QNAP in vSphere Environment

HOW TO USE QNAP NAS AS A VMWARE DATASTORE VIA iSCSI
Document revision history:

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<td>Jan 2010</td>
<td>1.7</td>
<td>New firmware, EXT4 write cache.</td>
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<td>Apr 2010</td>
<td>1.8</td>
<td>Add the information about how to extend a datastore to several LUNs.</td>
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How to use the QNAP Turbo NAS as a VMware datastore via iSCSI

This document shows you how to configure the QNAP Turbo NAS as a VMware datastore for the vSphere 4.0 environment by the built-in iSCSI feature. All the x86-based Turbo NAS models (e.g. TS-x39, TS-x59, TS-509, TS-809) support this feature. Refer to the comparison table:
http://www.qnap.com/images/products/comparison/Comparison_NAS.html

The Turbo NAS allows you to set up VMware clusters using VMware HA(2) and VMware FT(3).

iSCSI is a block level storage, and iSCSI datastore is an ideal storage for block IO oriented application like databases.
Important notice:

Requirements:
- The firmware version of the NAS must be 3.2.0 or later.
- The VMware vSphere server version must be ESX 4.0 or above OR ESXi 4.0 or above.

If your NAS is configured as an EXT4 disk volume, update the NAS firmware to version 3.2.1 build 1231 or above, and disable the write cache in “System Administration” > “Hardware”.

The write cache setting is disabled by default in the NAS firmware version 3.2.1 while it is enabled by default in the previous firmware versions.
Create an iSCSI LUN on the Turbo NAS

First of all, create an iSCSI logical unit number (LUN) on your Turbo NAS and call it ESXDataStore02. The name of the iSCSI LUN will be:

iqn.2004-04.com:NAS:iSCSI.ESXDataStore02.BBA3D9

For the details of creating an iSCSI target and LUN, see the application note “Create and use the iSCSI target service on the QNAP NAS” on http://www.QNAP.com/pro_features.asp

ESX 4.0 does not support LUN larger than 2TB (2048GB). Therefore, you will not be able to use a LUN larger than 2TB.

The Turbo NAS supports multiple LUN per target. This feature allows you to extend the capacity of your 2TB iSCSI datastore by adding a LUN to your target.

VMware is able to use multiple LUN for its datastores. We will use this feature to increase the capacity of the datastore to over 2TB. Refer to page 20 for more details.

Once the LUN has been created, you can add it to your datastore as illustrated below.
Enable iSCSI software adapter in vSphere center

Considering that your vSphere Center is properly and minimally set up, enable the iSCSI software adapter.
Select the host. Click the “Configuration” tab and select “Storage Adapter”. Select “iSCSI Software Adapter” (scroll down to see it). Then click “Properties” in the “Details” panel.

You can see that the adapter is disabled.
To enable the iSCSI software adapter, click “Configure”.

Check the option “Enabled” and click “OK”.

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The iSCSI software adapter is enabled.
Connect your QNAP iSCSI target LUN to your VMware host

There are 2 ways to connect your iSCSI target:

- **Automatic discovery**: Select this option to discover and connect the iSCSI targets automatically every time you restart your VMware host. To use this option, you need a dedicated NAS for your datastore.
- **Static discovery**: Select this option to connect the iSCSI targets manually.

### Automatic discovery (a dedicated NAS required)

For automatic iSCSI target detection, you can use Dynamic Discovery to automatically add all the LUN from the NAS. Go to the "Dynamic Discovery" tab. Click “Add” to add your NAS IP address. Then click “OK”.

![Dynamic Discovery Window](image.png)
The IP address of your NAS will be shown on the list.
On the “Static Discovery” tab, you will find the iSCSI target that you have created before. Click “OK”.

![Static Discovery Tab]

Click “Yes” to allow a rescan of the software iSCSI bus adapter.

![Rescan Dialog]

Note from VMware “iSCSI_SAN_Configuration_Guide”: Each time you remove a static target added by dynamic discovery, the target might be returned to the list the next time a rescan takes place, or the HBA is reset, or the host is rebooted.
Static discovery

To add your iSCSI target manually, go to “Static Discovery” and click “Add”.

![Static Discovery Interface](image)

Enter the IP address of your NAS and the iSCSI target name that you created previously. In this example, enter “iqn.2004-04.com:NAS:iSCSI.ESXDataStore02.BBA3D9”.

You can login the NAS and go to “Disk Management” > “iSCSI” to check the name of the iSCSI target.

![iSCSI Target Interface](image)
After entering the details, click “OK”.

The iSCSI target LUN will be shown on the list.
Create and enable the new datastore

Once the iSCSI target has been connected, you can add your storage on that LUN. Go to your VMware host storage management.

Select your host (the NAS). On the “Configuration” tab, select “Storage” and click “Add storage”.

![Image of VMware host storage management interface]

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Select “Disk / LUN” and click “Next”.

The LUN of your NAS that has been connected previously will be shown.
Select the LUN and click “Next”.

As you can see above, the disk is empty. We can read the capacity and a message that says: “A partition will be created and used”. Click “Next”.

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Enter the datastore name, which is “ESXDataStore02” in this example. You are free to name it as you want.

Choose your maximum file size. For example 1TB with a block size of 4 MB, depending on the size of your virtual machines.

Then, click “Next”. You will see a review of all the settings.
Click “Finish” to enable the datastore.

After a few seconds, you will see your new datastore on your NAS.
Extend your datastore to more than 2TB

This part shows you how to create an iSCSI datastore with a capacity larger than 2TB. Supposedly you have a 2TB LUN connected to your ESX, used for a datastore.

Now connect to the NAS, and create a new LUN. (You can choose to create a new target with a new LUN, or create a LUN and add it to an existing target.)

Here, we are going to add a LUN to an existing target.

Create a new LUN only:
Once the LUN has been created, it will be shown on the list.

Select the LUN and click the up arrow on the “Action” column to map the LUN to an existing target.

Select your target and click “APPLY”.
On the vSphere client, go to “Configuration” > “Storage Adapter” and click “Rescan”.

Rescan everything.
After the rescan is finished, you will be able to see the two LUNs: 2TB and 1200GB (1.17TB).
You can extend the existing datastore to that new LUN. Right click the datastore and select “Properties”.

You can see the 2TB LUN.
Click “Increase”.

Select the LUN you have created and click “Next”.

Follow the instructions to increase the volume capacity.
The operation lasts for a couple of seconds.
When finished, the capacity of your datastore capacity has increased by the second LUN.

For more details, please refer to the VMware documentation.
Advices:

- Refer to iSCSI_SAN_Configuration_Guide from VMware ("Networking Configuration for Software iSCSI Storage"), you can easily set up a Failover with Software iSCSI adapter.
- As each network connection is 1Gb/s, keep in mind that each connection you add to the NFS share will be shared with others. Depending on the requirement: idle VM will need a few of I/O whereas VM with high disk activity will need a lot of I/O.
- You can enable “Balance-alb” bonding mode or 802.3ad aggregation mode (an 802.3ad compliant switch required) to allow inbound and outbound traffic link aggregation.
- ESX 4.0 does not support a LUN with a capacity larger than 2 TB (2048 GB). Therefore, you will not be able to use a larger capacity with only 1 LUN (see “Create an iSCSI LUN on the Turbo NAS” on page 5).

SPC-3 persistent reservation: For more details, please read the FAQ.

VMware HA: High Availability. If a VM fails, it will be restarted to a new host.

VMware FT: Fault Tolerance. It provides continuous availability by having identical virtual machines running on separate hosts.

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