

Volume Expansion User Guide

Important Notice:

The Volume Expansion Members must have volume created by its own management tool. On the other hand, volume has created from standard system RAID volume creation is unable to join Volume Expansion Group.

With ThecusOS™ 5.0, one of the greatest feature is Dynamic Volume Expansion. With Volume expansion, the user has the choice to expand its storage capacity whenever required. A total of 8 physical volumes can be added for expansion and become on large logical volume to be managed under one system only.

To start with volume expansion, in the user UI, go to the **Storage** menu, choose the **Volume Expansion Management** item and the **Volume Expansion Management** screen appears. From here, you can see 2 major categories, **"Expansion Management"** and **"Expansion Member Creation"**.

Expansion Management: This is going to manage the joined volume members.

Expansion Member Creation: This one is to create a volume member from the current system. Each system is only allowed to create one volume member.

The volume expansion is only supported with 10G NIC, installed and connected. If no 10G NIC is found, the message below will appear.



NOTE

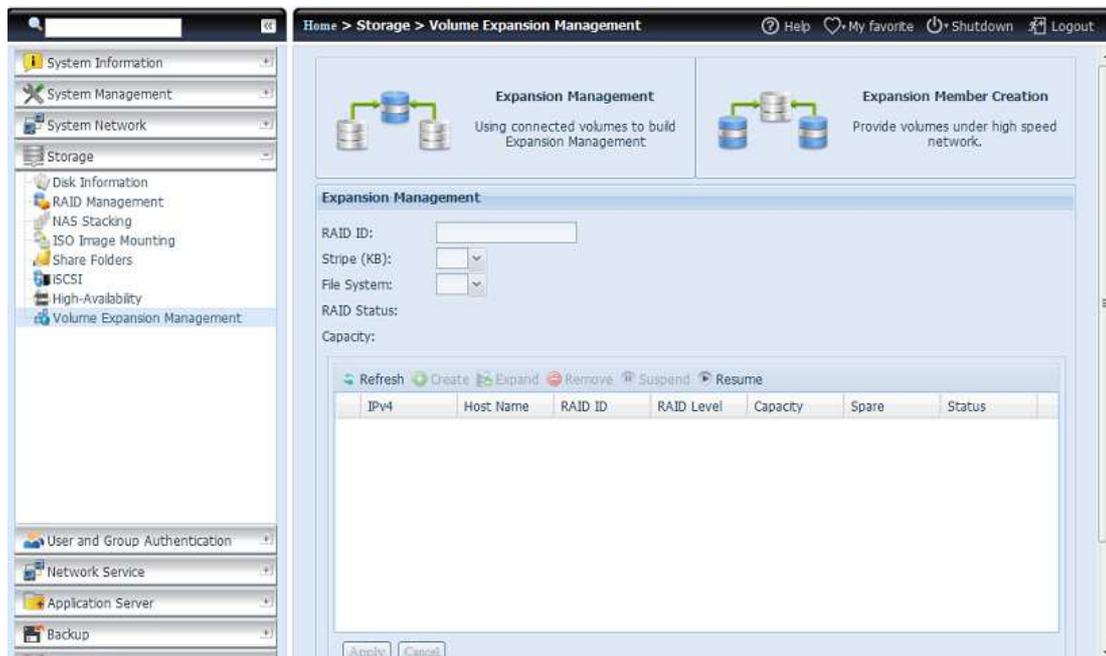
Volume expansion requires 10G environment to work. It could be either connected through a 10G switch or connected as peer to peer in between systems. The total of members that can be created in a volume expansion group is 8.

