

# Use QNAP RAID Expansion Enclosure to Expand Storage Capacity

## White Paper

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**Note:**

- Back up your system periodically to avoid any potential data loss. QNAP disclaims any responsibility of all sorts of data loss or recovery.
- Should you return any components of the RAID expansion enclosure package for refund or maintenance, make sure they are carefully packed for shipping. Any form of damages due to improper packaging will not be compensated.

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## Overview

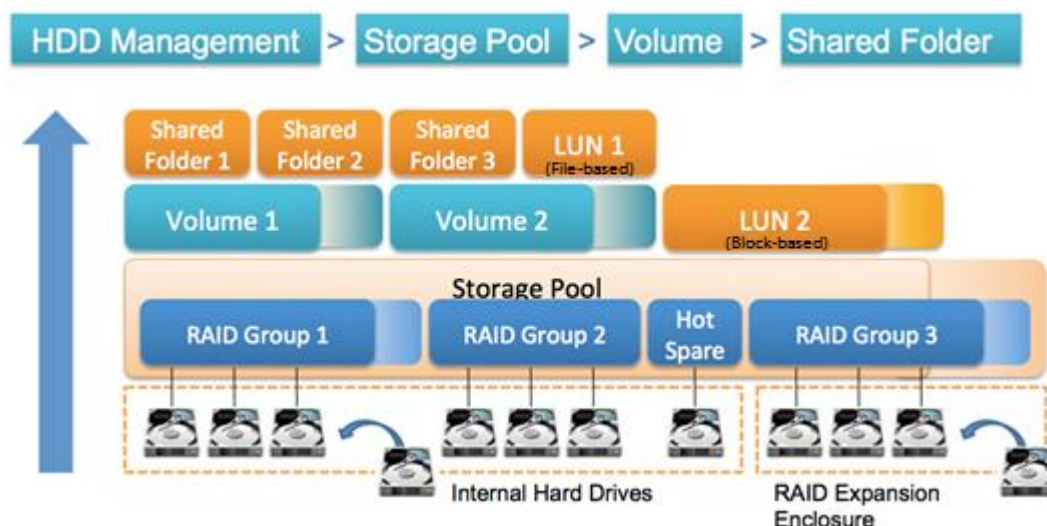
The QNAP RAID Expansion Enclosure is used to expand capacity of QNAP NAS. Multiple RAID Expansion Enclosures can be daisy chained to provide hundreds of Terabytes of raw capacity. This how-to guide will take you through the hardware installation and software configuration process.

## Before You Start

1. QNAP RAID expansion enclosures can ONLY be used with compatible QNAP Turbo NAS.
2. Install the hard drives in sequential order following the tray number.
3. Always turn on the RAID expansion enclosures before turning on the attached QNAP Turbo NAS.
4. Always shut down the QNAP Turbo NAS before turning off the RAID expansion enclosures.
5. Visit QNAP web site for supported NAS models.

## Understand QNAP Flexible Volume

The QNAP Flexible Volume Architecture consists of the following four layers: Disk Management, Storage Pool, Volume and Shared Folders, as shown below:



- **RAID Group**
  - Grouping individual physical drives together by setting RAID to form one “bigger drive”.
- **Storage pool**
  - Multiple RAID Groups can be aggregated as a storage pool.
- **Volume**
  - Space used for shared folders and iSCSI LUN to store data.
- **Simple Volume / RAID Volume**
  - Also known as legacy volume before FW 3.8 that uses RAID group to present a disk volume. The volume cannot be extended.
- **Flexible Volume**
  - Use storage pool space to create a specific disk volume. The volume can be extent on demand.

