

Scale-Out Functionality User Guide

Important Notes:

- 1. The Client mode is the default mode.
- 2. Once the system has enabled the server role of the Scale-Out function, all other services will be stopped.
- 3. It is recommend to use only identical HDD models in one NAS
- 4. If Auto Management is enabled, please ensure that the standby brick volume's size is equal or greater than the size of the damaged volume
- 5. It is recommended to use at least two Scale-Out systems to avoid a single point of failure.
- 6. Resetting a Scale-Out server will erase all data.
- 7. "Brick" means storage volume in the context of this manual, e.g. a formatted HDD or a RAID 1, etc.
- 8. Even though, theoretically a scale out compound can be realized over the internet with the use of VPNs, we recommend the usage in a local network environment with at least one Gigabit of bandwidth.

Table of Contents

General Explanation of Scale Out	3
First Steps and Scale-Out Client Role	3
Enabling Scale-Out Server Role	5
Storage Pool	6
Volumes	10
Volume Expansion and Repairing	15
Auto Management	18
Stop Scale-Out	18
Reset Scale-Out	19
Create Scale-Out Shared Folder	19
Support	22

General Explanation of Scale Out

The Scale-Out function allows volume capacity being expanded dynamically through connecting numerous independent Thecus NAS systems in the same network subnet. The most remarkable advantage concerning the Thecus Scale-Out function is that the expansion impact is minimal. Added capacity will be seamlessly integrated into the network storage, the data will be automatically redistributed to the new storage capacity and even single disks in existing NAS can be added to the scale out compound easily.

Also, since the data is distributed across devices, RAID system's redundancy becomes obsolete in many applications as the Scale-Out system offers redundancy (with the number of copies being selectable) across devices with the added advantage that data would be still accessible, even if a whole NAS unit becomes unavailable.

Scale-Out relies on a client-server architecture and is usually requires at least two Thecus NAS systems. One acts as a client and the other one as server.

To understand better how Scale-Out works and learn how to easily set it up, let's systematically go through the steps below.

The Scale-Out function can be found under the "Storage" category in the "Setting" Panel.

First Steps and Scale-Out Client Role

In this example, the Thecus N2810, N5810PRO and N12910SAS will be used for the setting steps and actual usage. The N5810PRO will serve as the Scale-Out client and the other 2 units will act as Scale-Out servers.

To become the Scale-Out server, the user must have created a volume, which can be a RAID over several disks or a single disk classified as a JBOD (these creation functions are listed together in the RAID menu of the OS). The (RAID) volume can be created by following the standard creation procedure (please refer to the user manual) or by enabling "Auto Management", located in the advanced settings. For this sample unit we had a volume created before. Below you can find a screenshot of the RAID creation menu showing the volume status, which is a JBOD over two disks in our example case.

Setting Panel	
Q Function Search	
Control	•
Privilege	•
Storage	
🖫 Disk & Raid	
iscsi	
🗐 ISO Mount	
🍗 Disk Clone and Wipe	
Scale Out	
Services	•
Backup	

Setting Panel									— — ×
Q Function Search		RAID Dis	k Spin Dov	vn Disl	k Security				
Control	. *	Create							
Privilege	*	RAID Name	Statue	Laval	Diek	Capacity	Ella S	ESCK Time	ESCK St
Storage		Posito Ivallie	Status	L'OYCI	Disk	Gapacity	File o	rook line	POOK OF
😳 Disk & Raid		1N2810scV1	Healthy	JBOD	1	0.00% 0.03GB/1859.59GB	xfs		
iscsi		1N2810scV2	Healthy	JBOD	2	0.00% 0.03GB/928.55GB	xfs		
ISO Mount		\square							

The system IP address is needed to let the Scale-Out client connect, so we have listed the system/s IP address. The example system IP for this unit is 172.16.65.143.



Now, we can continue to set the Scale-Out functional role for this candidate. The Scale-Out functions can be found under the "Storage" category. Click on Scale-Out and the settings screen will appear as below. The default role of Scale-Out is client mode.