NOTE

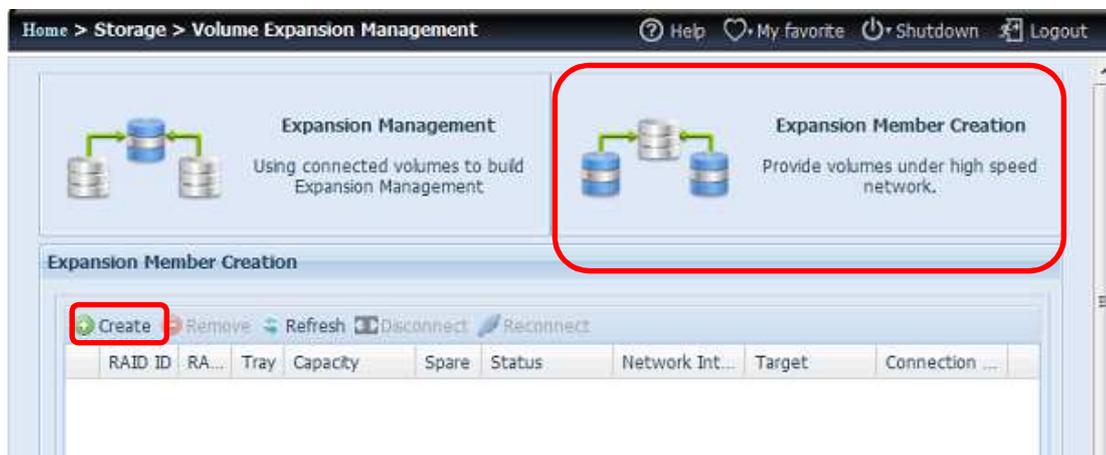
Volume expansion with a single additional system contains 2 elements: "Expansion Management" and "Expansion Member Creation". It is not necessary to have a member belonging to the system which manages the volume expansion group.

Expansion Member Creation

If your 10GbE is installed and connected then let's start with volume member creation.

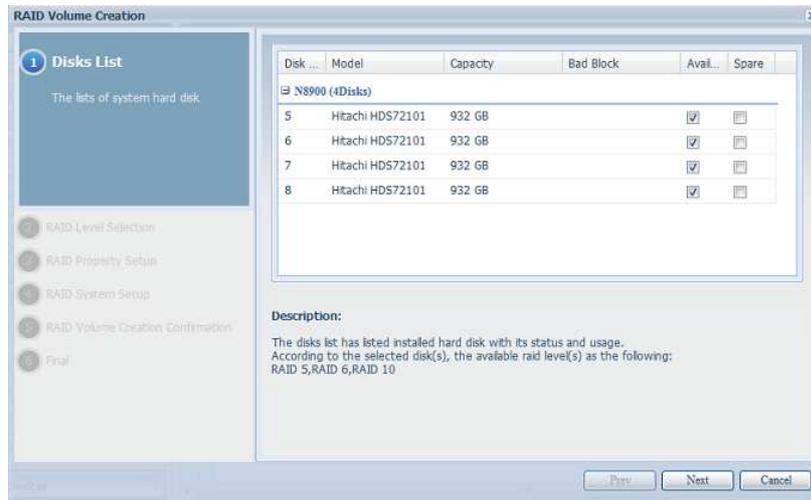


Click on "Expansion Member Creation", and then select "Create" to start.

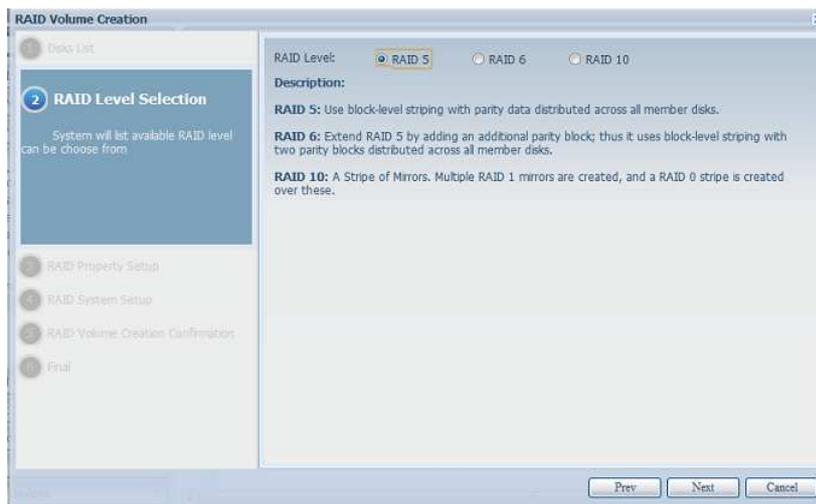


The volume creation wizard appears and leads you to complete the volume creation.