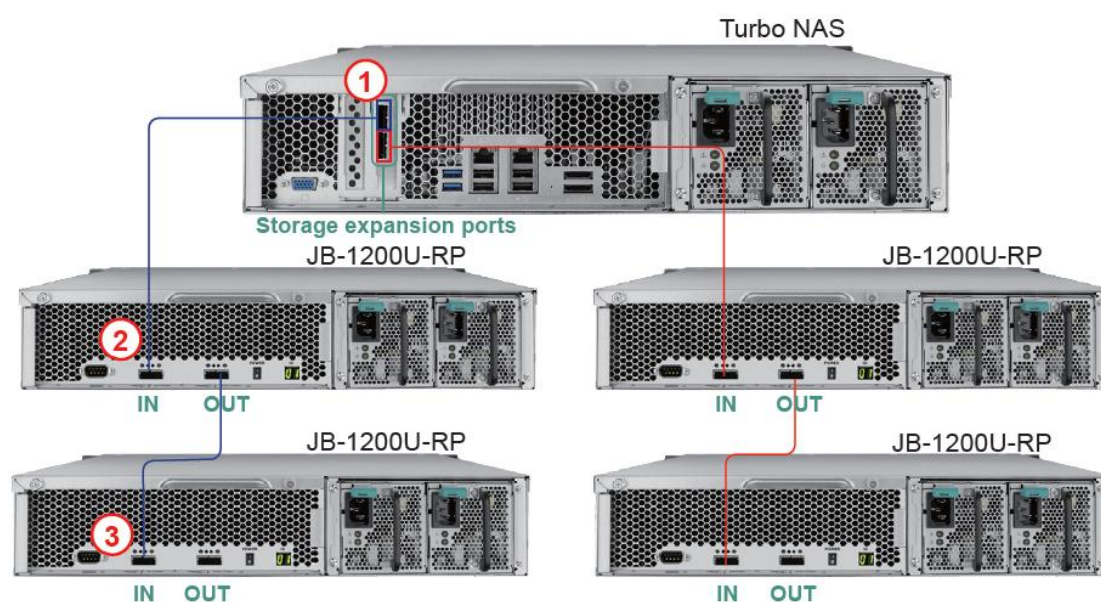
# Install and Configure

## Install QNAP RAID Expansion Enclosure

### Cabling the NAS and RAID expansion enclosure

An example of connecting a QNAP NAS to four RAID expansion enclosures is shown below.

Note: please refer to the QNAP RAID Expansion Enclosure hardware manual for more detailed instructions.



1	<b>Connect the QNAP NAS to the QNAP RAID Expansion Enclosure:</b> If two (or above) RAID expansion enclosures are configured, connect the two storage expansion ports on the NAS to two RAID expansions for maximized performance.
2	<b>Connect the QNAP NAS to the QNAP RAID Expansion Enclosure:</b> Connect the storage expansion port* on the QNAP NAS to the IN (●●) port of a RAID expansion using the external Mini SAS cable (SFF-8088).

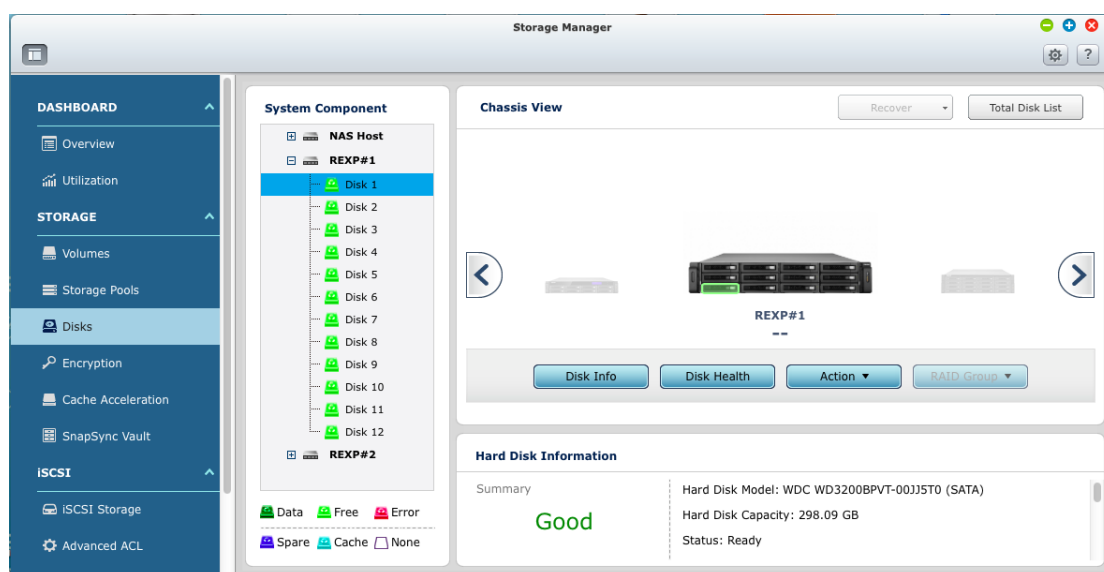
	(*Note: An optional storage expansion card may be required on the QNAP NAS.)
3	<b>Connect the QNAP RAID Expansion Enclosure to another RAID Expansion Enclosure:</b> Connect a Mini SAS cable (SFF-8088) from the OUT (◆◆) port of the RAID expansion to the IN (●●) port of another RAID expansion.



