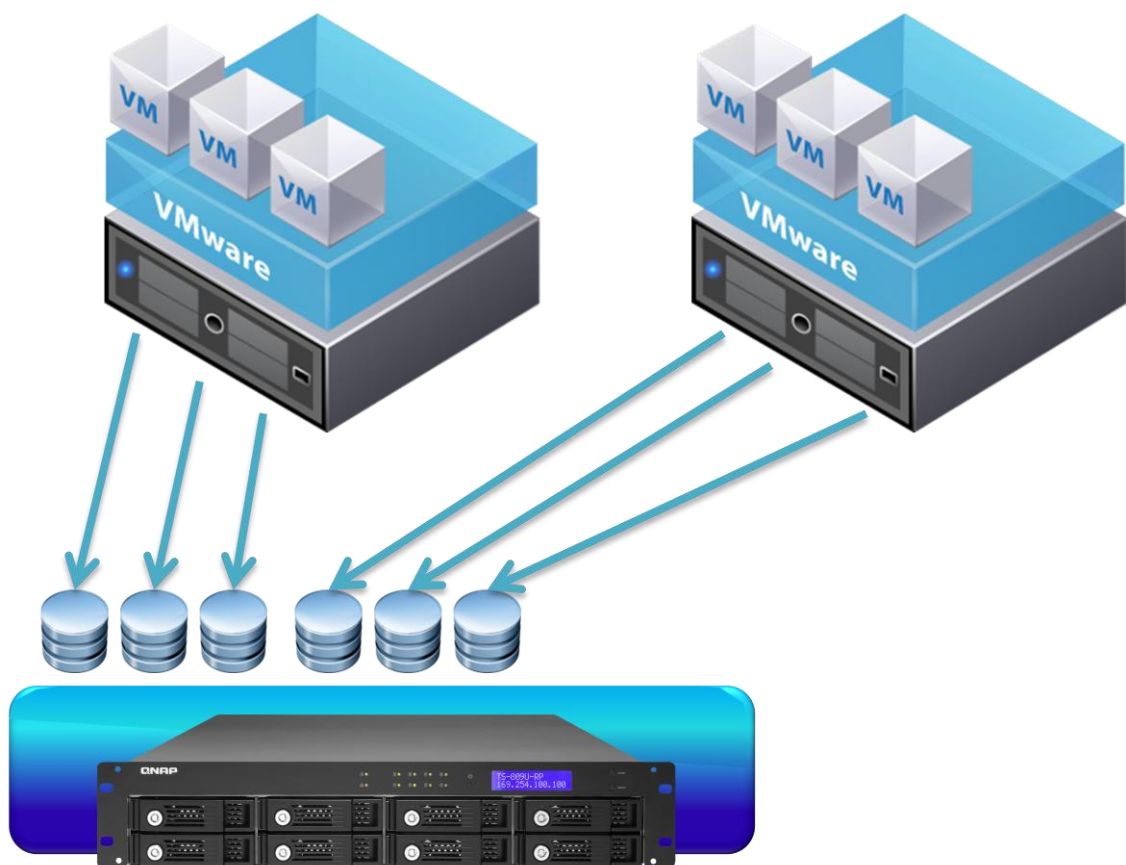


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## *QNAP in vSphere Environment*

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## **HOW TO USE QNAP NAS AS A VMWARE DATASTORE VIA NFS**

## How to use QNAP NAS as a VMware Datastore via NFS

QNAP provides you what others cannot!

Because NFS is a file level storage, NFS Datastore is an ideal storage for file oriented applications. Use a QNAP NAS as NFS server will be safe, efficient, and you will be able to use all other features that QNAP brings to you. Moreover, the Online RAID Level Migration and Online Capacity Expansion features of QNAP Turbo NAS will allow you to extend this datastore online without downtime.

NFS is an easy way to setup a VMware Datastore using your QNAP NAS. VMware supports NFS Datastores, even for an advanced usage:

### **NFS Datastore**

*ESXi (and ESX)\* can access a designated NFS volume located on a NAS server, mount the volume, and use it for its storage needs. You can use NFS volumes to store and boot virtual machines in the same way that you use VMFS datastores. ESXi (and ESX)\* supports the following shared storage capabilities on NFS volumes:*

- vMotion*
- VMware DRS and VMware HA*
- ISO images, which are presented as CD-ROMs to virtual machines*
- Virtual machine snapshots*

...