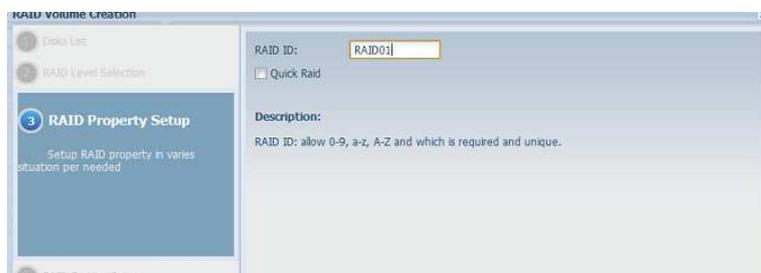
1. Select the available disks from the system. Please be notified that the volume has to be RAID5, RAID6, RAID10, RAID50 or RAID60.



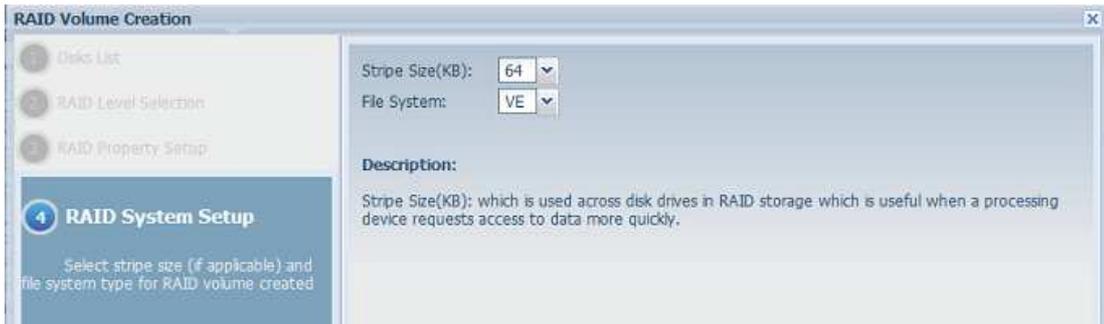
2. Choose the desired RAID mode from the available RAID type.



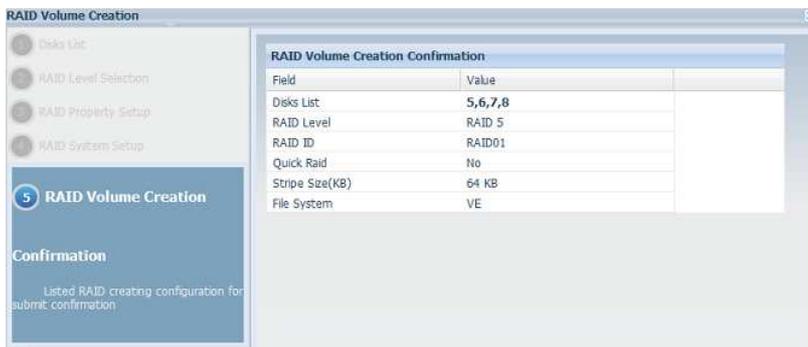
3. Give a name to the RAID ID.