**Caution:** Do not connect an OUT port (◆◆) to another OUT port (◆◆) or an IN port (●●) to another IN port (●●).

### Check if the RAID Expansion Enclosure is installed successfully

1. Login to the Turbo NAS with administrator privileges
2. Go to **Storage Manager > Storage > Disks** and select REXP# to check if the enclosures and disks are already installed.

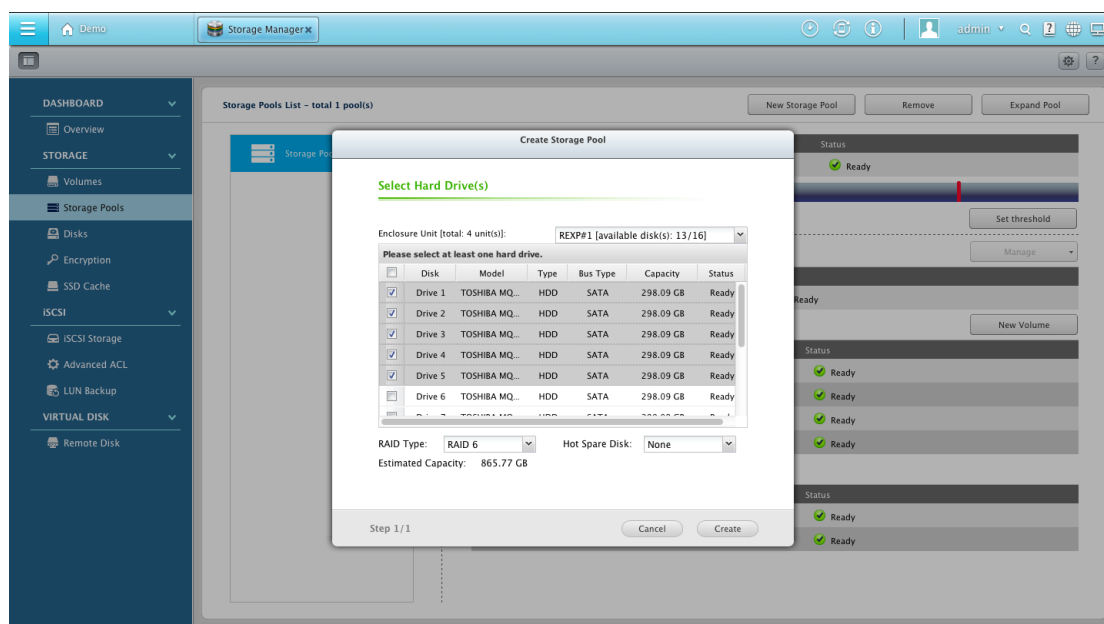


# Create a new storage pool on RAID

## Expansion Enclosure

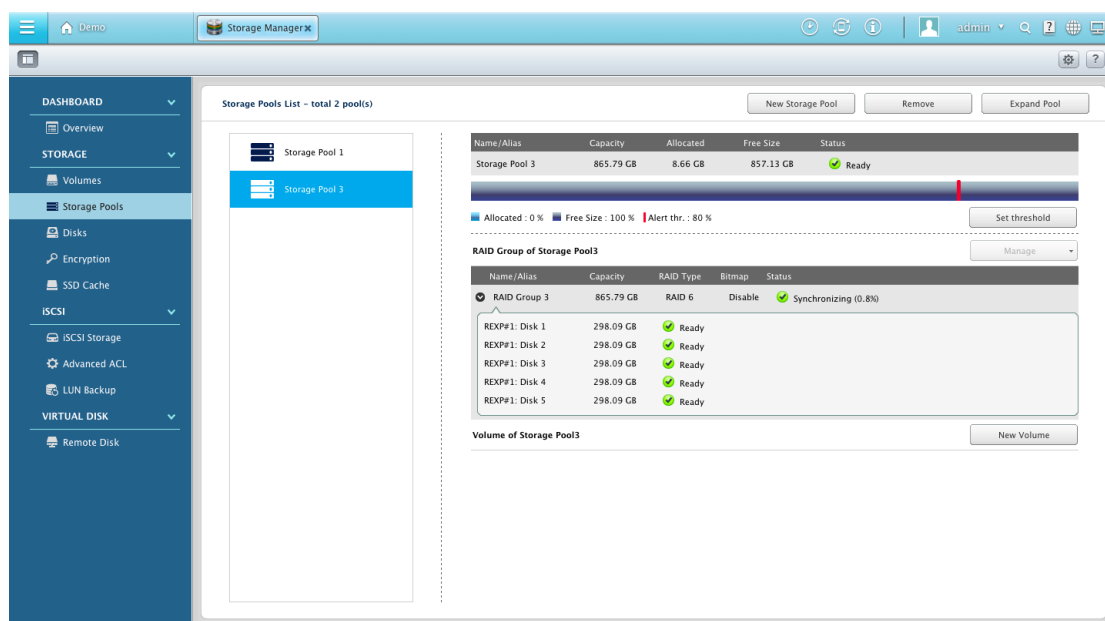
Except as storage expansion capacity, user can create a separate storage pool and volume on the RAID expansion enclosure.

1. Login to the Turbo NAS with administrator privileges.
2. Go to **Storage Manager > Storage Pool**, and click **New Storage Pool** to open the storage creation window. Select the enclosure and hard drives to add to the new storage pool and select a proper RAID type.



3. Click **Create**, and a new storage pool will be created. Please note that the data on selected hard drives will be cleared.