### **NFS Datastores as Repositories for Commonly Used Files**

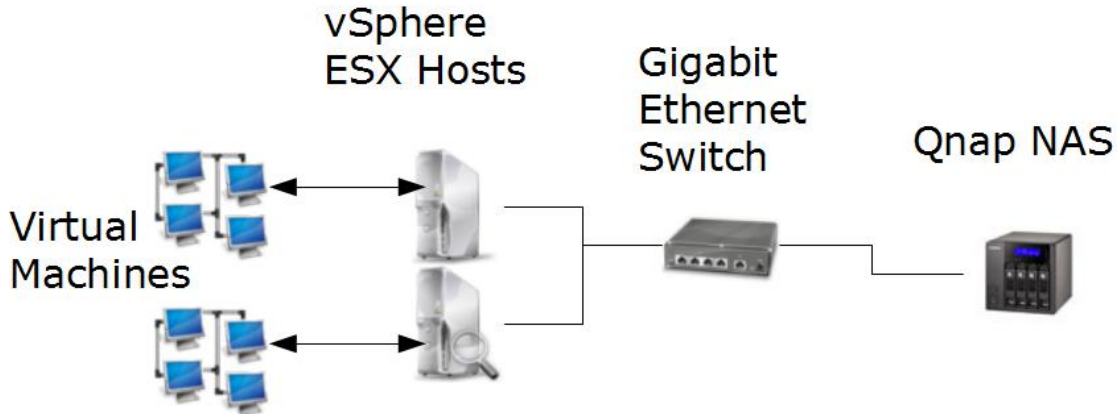
*In addition to storing virtual disks on NFS datastores, you can also use NFS as a central repository for ISO images, virtual machine templates, and so on. To use NFS as a shared repository, you create a directory on the NFS server and then mount it as a datastore on all hosts.*



(ESXi\_Configuration\_Guide and ESX\_Configuration\_Guide from <http://www.vmware.com/support/pubs/> for **vSphere 4.0**)

\* Comment added by QNAP after it has been verified in VMware documentation.

## Network architecture:



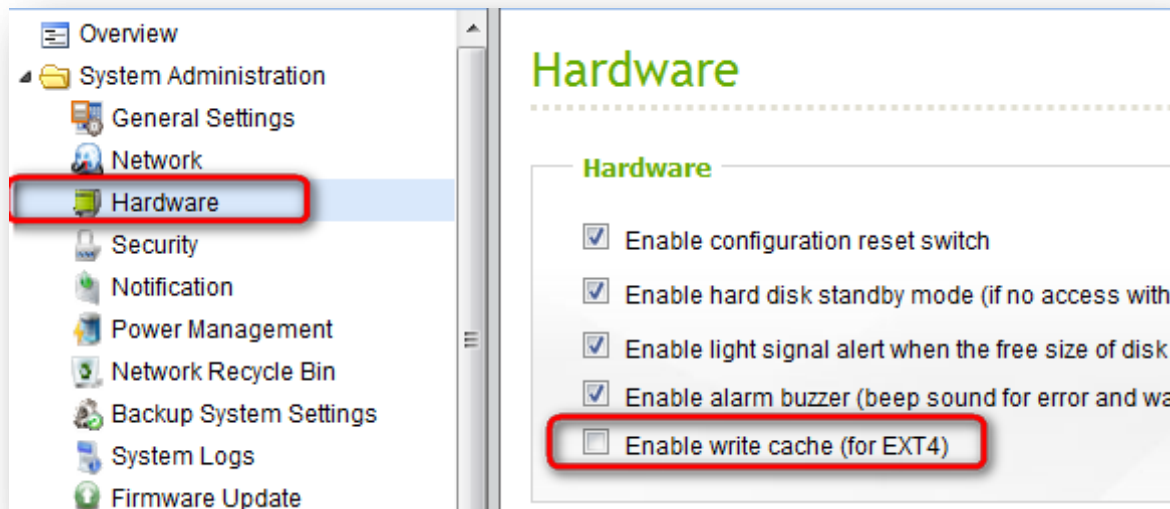
You will have better performance by connecting your ESX servers and your QNAP NAS with a Gigabit Ethernet switch. Each of your VMware hosts will be able to connect to your QNAP NAS by NFS and allow you to add an NFS Datastore in your vSphere environment.