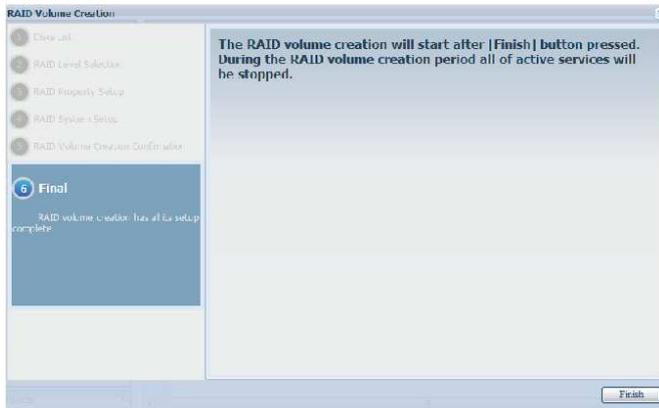
4. Specify the stripe size. The file system is "VE" as default and can't be changed.



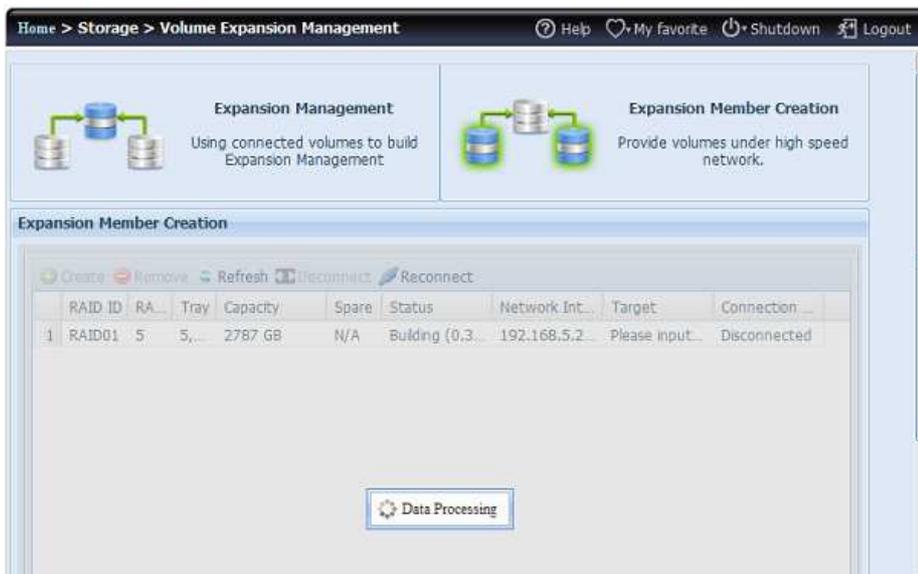
5. After confirmation, the RAID volume settings information will appear.



6. Click finish to confirm the RAID volume creation.



7. Volume creation is started. It may take a few hours depending on the HDD capacity.



8. After volume creation is completed, the volume will be listed as below and ready to join as a member on the volume expansion group.



Now, we have successfully created a volume expansion member. This will be our sample unit 1, WAN/LAN1 IP 172.16.64.191, 10G NIC IP 192.168.5.254 and RAID5.

Since the volume expansion function only works in a 10G environment, a 10G IP will be needed as a key to manage the volume expansion group.



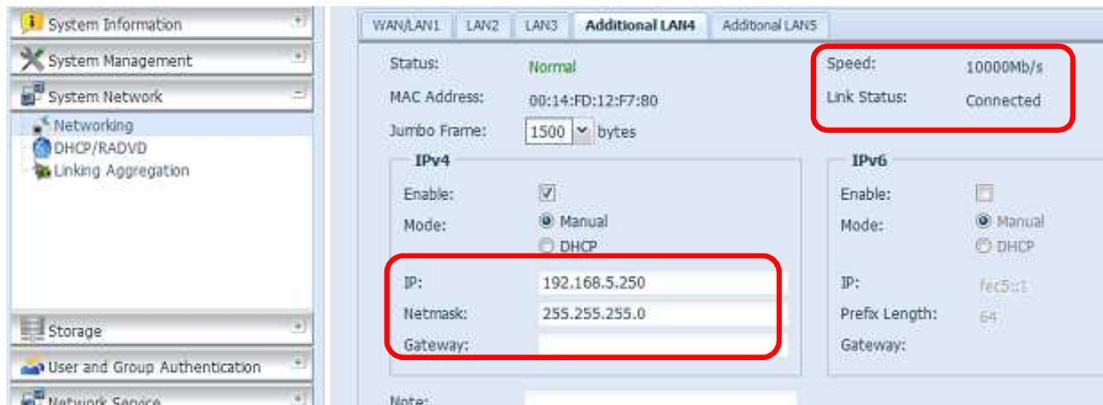
Our sample unit 2 is WAN/LAN1 IP 172.16.66.111, 10G NIC IP 192.168.5.250 and the volume used for volume expansion is created in RAID10.