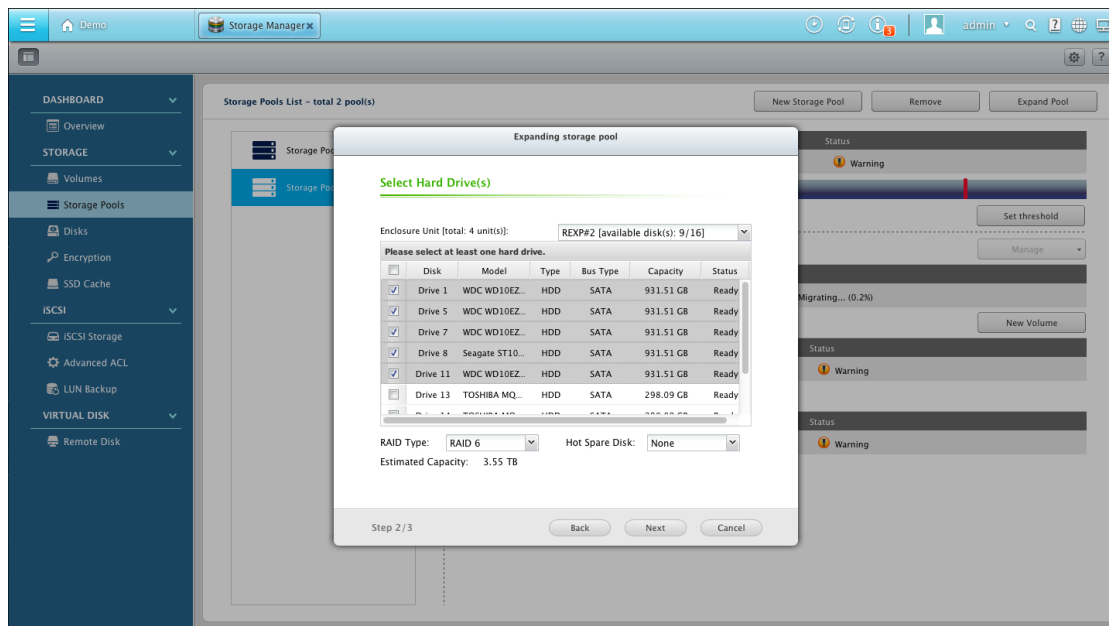


## Expand storage pool capacity online

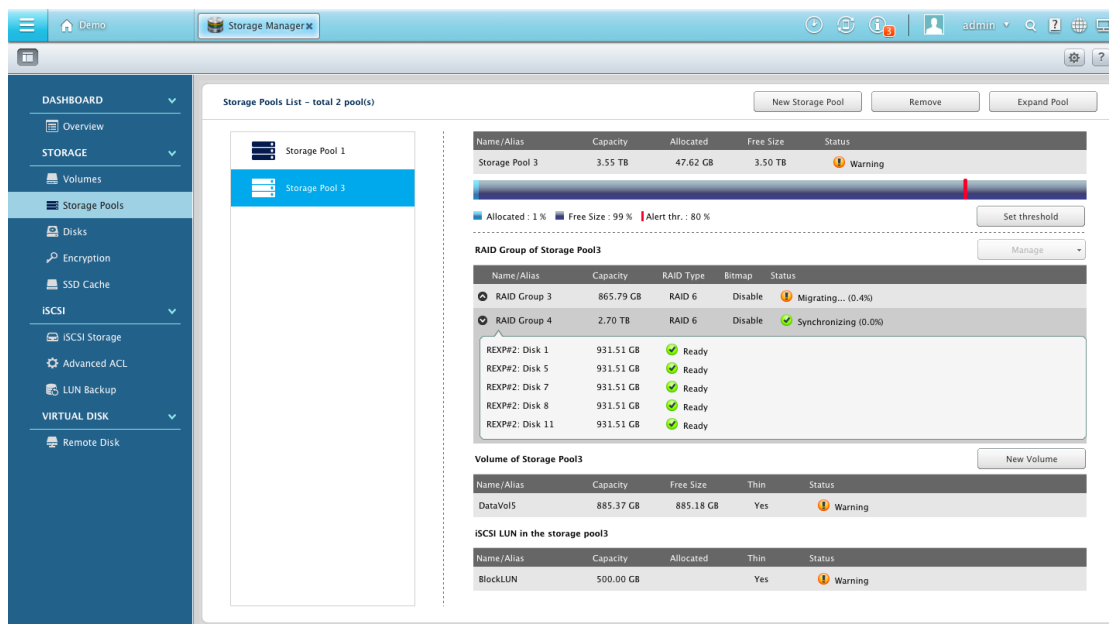
To expand the storage pool capacity, please refer to below:

### Create a new RAID group

1. Go to **Storage Manager > Storage Pool** and click **Expand Pool** to bring up the Storage Pool Expansion Wizard.
2. Select **Create a new RAID group** and click **Next**.
3. Select an enclosure and hard drives to be added to the RAID group and click **Next**.