### Procedure requirements:

- QNAP NAS with firmware version 3.2.0 or later
- ESX 4.0 or above OR ESXi 4.0 or above

### Important Notice:

If you are using EXT4, please update to firmware 3.2.1 build 1231 or above, and disable the write cache:



In v3.2.1, by default the [write cache] is disabled for stability. (Before v3.2.1, write cache was always enabled)

## Step 1: Enable NFS feature on the QNAP NAS

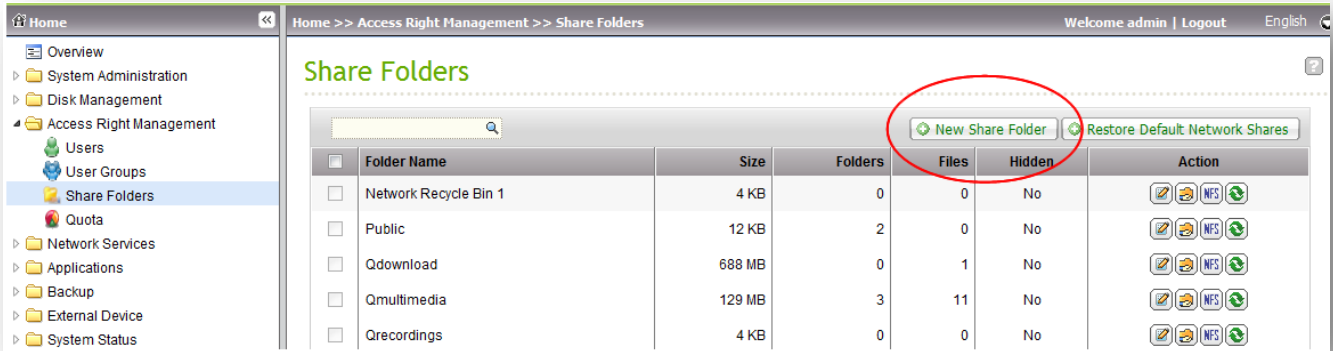
First, we are going to enable NFS feature and create your NFS share on your QNAP NAS. It will be used as a datastore for your VMware environment.

To do so, login your QNAP NAS. Go to "Network Services" > "NFS Service", and enable the NFS service.



## Step 2: Create a share folder on the QNAP NAS

Once the NFS service is enabled, you can create your share. Let's call it ESXDataStore01 for this example.

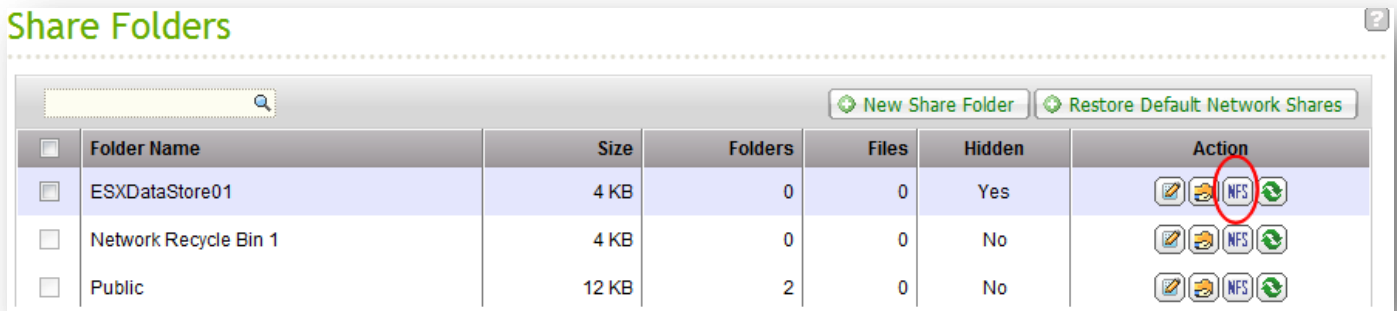


From the "Access Right Management", select "Share Folders", then click "New Share Folders".