Volume Expansion Management

Since the volume expansion function only works in a 10G environment, a 10G IP will be needed as a key to manage the volume expansion group. Let's use our

sample unit 2 with 10G IP 192.168.5.250 to manage the volume expansion group. The screen shot below shows the installed and connected 10G NIC with the IP 192.168.5.250.

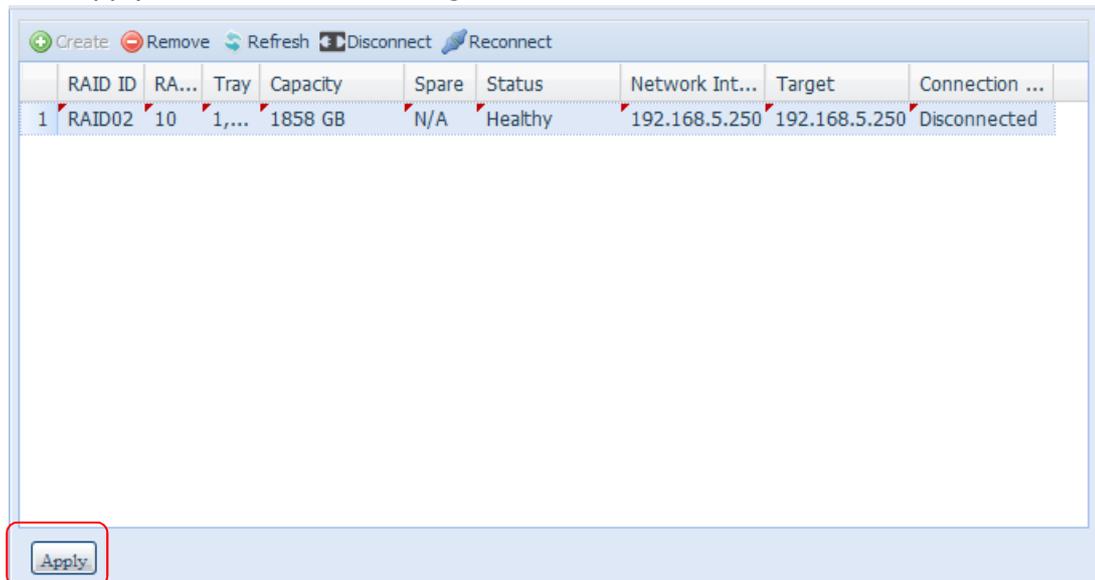


Let's add a 1st expansion volume group member. From the expansion volume created, fill in the "Target" IP address "192.168.5.250". It means that this expansion volume is going to join the associated volume group.

Please make sure that the joined member has the same network subnet.



Press "Apply" to confirm the setting.



After confirmation, the connection status will change from "Disconnected" to "Connected".

Expansion Management
Using connected volumes to build Expansion Management

Expansion Member Creation
Provide volumes under high speed network.

Expansion Member Creation

	RAID ID	RA...	Tray	Capacity	Spare	Status	Network Int...	Target	Connection ...
1	RAID02	10	1,...	1858 GB	N/A	Healthy	192.168.5.250	192.168.5.250	Connected

Go to the "Expansion Management" screen, click on "Create", a member is ready to be joined.

Expansion Management
Using connected volumes to build Expansion Management

Expansion Member Creation
Provide volumes under high speed network.