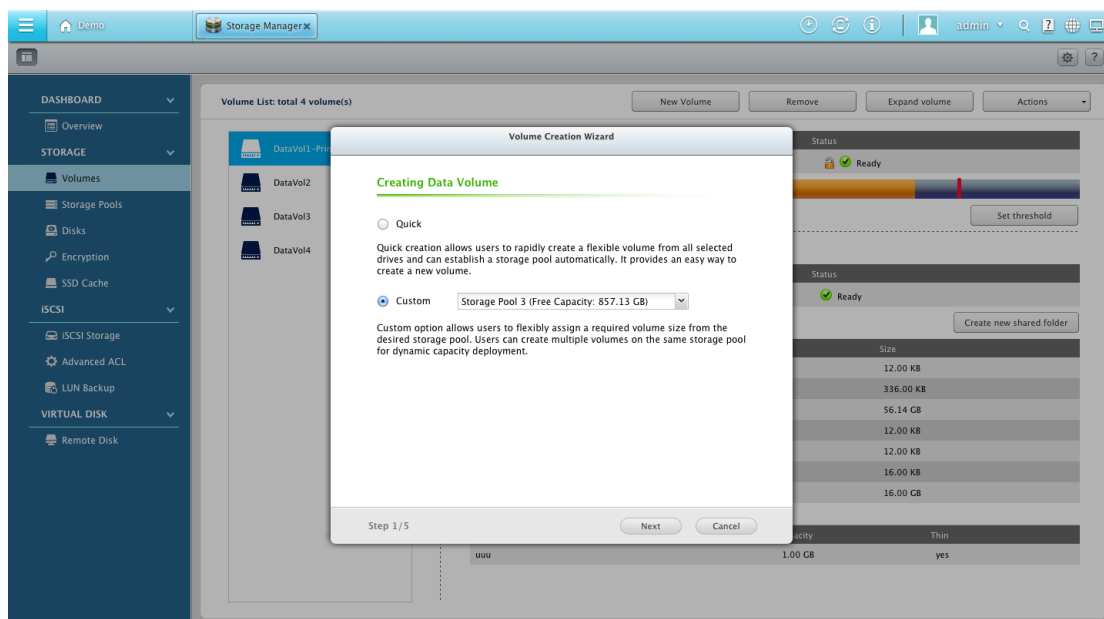


4. Preview settings in the confirmation page and click **Expand** to finish.



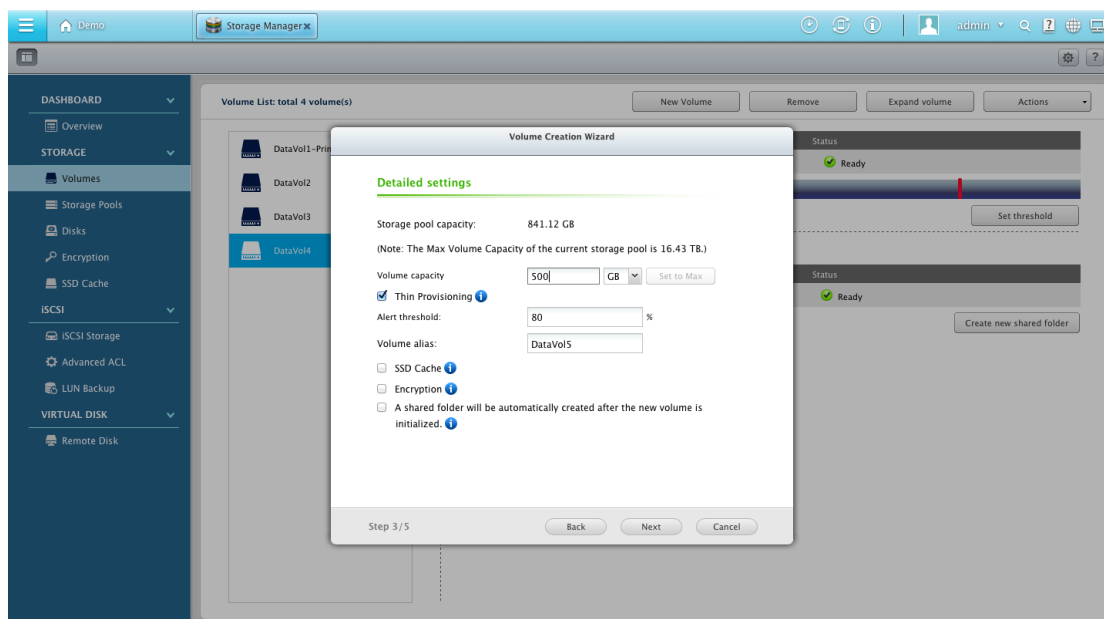
## Create a new volume

1. Go to **Storage Manager > Volume** and