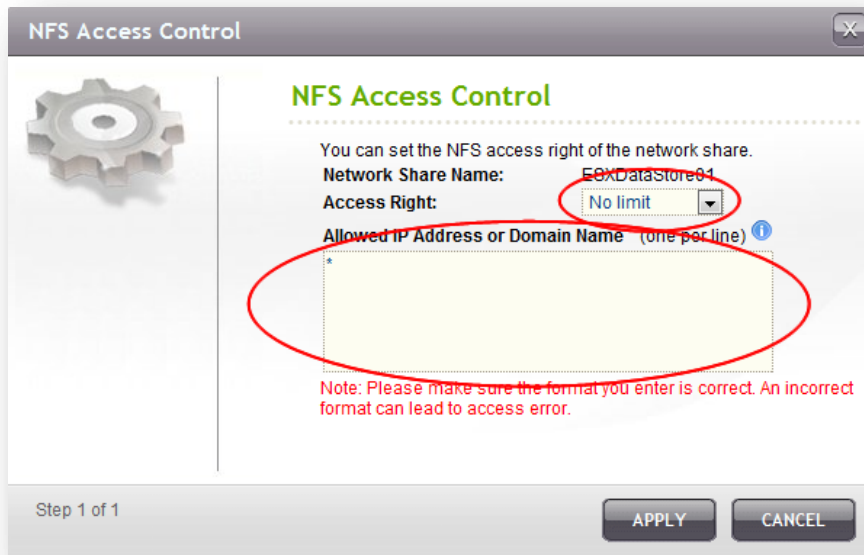
When prompted, fill the form as follow:

- Folder Name: Your datastore name. We want to call it "ESXDataStore01" in the example.
- Disk Volume: The volume where you want your datastore to locate. If there are 2 RAID volumes on your NAS, you can choose one.
- Hide Folder: Select "YES", because we don't want it to be visible as it is used for a special purpose: your VMware environment.
- Lock file (oplocks): Select "NO", we don't want to use this functionality as we will use NFS access.

Once finished, you can go back to the share folder list. (Access Right Management > Share Folders) On the share ESXDataStore01, you can click "NFS" to set up the NFS access right for this share:

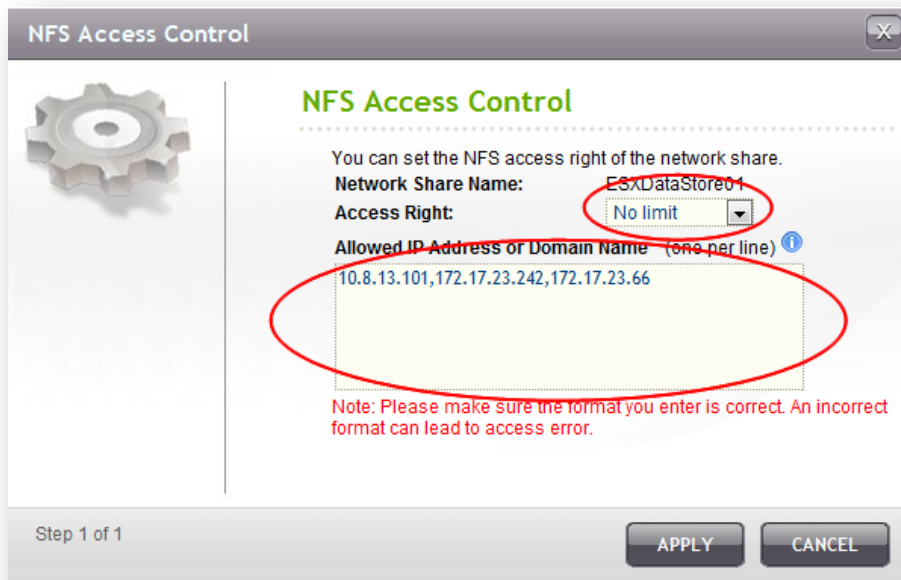


Set "no limit" access right for the NFS share and allow all IP to connect.



However, for higher security (though necessary), you may select to allow only ESX Servers to connect to your NFS datastore. (The VMKernel network port is used to connect to NFS. You can find it in host configuration panel > networking. You can see the VMkernel port IP.)

