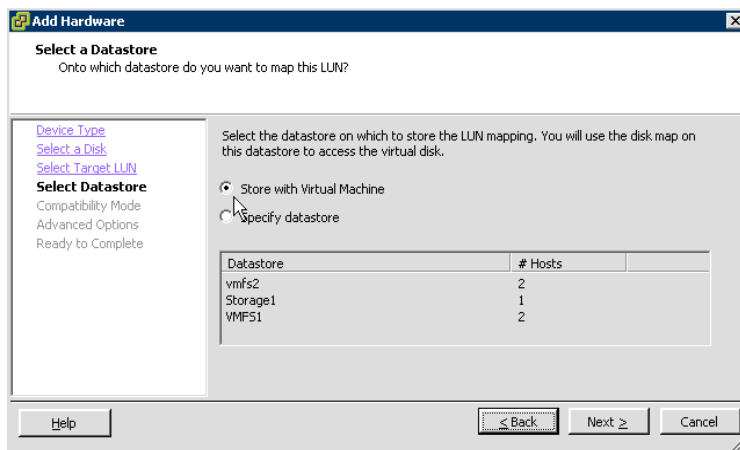
1. Follow the steps below to assign or modify the WWN or the Virtual Machine. (This procedure is also found starting on page 58 of the [Fibre Channel SAN Configuration Guide for ESX Server 4.0..](#))

To assign a WWN to an existing VM using Virtual Center:

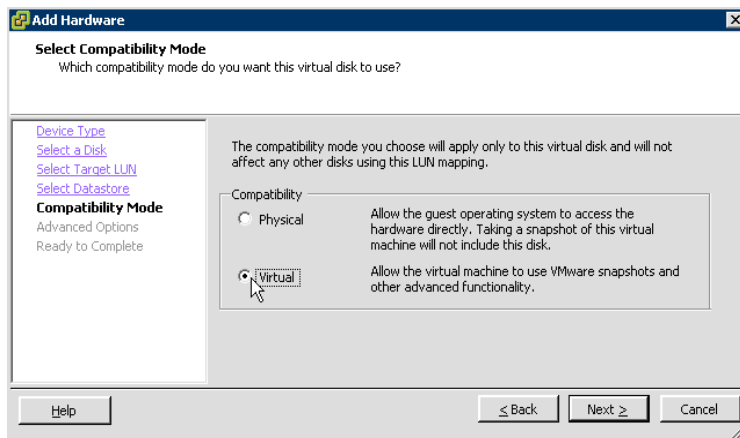
- a. From Virtual Center, select the VM to which you want to assign a WWN, right-click and choose **Edit the Virtual Machine Settings**.
- b. Click the **Options** tab and click **Fibre Channel NPIV**.
- c. In the dialog box, select **Generate**. Here are the available options:
 - Leave Unchanged: Existing WWNs are retained.
 - Generate New WWN: A new set of WWNs are generated.
 - Remove WWN assignment. Removes the WWNs from the VM.
- d. Click **Close** and exit configuration.
- e. If an RDM disk has not been assigned to the VM, then add it.
- f. Right-click on the VM that will be used for NPIV and choose **Edit settings**.
- g. Click **Add** under the VM properties, select **Hard Disk**, and click **Next**.
- h. Select **Raw Device Mappings** and click **Next**.
- i. Select a disk from the available LUNs and click **Next**.



- j. Under **Select a Datastore**, click the **Store with Virtual Machine** radio button.
NOTE: To use VMotion for VMs with NPIV enabled, make sure that the RDM file is located on the same datastore on which the VM configuration file resides.



- k. Under **Select the Compatibility Mode**, click the **Virtual** radio button. For more information on compatibility modes, refer to the *Fibre Channel SAN Configuration Guide for ESX Server 4.0*. To use VMotion, select the **Virtual Compatibility** mode.



- l. Leave the defaults for the Advanced Options, click **Next**, and click **Finish**.

To assign a WWN to a new VM using Virtual Center:

- Right-click an ESX Server or cluster and click **New Virtual Machine**.
- Click the Custom radio button, enter a name for the VM, and click **Next**.
- Enter the appropriate information and stop at the Select Disk Type screen.
- Select the Raw Disk Mapping and click **Next**.
- Follow steps j through l above under “To assign a WWN to an existing VM using vCenter to add the RDM disk.”
- On the last screen, click the check box **Edit the virtual machine settings before submitting** and click **Finish**.
- Click the **Options** tab and click **Fibre Channel NPIV**.

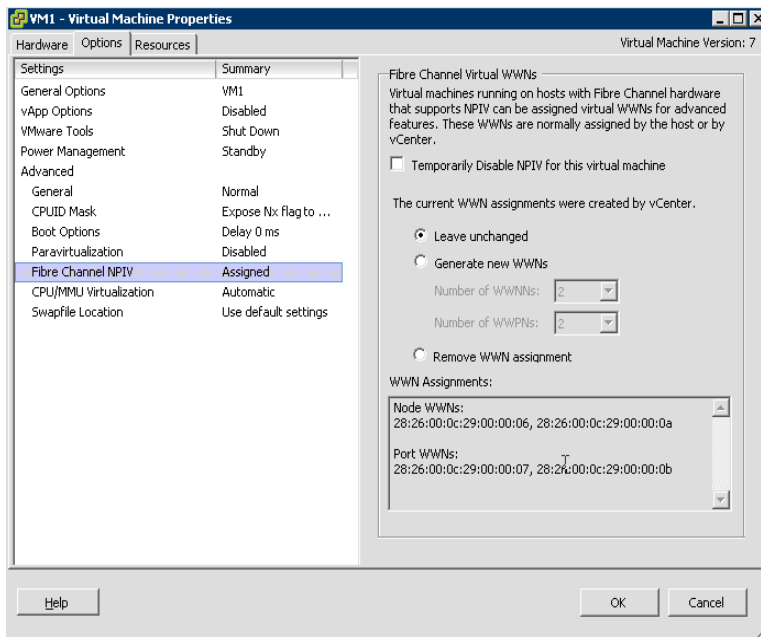
- h. In the dialog box, select **Generate New WWN**.

NOTE: In most cases, if a dual fabric is implemented with an Active/Active array, then two World Wide Node Names (WWNNs) and two World Wide Port Names (WWPNs) should be enough.

- i. Click **Close** and exit configuration.

NOTE: Do not power on the VM guest after assigning the RDMs a virtual WWN. If you power on the VM prior to zoning and LUN masking then the VM will fail back to the physical HBA WWN.