Setting Panel		- = ×	- desire
Q Function Search	Scale Out Settings	a	201111
Log & Notification Power & Hardware System Information	Scale Out Settings Status Deactivate	ed	
Network	Role Client		
Regional Option External Device Monitor Firmware Setting	Sync E-mail Notification Sync E-m Start Scale Out Reset Scale Out	nail Notification Setting 2	
Privilege v	Description		
Storage A Disk & Raid SCSI SO Mount Disk Open and Million	 Scale Out provides horizontal storage expansion. Its st designated a NAS to be a peer, a RAID as a brick, and m Up", "Scale Out" provides the convenience to perform exp 2. After activate Scale Out NAS role will be server, server create Storage space(Volume). 	structure consists of "peer", "brick" and "volume". We have nultiple bricks to form a volume. Compared to traditional "Scale (pansion and repair while keeping NAS services running. r can add NAS(peer) to cluster, user RAID(brick) on NAS to	
Scale Out	 If you want to access file with Volume, you have to creat IP and volume name After mount success you can access this NAS role is client. 	ate share folder and pick mount volume option then input Server ss volume via share folder. When Scale Out status is 'deactivate'	
陈调	1		

Enabling Scale-Out Server Role

The default mode of Scale-Out is client mode. To select a server role, please input a password in "Cluster Password". Then click on the "Start Scale-Out" button. This cluster password is going to be used for the scale our server members to know each other and distinguish it from other Scale-Out groups.

Once the Scale-Out server role has been created, the system will log out automatically. Please login again and since the Scale-Out server has been enabled, you will notice that many functions have been disabled, such as iSCSI, samba, afp ftp, etc. Now, when go to the Scale-Out settings page, you will notice that the status of Scale-Out will have been set to the "Server" role.

Setting Panel	- ¤ ×	admir
Q Function Search	Scale Out Settings Storage Pool Volumes Auto Management	aumi
Control	v	
Privilege	Scale Out Settings	
Storage	A Chakes A Wester	
I Disk & Raid	Status Activate	
🍃 Disk Clone and Wipe	Role Server	
Scale Out	Cluster Password	
Services	Sync E-mail Notification Sync E-mail Notification Setting 2	
Backup	Stop Scale Out Reset Scale Out	
	Description 1. Scale Out provides horizontal storage expansion. Its structure consists of "peer", "brick" and "volume". We have designated a NAS to be a peer, a RAID as a brick, and multiple bricks to form a volume. Compared to traditional "Scale Up", "Scale Out" provides the convenience to perform expansion and repair while keeping NAS services running. 2. After activate Scale Out NAS role will be server, server can add NAS(peer) to cluster, user RAID(brick) on NAS to create Storage space(Volume). 3. If you want to access file with Volume, you have to create share folder and pick mount volume option then input Server IP and volume name. After mount success you can access volume via share folder. When Scale Out status is 'deactivate' this NAS role is client.	

Other than then Scale-Out role being set to "Server", there are a few more tabs available for further settings.

Scale Out Settings	Storage Pool Volum	nes Auto Management	
Scale Out Sett	ings		
Status		Activato	
Role		Server	
Cluster Pas	sword	••••••	
Sync E-mai	I Notification	Sync E-mail Notification S	Setting ?
Stop Scal	e Out Reset Scale Out	t	

Storage Pool

"Storage Pool" is the tab that lists the available "Peers" for Scale-Out server members. The "Peers" can be seen as a single systems. In the "Peer" information section, we can see that there are two "Bricks" available; the "Brick" can be seen as a "Volume" count of the associated system; this sample unit has 2 volumes created. Look at the screenshot below for details.

Setting Panel										- 0	o ×
Q Function Search		Scale Out Settings	Storage Pool	Volumes	Auto Management						
Control	۷	Add Peer Remov	e Peer							Refr	resh
Privilege	٣	NAS Name		IP Addre	55	Ŧ	Brick Count	Ŧ	Status		T
Storage	*	N2810		172.16.6	5.143		2		Online		
Disk & Raid Disk Clone and Wipe											

To see more "Bricks" from other systems, click on "Add Peer", and the system will browse the local network and list all available "Peers" to choose from. See below for a sample list:

8	NAS Name	Ŧ	IP Address	NAS TYPE	Version T
	Saltor-N5550		172.16.64.179	N5550	3.01.00.develop.cdv
	N7770-10G		172.16.65.52	N7770-10G	3.01.00.develop
0	N5810PRO-Jordan		172.16.64.189	N5810PRO	3.01.00
0	N5810PRO		172.16.64.151	N5810PRO	3.01.00.develop
8	N5810PRO-Alan		172.16.65.51	N5810	3.01.00 develop
•	N12910SASp2		172.16.64.137	N12910SAS	3.01.00

Let's choose N12910SASp2, then click "Next" and the system will require the admin's password to gain the permission to add.

ise input admin	password to add peer		
x	IP Address	Admin Password	
	N129105A 5p2		

Input the admin's password of the associated system and then click the "Add" button.