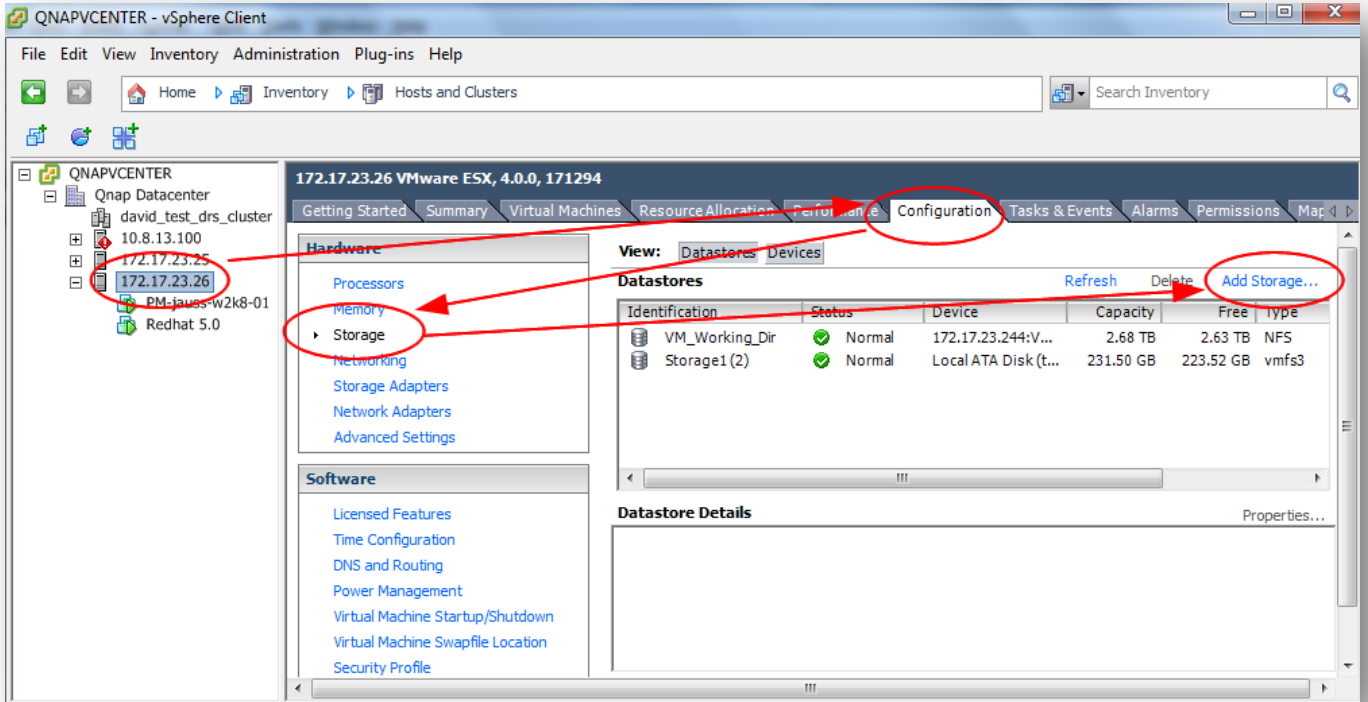
Enter the IP addresses of all your ESX Servers and separate them by a coma, without space:



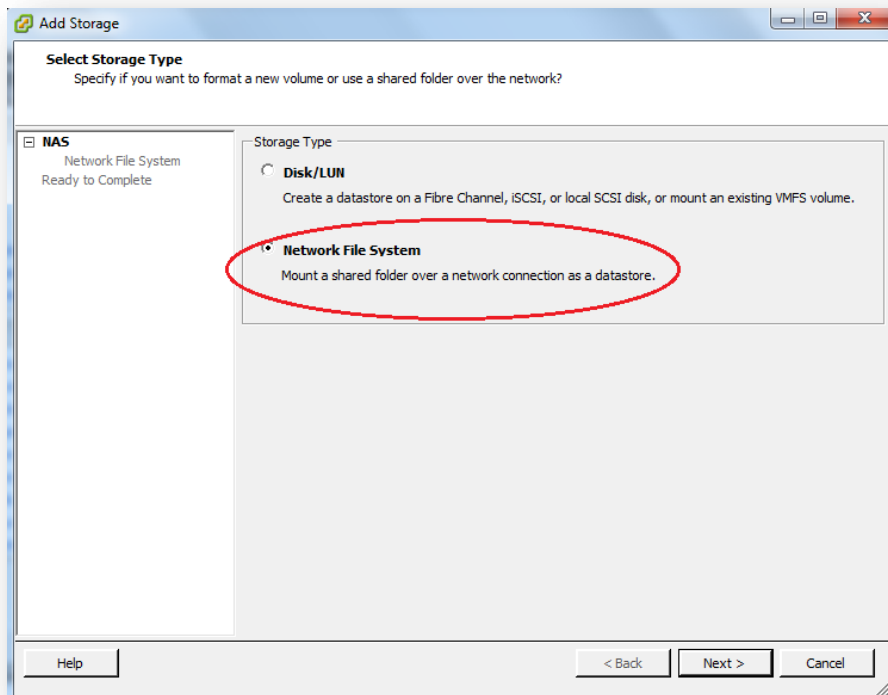
### Step 3: Mount the NFS share folder as a Datastore

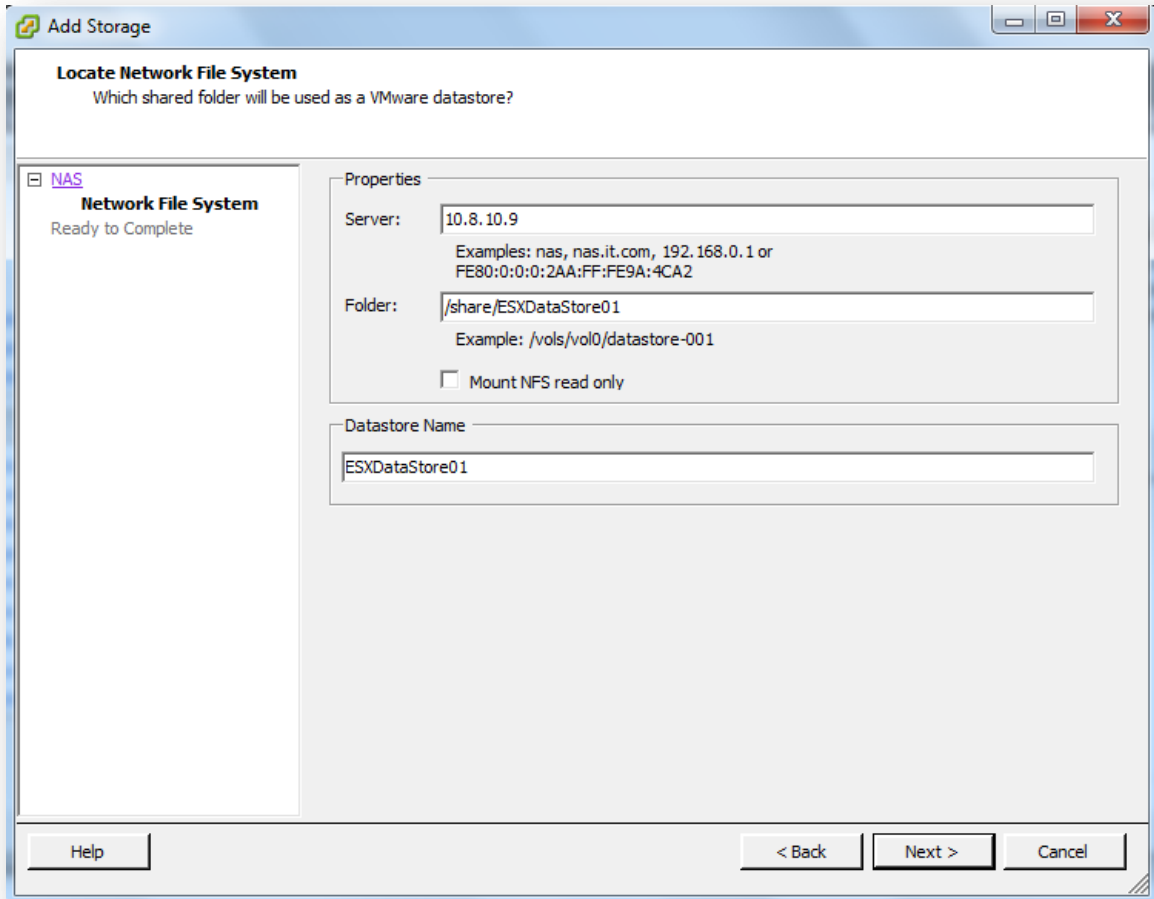
Once your share folder has been created and the NFS security has set up, you can add the new datastore with your vSphere client.