2. Once you have assigned a WWN to the VM, right-click the VM to return to VM settings and choose **Edit Settings** from the menu.
3. Click the **Options** tab and click **Fibre Channel NPIV** in the left pane.



4. Record the WWNNs and the WWPNs. The storage administrator will need this information to zone and mask LUNs in the back-end storage. (Follow the Storage Administrator steps below to zone and mask LUNs.)
5. After the storage administrator completes zoning and configuration of the storage, you can safely power on the VM.

6. After you have safely powered on the Virtual Machine, Secure Shell (SSH) or telnet into the physical ESX Server to verify that I/O traffic is actually flowing through the virtual port. If a Brocade HBA is installed, then issue the command on the physical port with the vPort: `cat /proc/scsi/bfa/3` (The adapter instance numbers vary depending on the slot number of the HBA and the ports connected).

```
[root@esx bfa]# cat 3
Chip Revision: Rev-C
Manufacturer: Brocade
Model Description: Brocade-825
Instance Num: 0
Serial Num: ALX0430D02K
Firmware Version: FCHBA1.1.1.1
Hardware Version: Rev-C
Bios Version:
Optrom Version:
Port Count: 2
WWNN: 20:00:00:05:1e:59:f3:56
WWPN: 10:00:00:05:1e:59:f3:56
Instance num: 0
Target ID: 0 WWPN: 50:06:01:61:4b:a0:18:46
Target ID: 1 WWPN: 50:06:01:60:4b:a0:18:46
VPort list:
WWPN: 28:26:00:0c:29:00:00:07
[root@esx bfa]#
```

When you see the virtual WWNs (also known as vPorts) listed, you know that everything is fine.

Storage Administrator Tasks

Prior to zoning the VM, be sure that you have zoned all the physical HBA WWNs to the correct storage array port WWN/s. Storage best practices are to zone a single initiator to single target to maintain security and reduce interference. Once you receive the virtual WWNs from the Server administrator, you then need to create unique zones for each VM to the storage array port WWN/s. However, if you have a very small environment, then you may find it easier to place all the physical HBA port WWNs into one zone and then individually zone each VM to an array port.

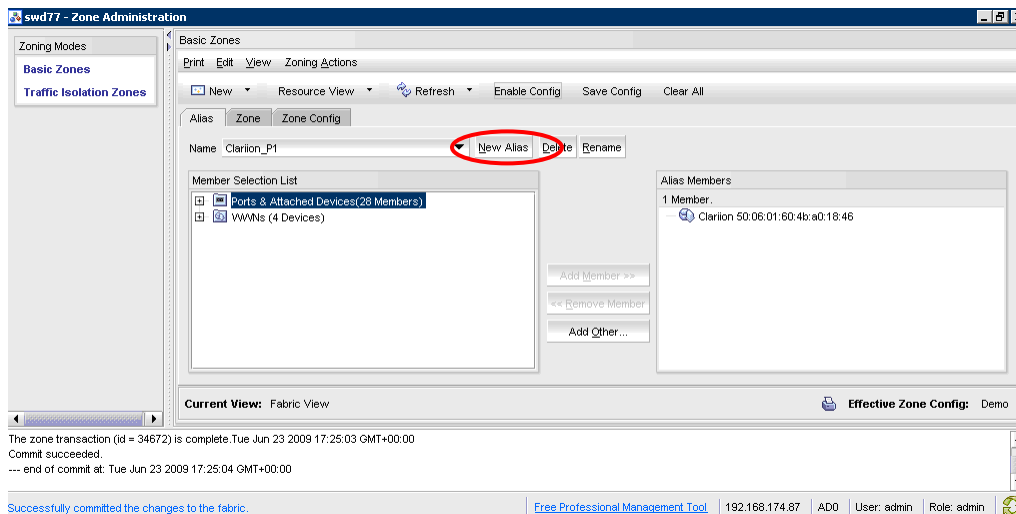
High-Level Zoning Steps

- Zone physical HBA WWNs to storage WWPNS
 - Create an alias for the NPIV-enabled VM
 - Manually add the WWPN to the newly created alias
 - Zone the alias to associated storage ports
 - Add the new zones to the Zoning configuration
 - Save the switch configuration
 - Enable the switch configuration
1. Log in to the Brocade switch using Brocade Web Tools, Brocade Data Center Fabric Manager (DCFM™), or the Fabric OS® (FOS) Command-Line Interface (CLI) to configure Zoning. This paper will explain how to Zone using Brocade Web Tools and the CLI.

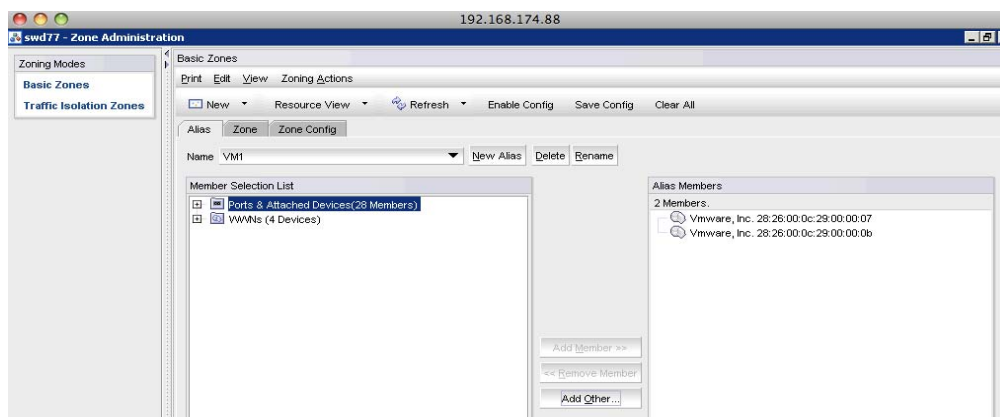
To zone using Brocade Web Tools (assuming that all the physical HBAs ports and array ports are zoned):

- a. To log in to Web Tools, open an Internet Explorer window and typing the FQDN or IP address (for example, <https://5100edge1.brocade.com>).

- b. Log in to the switch, and click **Zone Admin**.
- c. Click **New Alias** and type a name for the VM guest Node Name (for example, VM1).