Add Peer					× × admin
Add P Please inp	eer ut admin	password to add peer		Add Peer Add Peer Success	
	x	IP Address	Admin Password		
		N129105A Sp2 172.16.64.137	Add Peer Success		
				Finis	ch.

The system will start to communicate with the selected candidate and display a pop-up message once the operation has been completed. Since the system will need to enable the Scale Out role at candidate side, it may take a little while; therefore please be patient while the task is being completed.

Now the storage pool will have a new Peer that will join four additional bricks to the storage pool. Please see below.

Sc	ale Out Settings	Storage Pool	Volumes	Auto Management					
Ad	id Peer Remov								Refresh
\square	NAS Name	٢	IP Addre	ISS	т	Brick	Count 🍸	Status	т
•	N12910SASp2		172.16.6	34.137		4		Online	
+	N2810		172.16.6	35.143		2		Online	

NAS Name	T	IP Address	Ŧ	Brick Count	T	Status	
N12910SASp2		172.16.64.137		4		Online	
0000mm	No.	RAID Name	Status	Disk		Capacity	6
-	1	1N12910scV1	Healthy	6 IS		1.8 TB	
	2	1N12910scV2	Healthy	4		1.8 TB	
	з	1N12910scV3	Healthy	7		1.8 TB	
	4	1N12910scV4	Healthy	10		1.8 TB	
,	No	RAID Name	Status	Disk		Capacity	ċ
No. 1	1	1N2810scV1	Healthy	/ 1		1.8 TB	
	2	1N2810scV2	Healthy	2		928.5 GB	

Let's check where these bricks have come from. Login to the just added NAS (<u>http://172.16.64.137</u>) (only in this example, your IP will differ) and check the RAID volumes and you can find that the volumes have joined the list of our Scale-Out bricks.

Setting Panel								- = ×
Q Function Search	RAID D	isk Spi	n Down					
Control	Create							
Privilege .	AID N	Status	Level	Disk	Capacity	File S	ESCK Time	ESCK Status
Storage	in the second second	GIBIDS	Teac.	Dian.	Capacity	The day	Poore mile	rook status
📲 Disk & Raid	1N12910sc	Healthy	JBOD	1	0.00% 0.00GB / 1860.50GB	btrfs		
✓ SSD Cache	1N12910sc	Healthy	JBOD	4	0.00% 0.00GB/1860.50GB	btrfs		
🍃 Disk Clone and Wipe	1N12910sc	Healthy	JBOD	7	0.00% 0.00GB / 1860.50GB	btrfs		
Scale Out	1N12010ec	Healthy	IBOD	10	0.00% 0.00GB / 1980 50GB	hirfs		
Services	,	riceleft	0000		0.0010 0.000011000.0000		1.	
Destrue								

For the same Scale-Out server group, members will sync their settings periodically. As you can see, the first Scale-Out sample unit N2810@172.16.65.143 and the joined peer N12910SASp2@172.16.64.137 have the same 'Storage Pool' lists.

etting Panel								-	•
C Function Search	Scale Out Settings	Storage Pool	Volumes	Auto Management					
control 🗸	Add Pear Remo	va Paar						R	ofrach
rivilege 🔻	NAS Name	101001	ID Addre	100	-	Brick Count	• Status		-
orage 🔺	NAS Name		172.46	555	T	Blick Count	Online		7
🔋 Disk & Raid	N2810		172.16	55 143		2	Online		
Disk Clone and Wipe				50.110		-	onino		ノ
Scale Out									
0 172.16.64.13	7/admin/index.html	J				☆ 🚰	\$ 0	0 3	3
etting Panel								-	
C Function Search	Scale Out Settings	Storage Pool	Volumes	Auto Management	-				
ontrol									
rivilege .	Add Peer Remo							R	etres
itorage	NAS Name		IP Addr	ess	T	Brick Count	▼ Status		
Disk & Raid	▶ N2810		172.16.65.143			2 On		_	
SSD Cache	 N12910SASp2 		172.16	64.137		4	Online)	
Disk Clone and Wine									
Scale Out									
		<u> </u>							
	1 In	e System wi The selected	ll fail to 1 Peer is	add a Peer If:	ISP	d in			
NOTE				an cauy being	usc				
NOTE	oth	ner scale out	t server	group.					
NOTE	oth 2.1	ner scale ou The input ac	t server dmin pa	group. ssword is incori	ect				