click **New Volume** to bring up the Volume Creation Wizard.



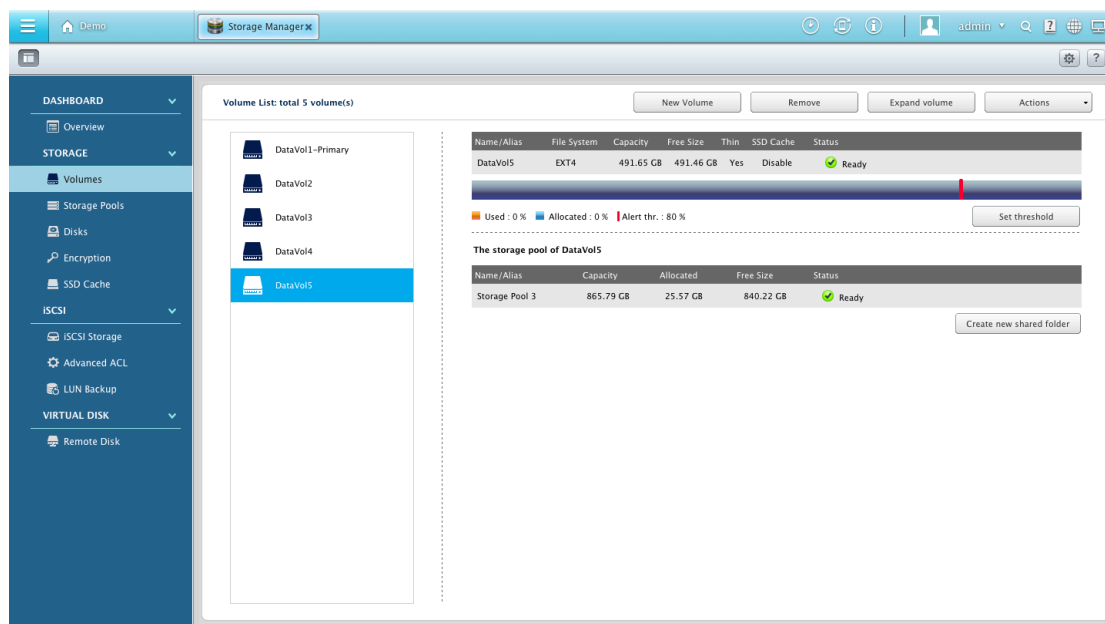
2. Select **Quick** or **Custom**. In this example, we will use the newly created storage pool. So, select **Custom** and the name