Expansion Management

RAID ID:

Stripe (KB):

File System:

RAID Status:

Capacity:

IPv4	Host Name	RAID ID	RAID Level	Capacity	Spare	Status

Expansion Management
Using connected volumes to build Expansion Management

Expansion Member Creation
Provide volumes under high speed network.

Expansion Management

RAID ID:

Stripe (KB):

File System:

RAID Status:

Capacity:

IPv4	Host Name	RAID ID	RAID Level	Capacity	Spare	Status	
1	192.168.5.250	N8900	RAID02	10	1858 GB	N/A	Healthy

Next, input the RAID ID (We used "ve01" as our example) and select the member to be joined by clicking on it. Confirm by pressing "Apply" to complete the Volume Expansion creation.

RAID ID:

Stripe (KB):

File System:

RAID Status:

Capacity:

	IPv4	Host Name	RAID ID	RAID Level	Capacity	Spare	Status
1	192.168.5.250	N8900	RAID02	10	1858 GB	N/A	Healthy

After the volume expansion management has successfully created and a member joined, then the VE volume "ve01" will display the information as shown below. The volume size is noted to be 1855.2GB with an Healthy RAID. The joined member is listed with information about its capacity and status.

Expansion Management
Using connected volumes to build Expansion Management

Expansion Member Creation
Provide volumes under high speed network.

Expansion Management

RAID ID:

Stripe (KB):

File System:

RAID Status: **Healthy**

Capacity: 1855.2 GB

■ Used
■ Unused

	IPv4	Host Name	RAID ID	RAID Level	Capacity	Spare	Status
1	192.168.5.250	N8900	RAID02	10	1858 GB	N/A	Healthy

Now let's add more members to the volume "ve01". Let's take our sample unit 1 and add the created volume from it. Please follow the procedure below.

Select the created VE volume from the system.

Expansion Management
Using connected volumes to build Expansion Management

Expansion Member Creation
Provide volumes under high speed network.

Expansion Member Creation

Create Remove Refresh Disconnect Reconnect

	RAID ID	RA...	Tray	Capacity	Spare	Status	Network Int...	Target	Connection ...
1	RAID01	5	5,...	2787 GB	N/A	Healthy	192.168.5.254	Please input ...	Disconnected

Input the "Target" IP address for which VE volume this unit is going to join. Click on "Please input...."

Expansion Member Creation

Create Remove Refresh Disconnect Reconnect

	RAID ID	RA...	Tray	Capacity	Spare	Status	Network Int...	Target	Connection ...
1	RAID01	5	5,...	2787 GB	N/A	Healthy	192.168.5.254		Disconnected

In this case, this unit is going to join the "ve01" which the IP is 192.168.5.250. So simply input 192.168.5.250, then click "Apply" to confirm.

Expansion Management

Expansion Member Creation

Expansion Member Creation

Create Remove Refresh Disconnect Reconnect

	RAID ID	RA...	Tray	Capacity	Spare	Status	Network Int...	Target	Connection ...
1	RAID01	5	5,...	2787 GB	N/A	Healthy	192.168.5.254	192.168.5.250	Disconnected

After confirmation, the status will be changed from "Disconnected" to "Connected"

Expansion Member Creation

Create Remove Refresh Disconnect Reconnect

	RAID ID	RA...	Tray	Capacity	Spare	Status	Network Int...	Target	Connection ...
1	RAID01	5	5,...	2787 GB	N/A	Healthy	192.168.5.254	192.168.5.250	Connected

Now, go back to the system 192.168.5.250 which is our volume expansion management unit and open the volume expansion management page, click on "Expand". The available volume which can be joined as a member will be listed.

As shown in the screen shot below, it is listed that there is a VE volume from the system N8900pm (sample unit 1) available. This is the VE volume that was just generated to join "ve01", this unit IP address is 192.168.5.254.