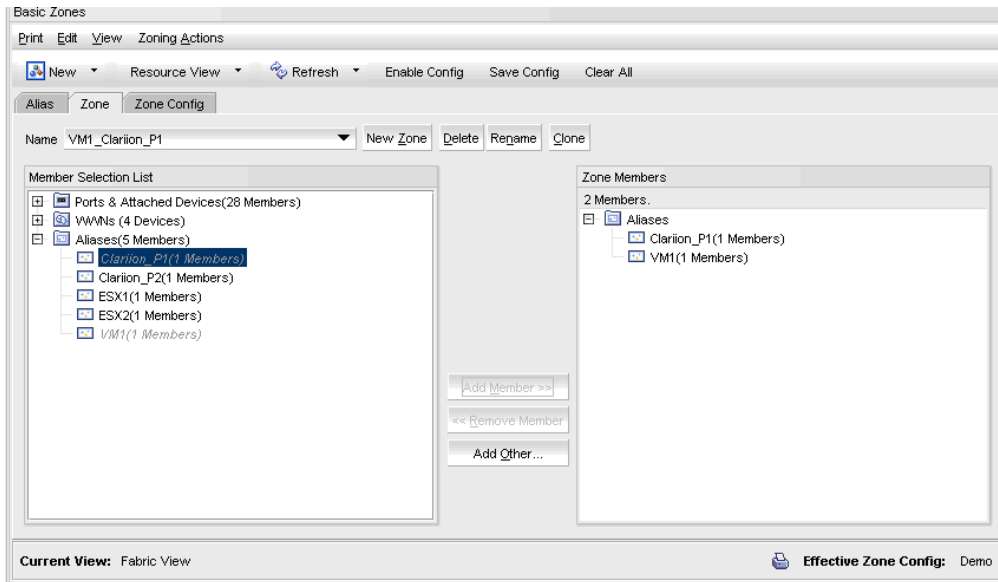
- d. With the Alias selected from the drop-down men, click **Add Other**.
- e. In the dialog box that displays, enter the WWPNs generated by vCenter and click **OK**.
Once you have completed adding WWPNs, the screen should look similar to this:



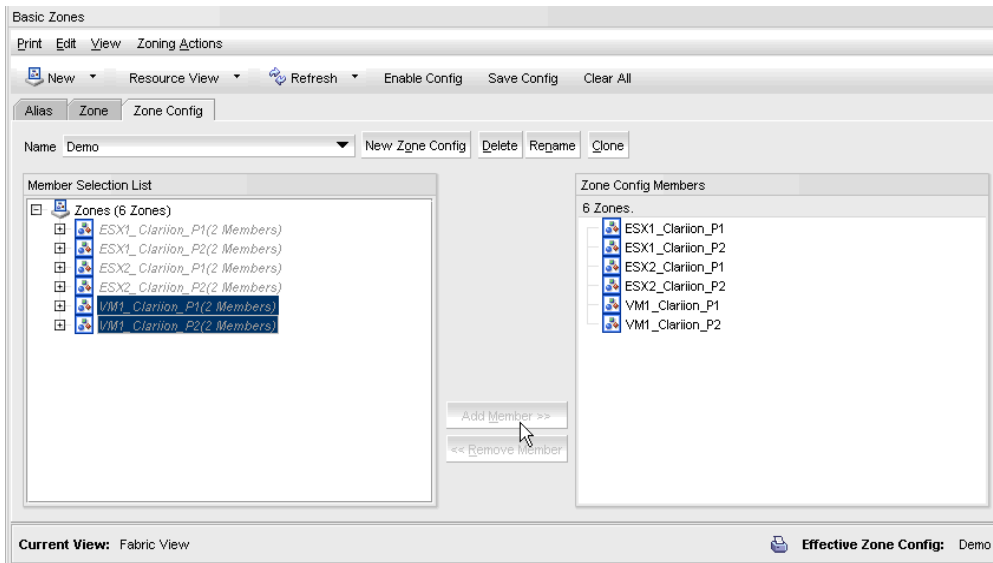
- f. Click the **Zone** tab and click **New Zone**.
- g. Enter a name for the zone and click **OK**.
- h. Click the **plus sign (+)** to expand the Aliases folder in the Zone tab.

- i. From the Member Selection List, select the newly created alias (for example, VM1) and the alias of the storage array ports (for example, Clariion_P1). Click the **Add Member** button, which adds the aliases to the zone.

NOTE: A SAN best practice is to zone one initiator to one target to increase security and to restrict interference from other hosts.



- j. Follow the steps to configure the second storage initiator.
- k. Click the **Zone Config** tab.
- l. From the Member Selection List, click the **plus sign (+)** next to Zones, select the newly created zones (VM1_Clariion_P1, VM1_Clariion_P2), and click **Add Member**.



- m. Click **Save Config** at the top. This operation can take 15 – 30 seconds.. Status is displayed at the bottom of the window.
- n. Once the configuration has been committed, click **Enable Config**. (This takes 15 – 30 seconds)

To zone using the FOS CLI, perform all the steps for each switch in the fabric:

- a. Telnet to the Brocade switch and create a new alias:

```
alicreate "vmguest1", "28:26:00:0c:29:00:00:07, 28:26:00:0c:29:00:00:0b"
```
 - b. Create a Zone to map the guest to storage: Once again, best practices is one initiator to one target: (The example below uses the name "Clariion" to easily identify the type of storage and is shown in the screen captures. However, the name user-configurable.)

```
zonecreate "vm1_Clariion_P1", "vm1:Clariion_P1"
zonecreate "vm1_Clariion_P2", "vm1:Clariion_P2"
```
 - c. Add the zone to the configuration:

```
cfgadd "mycfg", "vm1_Clariion_P1"
cfgadd "mycfg", "vm2_Clariion_P2"
```
 - d. Enable the configuration:

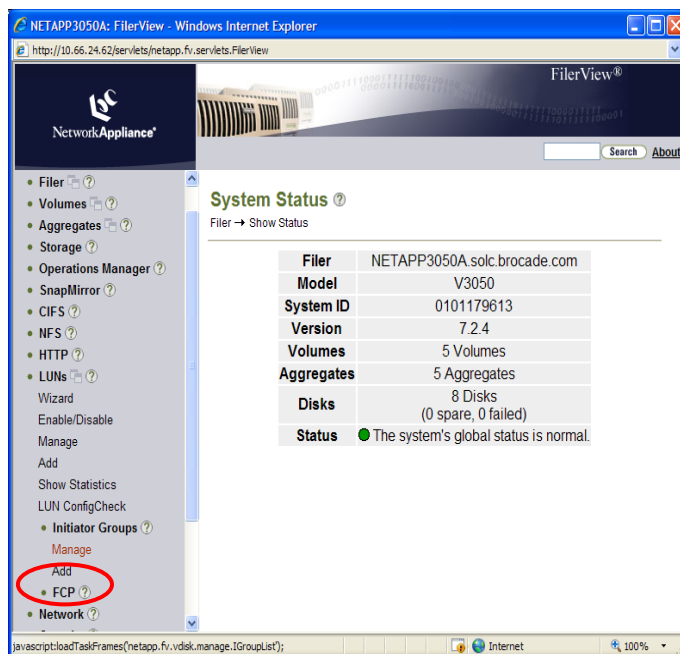
```
cfgenable "mycfg"
```
 - e. Press Y to confirm that you want to enable the configuration.
2. Once you have created the zone on the Brocade switch, log in to the storage array and add the WWNN and WPNs of the VM to the LUNs that the VM will access.