Open your vSphere client, and select the host on which you want to add the datastore. Go to the "Configuration" tab. Select "Storage" and click "Add storage".



Select "Network File System" as we want to add a NFS share folder. Click "Next".  
Fill the form as below:





- Server: The IP address of your QNAP NAS.
- Folder: The share folder you have created before ( ESXDataStore01 ) that we can access using /share/ ESXDataStore01
- Mount NFS read only. Do not check "read only" option.
- Datastore Name: The name of your datastore that will appear in VMware environment.

Click "Next" and review the summary. Then click "Finish".

After that, your new datastore will be available to your host.

View: **Datstores** Devices

Refresh Delete Add Storage...

Identification	Status	Device	Capacity	Free	Type	Last Update
VM Working Dir	✓ Normal	172.17.23.244:V...	2.68 TB	2.63 TB	NFS	9/29/2009 14:01:20
ESXDataStore01	✓ Normal	10.8.10.9:/share/...	457.23 GB	441.49 GB	NFS	9/29/2009 14:21:53
Storage1 (2)	✓ Normal	Local ATA Disk (t...	231.50 GB	223.52 GB	vmfs3	9/29/2009 14:51:56



## Step 4: What next?

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You may have some concerns about the reliability using a NFS Datastore in case of hardware problems. Many features are available to help you protect your data and the online service.

Here are some suggestions:

On the QNAP NAS side:

- You may want to use network failover mode using the 2 network ports to be safe in case of network problem. (Available on TS-410 TS-419P, TS-419U, TS-239 Pro, SS-439 Pro, TS-439 Pro, TS-439U-SP/RP, TS-509 Pro TS-639 Pro, SS-839 Pro, TS-809 Pro, TS-809U-RP. Please refer to [http://www.QNAP.com/images/products/comparison/Comparison\\_NAS.html](http://www.QNAP.com/images/products/comparison/Comparison_NAS.html))
- RAID 5 allows 1 disk failure
- RAID 5 + 1 hot spare disk or RAID 6 can allow 2 disks failure
- QNAP NAS can be configured as RAID 5 or 6 with a Hot Spare drive to quickly return to a normal mode when a RAID became degraded because of a disk failure. You can also check and compare different QNAP NAS models in the comparison table (see above).

On the VMware side:

- You may want to use Teaming and set up a Failover Policy to avoid network failure. Refer to "Load Balancing and Failover Policy" in ESX and ESXi Configuration Guide.
- You can enable VMware HA clusters to ensure high availability.
- You can set up VMware FT (Fault Tolerance) using NFS datastore. That is one of Virtual Machine Requirements for VMware FT. (cf: vSphere 4.0 Availability Guide)

Why choose a QNAP NAS as a NFS Datastore for vSphere 4.0?

- This solution is supported by VMware and by QNAP (see minimum requirements).
- NFS Datastores provide easy setup on both sides.
- Using **QNAP Online RAID Capacity Expansion** you are able to add more capacity to your datastore and change your hard drives by bigger ones to expand your QNAP NAS capacity, without stopping any services!
- You can use remote replication as a backup solution.
- You can use thin provisioning.

## Recommendations:

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As each network connections are 1Gb/s, keep in mind that each connection you will add to the NFS share will be shared with others. Depending of the need, idle VMs will not require a lot of I/O whereas VM with high disk activity will require a lot of I/O.

You can enable "Balance-alb" bonding mode or 802.3ad aggregation mode (an 802.3ad s compliant witch required) to allow inbound and outbound traffic link aggregation (up to 2 Gb/s).

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