

QNAP in vSphere Environment



How to use **QNAP NAS** as a **VM**ware **D**atastore 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:

 Overview System Administration General Settings 	•	Hardware
Network Hardware Ketwork Ke	Ш	Hardware Enable configuration reset switch Enable hard disk standby mode (if no access with Enable light signal alert when the free size of disk Enable alarm buzzer (beep sound for error and wa Enable write cache (for EXT4)

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.

යි Home	~	Home >>	Access Right Management >> Share Folders	We	elcome admin Logout English			
Overview		Char	- Caldena					
System Administration		Snai	re Folders					
Disk Management								
Access Right Management			Q	hare Folder 🛛 🔾	older 🛛 🔇 Restore Default Network Shares 📄			
🍓 Users 🍓 User Groups			Folder Name	Size	Folders	Files	Hidden	Action
💫 Share Folders			Network Recycle Bin 1	4 KB	0	0	No	2 3 1 1 1
 Quota Network Services 			Public	12 KB	2	0	No	
Applications			Qdownload	688 MB	0	1	No	2 3 1 1
Diackup External Device			Qmultimedia	129 MB	3	11	No	
System Status			Qrecordings	4 KB	0	0	No	S 1 1 1

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:

Shar	e Folders							
Q New Share Folder O Restore Default Network S								
	Folder Name	Size	Folders	Files	Hidden	Action		
	ESXDataStore01	4 KB	0	0	Yes			
	Network Recycle Bin 1	4 KB	0	0	No	Z		
	Public	12 KB	2	0	No			



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

NFS Access Control	\mathbf{x}
	NFS Access Control You can set the NFS access right of the network share. Network Share Name: Access Right: No limit Allowed IP Address or Domain Name (One pocline) Image: State Sta
Step 1 of 1	APPLY CANCEL

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:

NFS Access Contro	l III
	NFS Access Control You can set the NFS access right of the network share. Network Share Name: Access Right: No limit Allowed IP Address of Domain Name (one per line) 10.8.13.101,172.17.23.242,172.17.23.66 Note: Please make sure the format you enter is correct. An incorrect format can lead to access error.
Step 1 of 1	APPLY CANCEL



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:

🕜 Add Storage	
Select Storage Type Specify if you want to form	at a new volume or use a shared folder over the network?
NAS Network File System Ready to Complete	Storage Type C Disk/LUN Create a datastore on a Fibre Channel, ISCSI, or local SCSI disk, or mount an existing VMFS volume. Network File System Mount a shared folder over a network connection as a datastore.
Help	< Back Next > Cancel
	· · · · · · · · · · · · · · · · · · ·



Locate Network File System Which shared folder will be u	ed as a VMware datastore?	
INAS Network File System Ready to Complete	Properties Server: 10.8.10.9 Examples: nas, nas.it.com, 192.168.0.1 or FE80:0:0:0:2AA:FF:FE9A:4CA2	
	Folder: //share/ESXDataStore01 Example: /vols/vol0/datastore-001	
	ESXDataStore01	
Help	< Back	Next > Cancel

- 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.

vices							
					Refresh	Delete	Add Storage
Status	Device	Capacity	Free Type	Last Update			
🐼 Normal	172.17.23.244:V	2.68 TB	2.63 TB NFS	9/29/2009 14:01:20			
Normal	10.8.10.9:/share/	457.23 GB	441.49 GB NFS	9/29/2009 14:21:53			
Normal	Local ATA Disk (t	231.50 GB	223.52 GB vmts	9/29/2009 14:51:56			
	Status Status Normal Normal	Status Device Normal 172.17.23.244:V Normal 10.8.10.9:/share/ Normal Local ATA Disk (t	Status Device Capacity Normal 172.17.23.244:V 2.68 TB Normal 10.8.10.9:/share/ 457.23 GB Normal Local ATA Disk (t 231.50 GB	Status Device Capacity Free Type Normal 172.17.23.244:V 2.68 TB 2.63 TB NFS Normal 10.8.10.9:/share/ 457.23 GB 441.49 GB NFS Normal Local ATA Disk (t 231.50 GB 223.52 GB vmts3	Status Device Capacity Free Type Last Update Normal 172.17.23.244:V 2.68 TB 2.63 TB NFS 9/29/2009 14:01:20 Normal 10.8.10.9:/share/ 457.23 GB 441.49 GB NFS 9/29/2009 14:21:53 Normal Local ATA Disk (t 231.50 GB 223.52 GB vmts3 9/29/2009 14:51:56	Status Device Capacity Free Type Last Update Normal 172.17.23.244:V 2.68 TB 2.63 TB NFS 9/29/2009 14:01:20 Normal 10.8.10.9:/share/ 457.23 GB 441.49 GB NFS 9/29/2009 14:21:53 Normal Local ATA Disk (t 231.50 GB 223.52 GB vmfs3 9/29/2009 14:51:56	Refresh Delete Status Device Capacity Free Type Last Update Normal 172.17.23.244:V 2.68 TB 2.63 TB NFS 9/29/2009 14:01:20 Normal 10.8.10.9:/share/ 457.23 GB 441.49 GB NFS 9/29/2009 14:21:53 Normal Local ATA Disk (t 231.50 GB 223.52 GB vmrs3 9/29/2009 14:51:56



Step 4: What next?

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 <u>http://www.QNAP.com/images/products/comparison/Comparison_NAS.html</u>)
- 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:

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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