NOTE: Depending on the storage array, the WWNN may not be necessary.

Follow the instructions below to configure HDS AMS storage and the EMC Clariion array using **NetApp FilerView**.

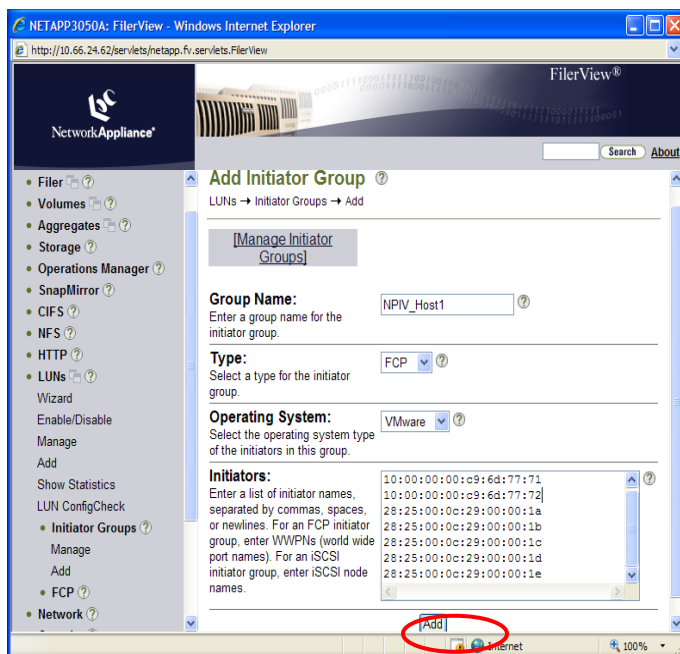
Using NetApp FilerView:

- a. Log in to FilerView on the NetApp appliance (for example, http://netapp3050a.brocade.com/na_admin)
- b. If an initiator group has not been created (makes the LUNs visible to connected hosts), then create one by clicking Add below "Initiator Groups" in the left navigation pane.



- c. In the Add Initiator Group screen, assign it a group name, a type (FCP), and an OS (VMware).

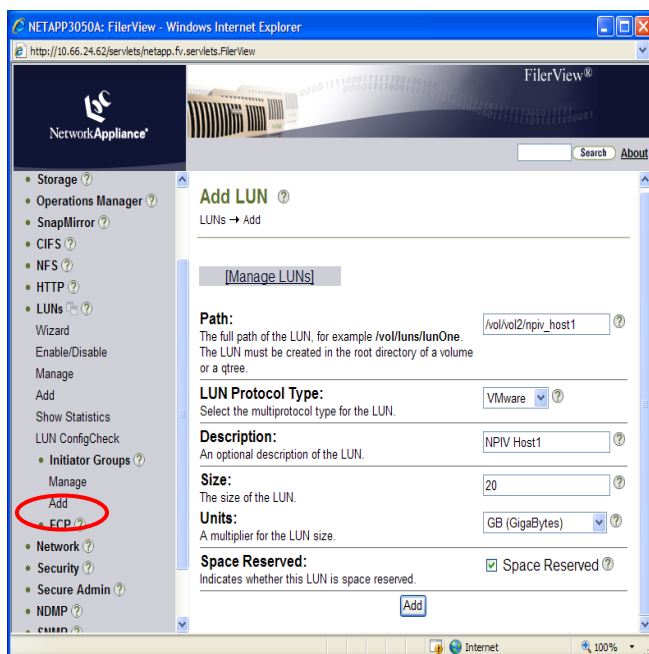
- d. Enter the VMware guest WWNN and WWPNS that you received from vCenter and the physical HBA WWPNS of the ESX Server host in the Initiators section. If you are using VMotion, be sure that you add the other ESX Server host physical HBA WWNs that participate in the VMotion process to ensure that the NPIV connection is maintained when the VMotion takes place. Otherwise the VM will default back to the physical HBA WWN and will not use NPIV.
- e. Click **Add**.



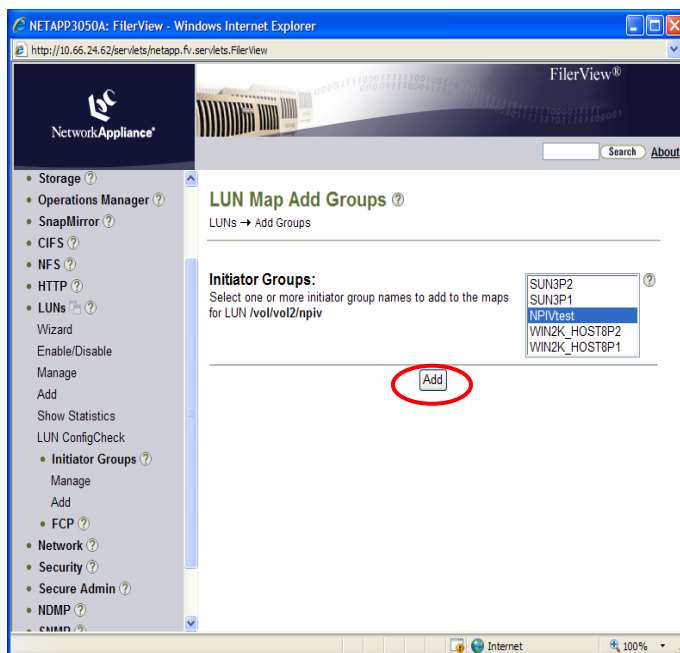
REMINDER: The number of physical HBA ports in the ESX Server device determines how many WWPNS you need to enter in the initiators group.

- f. Fill in the requested information and click **Add**.

- g. Click **Add** under LUNs in the left navigation pane.