of the storage pool and click **Next**.

3. Specify the volume capacity and the rest of the options and click **Next**.



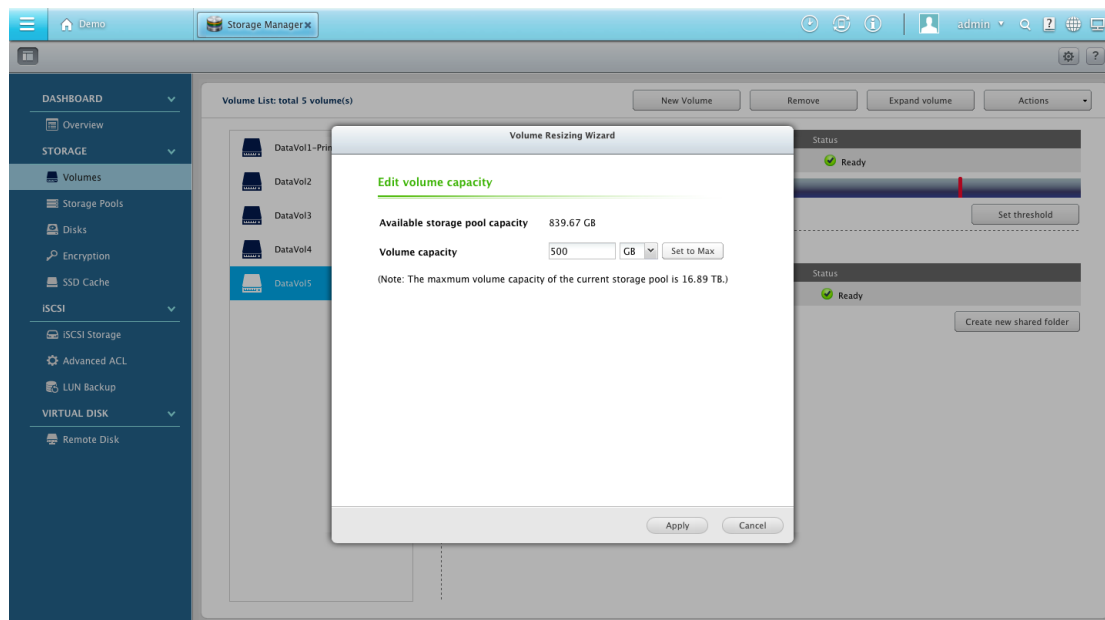
4. Review all settings in the confirmation page and click **Next**.