The screenshot shows the 'Expansion Management' interface. It includes fields for RAID ID (ve01), Stripe (KB) (64), File System (XFS), RAID Status (Healthy), and Capacity (1855.2 GB). A pie chart shows 100% unused space. Below are control buttons: Refresh, Create, Expand, Remove, Suspend, and Resume. A table lists the RAID members:

	IPv4	Host Name	RAID ID	RAID Level	Capacity	Spare	Status
1	192.168.5.254	N8900pm	RAID01	5	2787 GB	N/A	Healthy

Click "Apply" to confirm and the display will be as shown in the screen shot below.

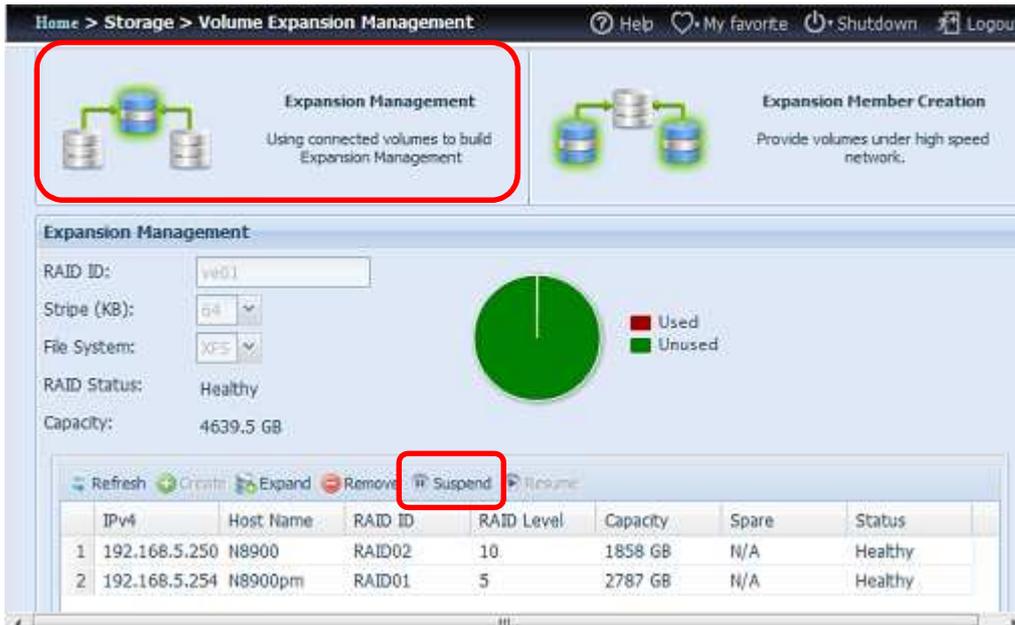
The volume expansion has successfully expanded its size from 1855.2GB to 4639.5GB. The volume expansion group ve01 now contains 2 members (2 units).

The screenshot shows the 'Volume Expansion Management' interface. It includes fields for RAID ID (ve01), Stripe (KB) (64), File System (XFS), RAID Status (Healthy), and Capacity (4639.5 GB). A pie chart shows 100% unused space. Below are control buttons: Refresh, Create, Expand, Remove, Suspend, and Resume. A table lists the RAID members, with the first two rows highlighted by a red box:

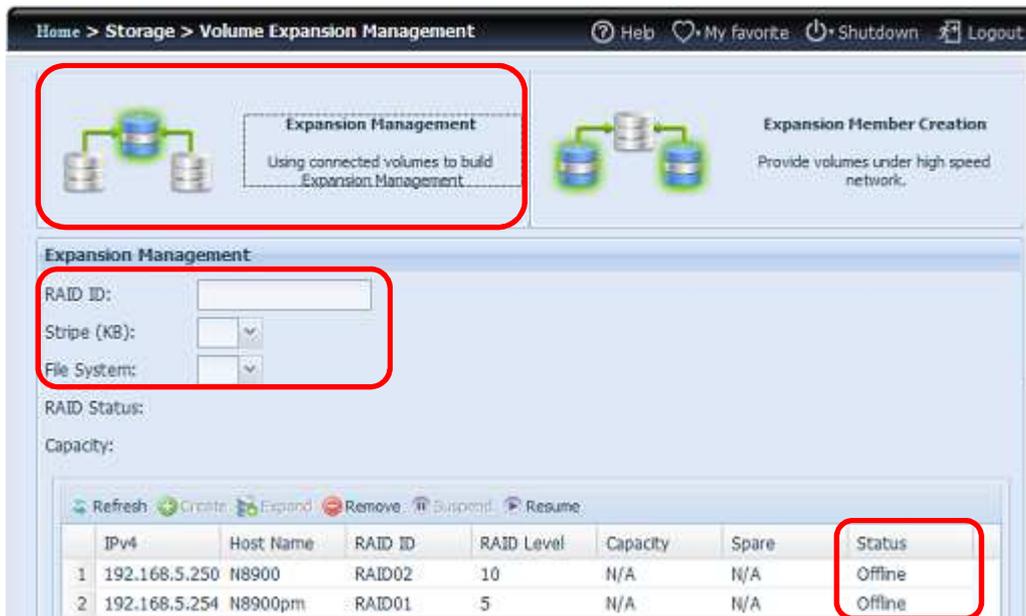
	IPv4	Host Name	RAID ID	RAID Level	Capacity	Spare	Status
1	192.168.5.250	N8900	RAID02	10	1858 GB	N/A	Healthy
2	192.168.5.254	N8900pm	RAID01	5	2787 GB	N/A	Healthy

Suspend Volume Expansion

If for any reason, the volume expansion volume needs to be stopped, simply click "Suspend".



Once "Suspend" is clicked, all of its members will become offline and the VE RAID info will become blank.



The members will also be shown as "Disconnected" after the volume is suspended.



At this point, all of the joined members are off-line and their data is inaccessible.

Resume Volume Expansion

To resume the volume expansion volume, there are two ways.

1. Click on "Resume" and the system will automatically reconnect to the members every 5 minutes. If all its members can be reconnected, then the volume will resume.

Please click on "Refresh" if the information does not show in time.

Expansion Management

RAID ID: ye01

Stripe (KB): 64

File System: XFS

RAID Status: Healthy

Capacity: 4639.5 GB

Refresh Create Expand Remove Suspend Resume

	IPv4	Host Name	RAID ID	RAID Level	Capacity	Spare	Status
1	192.168.5.250	N8900	RAID02	10	1858 GB	N/A	Healthy
2	192.168.5.254	N8900pm	RAID01	5	2787 GB	N/A	Healthy

2. Click on "Resume" then manually go to each member and click on "Reconnect".

Expansion Member Creation

Create Remove Refresh Disconnect Reconnect

	RAID ID	RA...	Tray	Capacity	Spare	Status	Network Int...	Target	Connection ...
1	RAID02	10	8,...	1858 GB	N/A	Healthy	192.168.5.250	192.168.5.250	Disconnected

Expansion Member Creation

Create Remove Refresh Disconnect Reconnect

	RAID ID	RA...	Tray	Capacity	Spare	Status	Network Int...	Target	Connection ...
1	RAID01	5	5,...	2787 GB	N/A	Healthy	192.168.5.254	192.168.5.250	Disconnected

The volume expansion is back and ready to perform.

Expansion Management

Using connected volumes to build Expansion Management.

Expansion Member Creation

Provide volumes under high speed network.

Expansion Management:

RAID ID: ye01

Stripe (KB): 64

File System: XFS

RAID Status: Healthy

Capacity: 4639.5 GB

Refresh Create Expand Remove Suspend Resume

	IPv4	Host Name	RAID ID	RAID Level	Capacity	Spare	Status
1	192.168.5.250	N8900	RAID02	10	1858 GB	N/A	Healthy
2	192.168.5.254	N8900pm	RAID01	5	2787 GB	N/A	Healthy