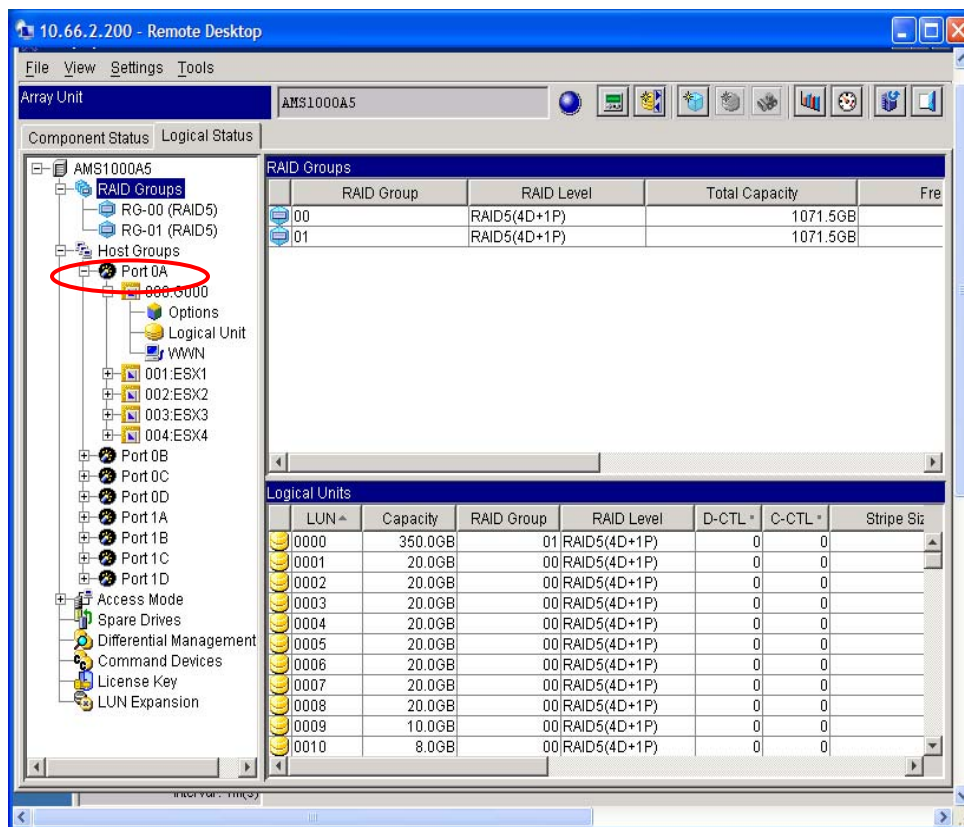
- h. In the Add LUN screen, enter the required information and click **Add**.
- i. Once the LUN is created, click **Manage** under **LUNs** in the left navigation panel and select the LUN you created.
- j. Click **Map LUN** and click **Add Groups to Map**.
- k. Select the initiator group you just created and click **Add**.



- l. Inform your VMware Administrator the VM can be powered on.

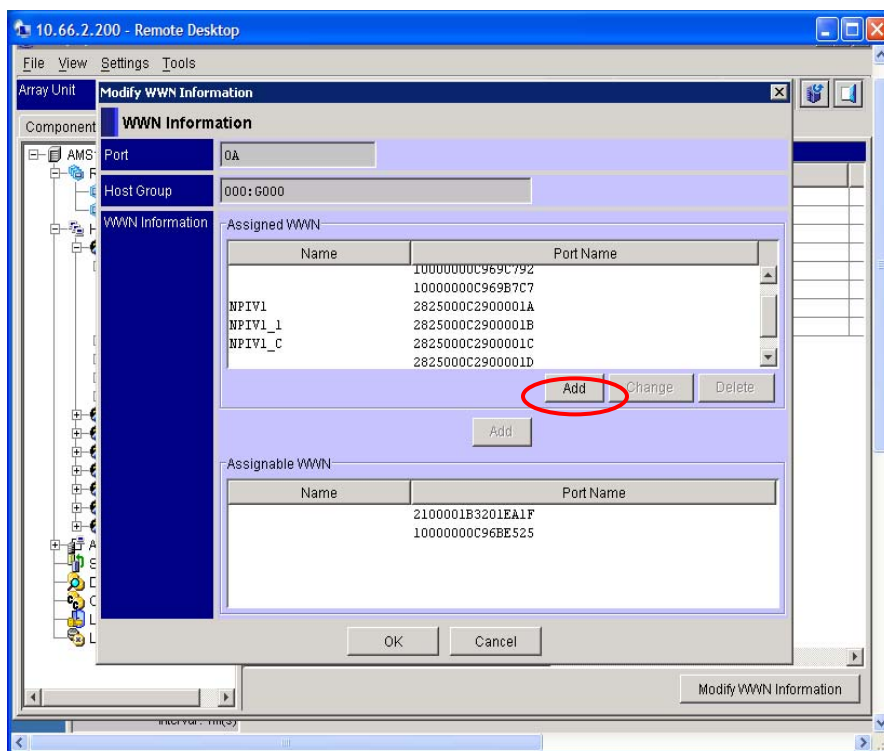
Using HDS AMS Storage Navigator:

- a. In the Logical Status tab, select the port group in which the LUNS are located in the left navigation pane.



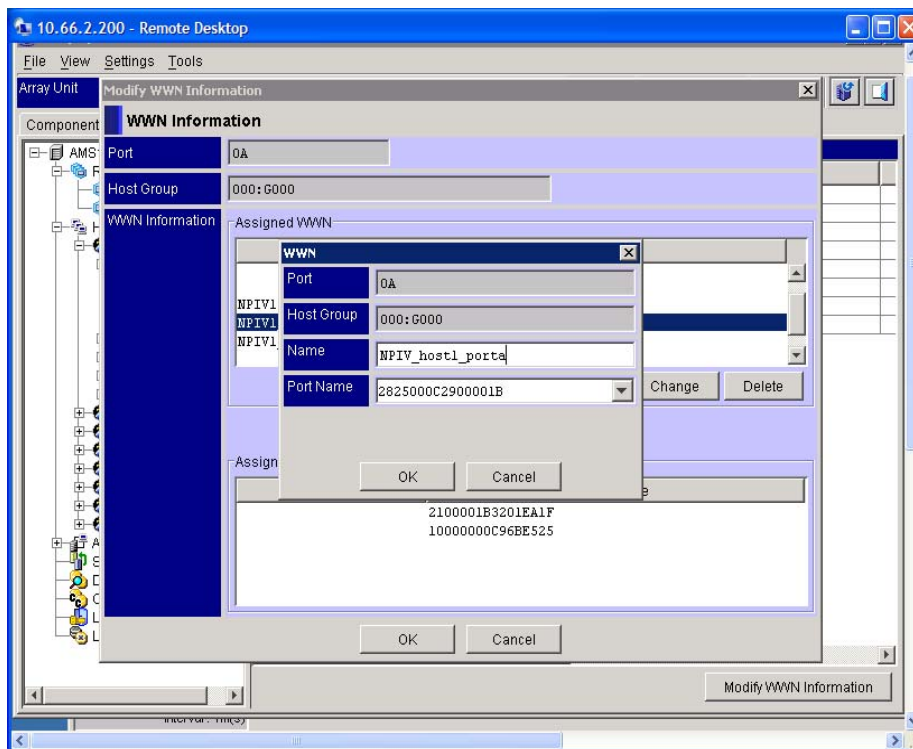
- b. Click **WWN** to select the WWNs that are available to map to this port group.
- c. Click **Modify WWN Information** at the bottom right.