5. A new volume is created.

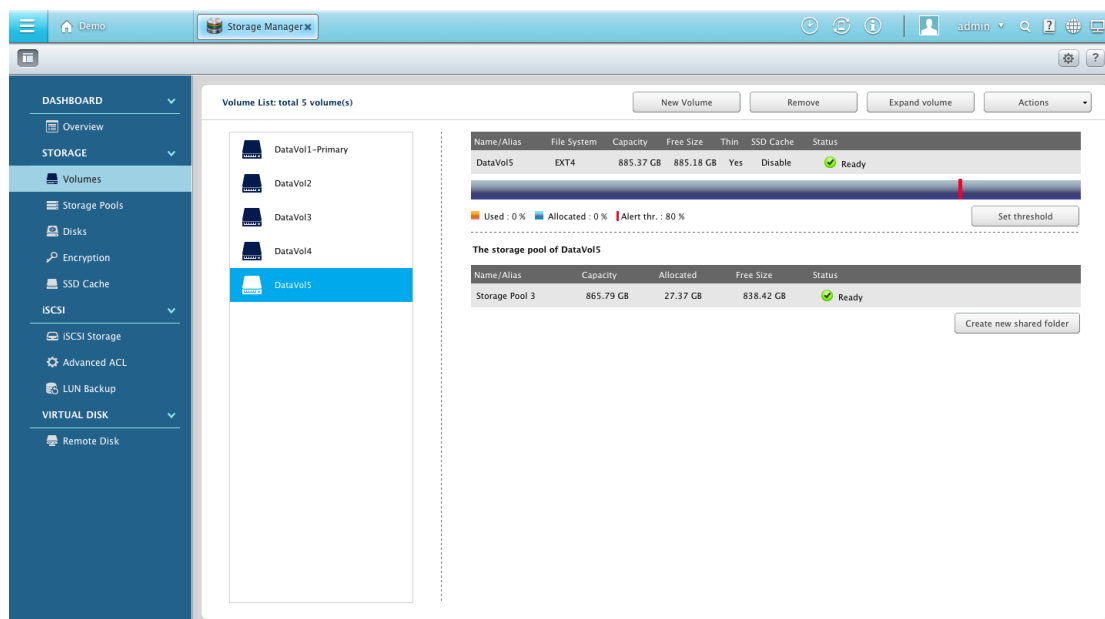


## Expand volume capacity online

1. Go to **Storage Manager > Volume** and click **Expand volume** to bring up the Volume Resizing Wizard.



2. Specify the size of the new capacity.
3. Click **Apply** to expand the volume capacity.



## Summary

QNAP RAID expansion enclosures and flexible volume management provides a flexible, plug-and-use, and economic storage expansion solution for data-hungry businesses. This flexibility also means that businesses do not have to make large investments at initial setup, and can flexibly expand their storage capacity to meet future requirements and/or budget.. Providing a potential raw capacity of up to 400TB, QNAP RAID expansion enclosures also provide a great solution for storing big data.

## Reference

How to use QNAP Flexible Volume Management

<http://www.qnap.com/en/index.php?lang=en&sn=9384>

RAID Expansion Enclosure Hardware Manual

[http://us1.qnap.com/Storage/Manual/RAID\\_Expansion\\_Enclosure\\_Hardware\\_Manual\\_ENG\\_20120705.pdf](http://us1.qnap.com/Storage/Manual/RAID_Expansion_Enclosure_Hardware_Manual_ENG_20120705.pdf)

## Technical Support

QNAP provides dedicated online support and customer service via instant messenger.

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