- d. In the WWN Information screen, click **Add**.



- e. In the WWN dialog box, add the virtual WWNs that the Server Administrator gave you. Also add the physical HBA WWNs of the ESX Server host and the physical HBA WWNs of the other ESX Server if you are using VMotion.

- f. Give the WWN a user-friendly name, enter the port WWN without any colons, and click **OK**.



- g. Click **OK** again.
- h. Inform your VMware Administrator to power on the Virtual Machine.

Using EMC AX4 Navisphere:

- Log in to Navisphere.
- Select **Server**.
- Select **Connection** from the tree menu on the left and click **New**.
- Enter all the appropriate information and click **Apply**.
- Initiator: Enter both the WWNN and WWPN in this format WWNN:WWPN: (for example, 28:26:00:0c:29:00:00:06: 28:26:00:0c:29:00:00:0b)

Operating System: Standard

Type: Click the **New** radio button and assign it a name and an IP address.

Navisphere Express Name: AX4-Virt Model: AX4-5SC

Create New Connection

Step 1: Enter the HBA Initiator name for the HBA you want to register. The Initiator name can be found on the new HBA.

Initiator Information

Initiator: 28.26.00.0c:29.00.00.06:28.26.00.0c:29.00.00.0b

Step 2: Choose the operating system of the server for the HBA you want to register. If your operating system is Windows, Linux, Solaris, or VMWare, please select the 'Standard' option. See the Support Matrix(Supported Configurations) on your AX4-5 support web site for details.

Operating System

Operating System: STANDARD

Step 3: Select 'New' to enter a valid server name and IP address to define a new server for the connection. Select 'Existing' in the following table to associate this connection with a server from the list of already defined servers for this storage system.

Type	Name	IP Address
<input checked="" type="radio"/> New	vm1.virtlab.brocade.com	192.168.174.95
<input type="radio"/> Existing	esx1.virtlab.brocade.com	

Step 4: Click 'Apply' to create the new connection.

Apply Cancel

- f. Select **Servers** from the left tree menu.
- g. Select the newly created server and click Assign to allow the VM access to the appropriate LUNs.

Navisphere Express Name: AX4-Virt Model: AX4-5SC

server information.

Name	Description
Assigned To	VM1.virtlab.brocade.com
IPAddress	192.168.174.95
Connectivity Status	Inactive
Operating System Name	N/A
Operating System Version	N/A

Virtual Disk Assignment

The following table lists the virtual disks that are currently assigned to. Click the name of the virtual disk for details about the virtual disk. Click 'Assign' if you want to have access to other virtual disks or click 'Unassign' if you want to remove access to one or more virtual disks.

Virtual Disk Name	File Systems	Device Name	Shared With
Virtual Disk 2			esx.virtlab.brocade.com, esx1.virtlab.brocade.com

Click 'Assign' if you want to have access to other virtual disks.

Assign...

Click 'Unassign' if you want to remove access to one or more virtual disks.

Unassign...

- h. Select the LUN(s) that were assigned by the Server Administrator and click **Apply**.
- i. Ask your Server Administrator to power on the Virtual Machine.

Verifying that the VM Is Functioning Correctly

1. Log in to the Brocade switch.

2. Issue the **switchShow** command.

You should see the NPIV ports with a number greater than 1 (“one”) as shown below. If you see only one NPIV port, then the setup has not been successful.

```
FAB_B_5100:admin> switchshow
switchName:    FAB_B_5100
switchType:    66.1
switchState:    Online
switchMode:    Native
switchRole:    Principal
switchDomain:   1
switchId:      fffc01
switchMwn:     10:00:00:05:1e:58:03:e8
zoning:        ON (KPN)
switchBeacon:  OFF
FC Router:     OFF
FC Router BB Fabric ID: 1

Area Port Media Speed State      Proto
=====
0 0 id N4 Online F-Port 4 NPIV public
1 1 id N4 Online F-Port 3 NPIV public
2 2 id N4 Online F-Port 3 NPIV public
3 3 id N4 Online F-Port 2 NPIV public
4 4 id N4 Online F-Port 50:01:43:80:01:34:a2:19
5 5 id N4 Online F-Port 50:01:43:80:01:34:a2:1d
```

You can also issue the **nsShow** command to show the ports logged in to the fabric. You should see the Virtual Machine NPIV ports.

```
N 010003; 3;28:16:00:0c:29:00:00:4e;28:16:00:0c:29:00:00:4c; na
FC4s: FCP
NodeSymb: [43] "Emulex LPe1105-HP F02.72A2 D0elx_7.4.0.13-2"
Fabric Port Name: 20:00:00:05:1e:58:03:e8
Permanent Port Name: 20:11:00:05:1e:05:cc:60
Port Index: 0
Share Area: No
Device Shared in Other AD: No
Redirect: No
```

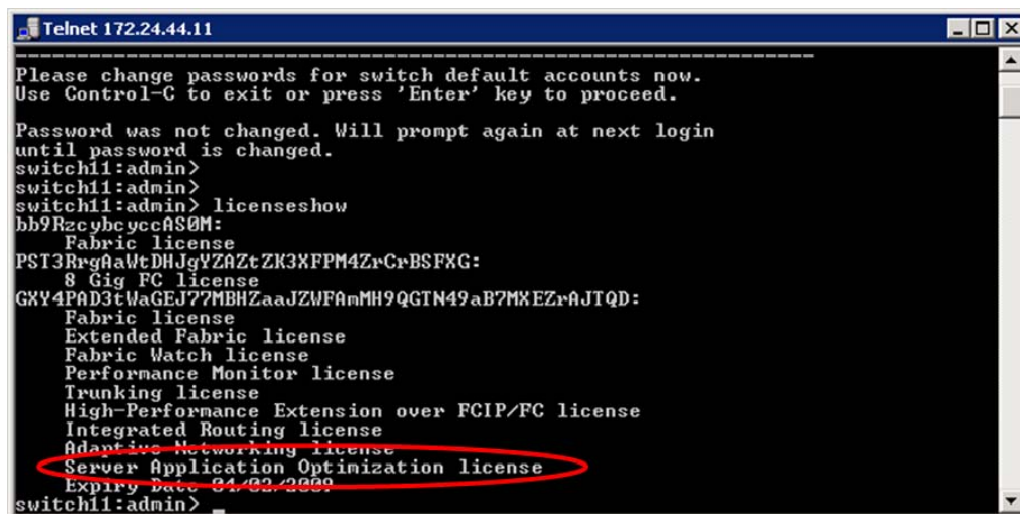
You could also use the service console on the ESX Server and check the /proc nodes of the HBA to get the details. The procedure to find this information is documented in the “Server Administrator Tasks” section in this document.

STREAMLINE WORKLOADS WITH QoS

NPIV is used to present dedicated LUNs into VMs via Raw Device Mapping. NPIV allows a SAN Administrator to isolate traffic for each VM. Combining the Brocade HBA with Brocade FC and Fibre Channel over Ethernet (FCoE) switches, Brocade offers the unique ability to provide true end-to-end QoS. Since virtualization enables dynamic movement of workloads around the data center, Brocade has the ability to maintain the QoS level of a workload even when it migrates to a different physical server. In addition Brocade virtual channel technology provides Adaptive Networking services to monitor resource usage, detect (or predict) congestion in the data path, and dynamically adjust resources to avoid congestion based on QoS priority.

QoS has one prerequisite: a Server Application Optimization (SAO) license needs to be applied on the switches to which HBAs are connected. An SAO license optimizes overall application or VM performance by extending Brocade virtual channel technology to the server infrastructure and application scaling by allowing specific traffic flows to be configured, prioritized, and optimized end-to-end throughout the data center. SAO is an optional Brocade switch license deployed with Brocade FC HBAs.

- To view the licenses on your switch, telnet to the switch and run the **licenseShow** command to see if the license is applied.

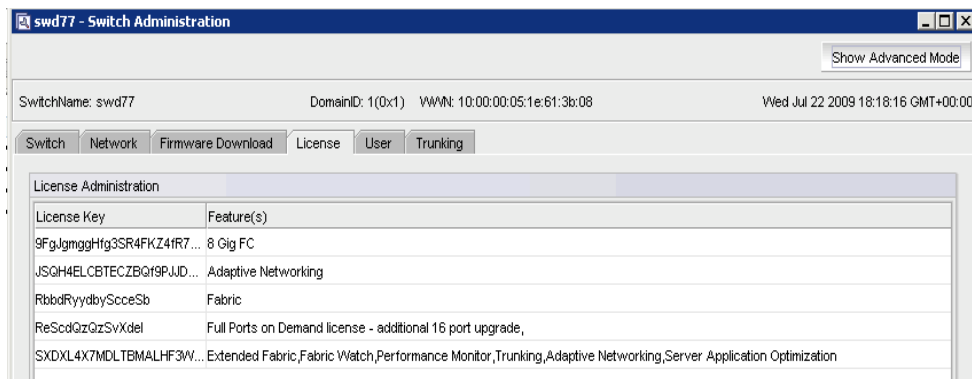


```

Telnet 172.24.44.11
-----
Please change passwords for switch default accounts now.
Use Control-C to exit or press 'Enter' key to proceed.

Password was not changed. Will prompt again at next login
until password is changed.
switch11:admin>
switch11:admin>
switch11:admin> licenseshow
bb9RzcybcyccASOM:
  Fabric license
PST3RrgAaWtDHJgYZAZtZK3XFFPM4ZrCrBSFXG:
  8 Gig FC license
GXY4PAd3tWaGEJ77MBHZaaJZWFAmMH9QGIN49aB7MXEZrAJTQD:
  Fabric license
  Extended Fabric license
  Fabric Watch license
  Performance Monitor license
  Trunking license
  High-Performance Extension over FCIP/FC license
  Integrated Routing license
  Adaptive Networking license
  Server Application Optimization license
  Expiry Date 04/03/2009
switch11:admin>
  
```

- To view the licenses using Web Tools, select **License** in the tree menu on the left, click the **License** tab, and ensure that the SAO license has been applied.



License Key	Feature(s)
9FgJgmggHfg3SR4FKZ4IR7...	8 Gig FC
JSQH4ELCBTECZBQf9PJJD...	Adaptive Networking
RbbdRyydybSceSb	Fabric
ReScdQzGzSvXdel	Full Ports on Demand license - additional 16 port upgrade,
SXDYL4X7MDLTBMALHF3W...	Extended Fabric, Fabric Watch, Performance Monitor, Trunking, Adaptive Networking, Server Application Optimization

Configuring Brocade HBA for QoS

1. Launch the Brocade Host Connectivity Manager (HCM).
2. Click **Discovery > Setup** from the main menu.
3. Enter the IP address or host name of the ESX Server host, the port number of the HCM agent of the ESX Server (Default is 34568), user ID, and password.

NOTE: You will need to open up a port on the ESX Server firewall to allow the HCM agent to communicate with HCM:

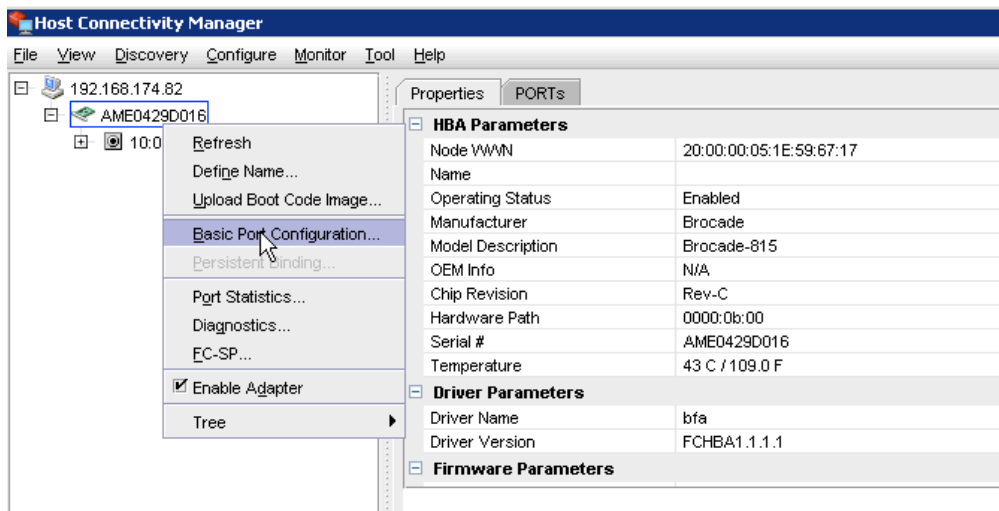
- a. Telnet or SSH to the ESX Server host.
- b. Issue the command (you need the appropriate ESX Server permissions) to run the command:

```
/usr/sbin/esxcfg-firewall -o 34568,tcp,in,https
```

```
/usr/sbin/esxcfg-firewall -o 34568,udp,out,https
```

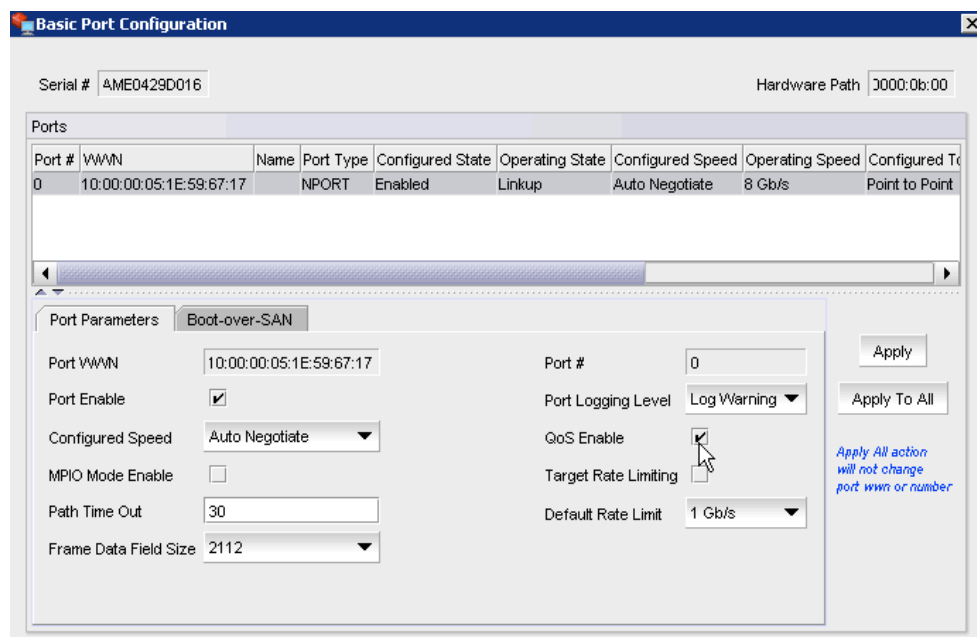


- c. Click **OK**.
- d. Right-click the HBA and from the menu, choose **Basic Port Configuration**.

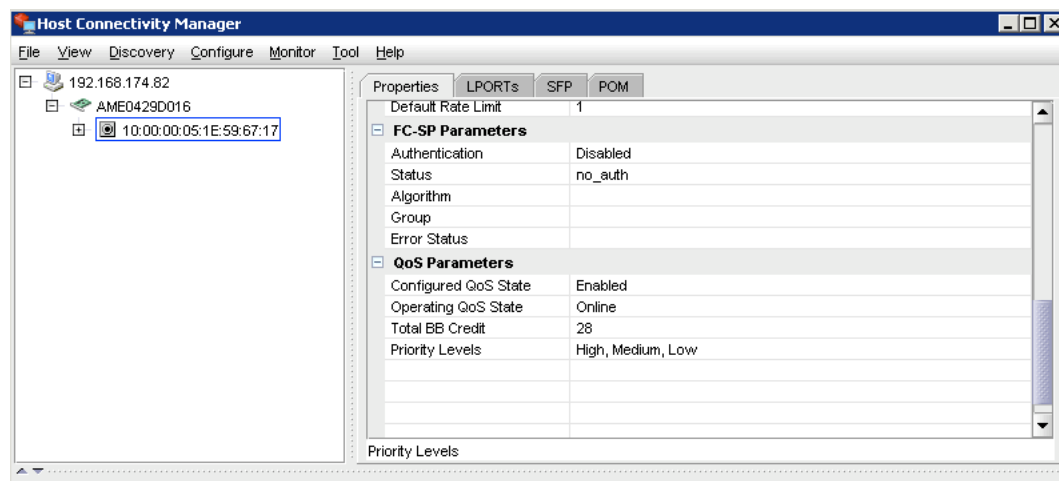


- e. In the Port Configuration dialog box, check **QoS enable**. Click **Yes** when prompted to allow the port to disable/enable.

NOTE: You will lose connectivity for brief amount of time.



- f. Once QoS is enabled, the QoS status is reflected in the port properties, which also show the available prioritization levels.



Configuring Brocade Switches for QoS

1. Telnet into the switch
2. Since the zones are already created, the next step is to modify the zone name to apply QoS (If this were a new zone, then just add the prefix below to the zone name). Traffic prioritization is accomplished by the use of special QoS zones. Prefixes in the zone names distinguish QoS zones from normal WWN zones:

QOSH_<zone name>: High priority zone

QOSM_<zone name>: Medium priority zone

QOSL_<zone name>: Low priority zone
3. Using one of the existing zones, rename the zone to apply a QoS priority. From the command prompt:

Zoneobjectrename "VM1_Clariion_P1", "QOSH_VM1_Clariion_P1" → Renames first zone

Zoneobjbectrename "VM1_Clariion_P1", "QOSH_VM1_Clariion_P2" → Renames second zone

Cfgenable Demo → Enables the configuration
4. Apply this configuration for all the zones that will be using QoS.

TROUBLESHOOTING

If you experience any problems, make sure that:

- The VM is powered off when you set up NPIV. If the VM is running when you make these changes, you will need to shut down, not a restart, the VM and the power it back on.
- You have properly zoned the VM virtual ports on the Brocade switch.
- You have properly LUN-masked the storage array with the Virtual WWNs of the VM.
- You are using an HBA that supports NPIV, requirements for which are listed in a previous section.
- You have NPIV enabled on the switch. You can check to see if NPIV is enabled on a switch by running the **portCfgShow** command. If the port is turned off then issue the **portcfgNPIVPort** command *<port number> <mode>*.

Mode 0 – Disables the NPIV capability on the port

Mode 1 – Enable the NPIV capability on the port

```
FAB_B_5100:admin> portcfgshow
```

Ports of Slot 0	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Speed	AN	AN	AN	AN	AN	AN	AN	AN	AN	AN	AN	AN	AN	AN	AN	AN
AL_PA Offset 13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Trunk Port	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
Long Distance	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
UC Link Init	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Locked L_Port	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Locked G_Port	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Disabled E_Port	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
ISL R_RDY Mode	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
RSCN Suppressed	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Persistent Disable	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
NPIV capability	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
QOS E_Port	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
EX Port	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Mirror Port
Rate Limit
Credit Recovery	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON

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