To remove a "Peer" from Scale-Out server group, select the associated "Peer" then click the "Remove Peer" button, then confirm.

Add Peer Remove Peer							Refresh
NAS Name	T	IP Address	T	Brick Count	T	Status	7
N2810		172.16.65.143		2		Online	
N12910SASp2		172.16.64.137		4		Online	
[2000mm	No 1 2 3	RAID Name 1N12910scV1 1N12910scV2 1N12910scV3 1N12910scV3	Status Health Health Health	Disk y 1 y 4 y 7		Capacity 1860.5 GB 1860.5 GB 1860.5 GB	
	4	11129105014	Health	y 10		1800.5 GB	
NOTE		The Peer ca localhost le	nnot be vel.	removed if i	t is a	at the	

Volumes

After the "Peer" and "Brick" setup has been completed, now we can create a "Scale-Out Volume" for Scale-Out to connect with.

Add Scale-Out Volume:

The Scale-Out volume can be created in ANY Scale-Out server as long as it is in the same group. Let's take our Scale-Out server with the IP <u>http://172.16.65.143</u> (example) to create a first Scale-Out volume.

$\leftarrow \rightarrow$	C 🛆 🛈 172.16.65.	143/	′admin/in	dex.htm				루 ☆	G. 2	0 0	\$ 6	
-	Setting Panel										×	
-	Q Function Search	1	Scale Ou	t Settings	Storage Pool	Volumes	Auto Management					
-	Control 🗸		Add	dit Or	eration 👻							
1	Privilege		State	is V	olume Name	Canacity		Replica Brick C		Healt	h	
Dis	Storage											
	🔟 Disk & Raid											
	🍃 Disk Clone and Wipe											
	Scale Out											

Click on "Add" and the "General Settings" screen will appear as below:

Volume Name							
Replica		3 2		2			
Cache Size		32	\$	MB	*	(Minimum: 4MB) 2	
Write Behind Cache Size		1	\$	MB	٣	2	
IO Thread Count		16	ţ.	(Vali	d R	ange: 1~64) 2	
Hostname	т	Brick Path					T
Hostname	-	Brick Path					-
Hostname 172.16.64.137	Ŧ	Brick Path 172.16.64.	137:/glu	ster/10	b87	/e75-9cf3-4e60-a365-c96ae56c259a	T
Hostname 172.16.64.137 172.16.64.137	T	Brick Path 172.16.64 172.16.64	137./glu 137./glu	ster/10 ster/19	587 9d0	'e75-9cf3-4e60-a365-c96ae56c259a)16b-5548-4f15-a292-2476ec896764	τ ν ε/
Hostname 172.16.64.137 172.16.64.137 172.16.64.137	T	Brick Path 172.16.64 172.16.64 172.16.64	137./glu 137./glu 137./glu	ster/10 ster/19 ster/9e	587 9d0	/e75-9cf3-4e60-a365-c96ae56c259a 116b-5548-4f15-a292-2476ec89676e a61a-3e72-4411-b128-465954ed018	T 1/ 1/ 1/
Hostname 172.16.64.137 172.16.64.137 172.16.64.137 172.16.64.137	T	Brick Path 172.16.64, 172.16.64, 172.16.64, 172.16.64	137./glu 137./glu 137./glu 137./glu	ster/10 ster/19 ster/9e ster/9e	687 9d0 657:	'e75-9cf3-4e60-a365-c96ae56c259a 116b-5548-4f15-a292-2476ec89676e a61a-3e72-4411-b128-465954ed018 d76f-4cdd-4d7a-92ef-c911d4c592a6	T 1/ 1/ 1/
Hostname 172.16.64.137 172.16.64.137 172.16.64.137 172.16.64.137 172.16.64.137 172.16.65.143	т	Brick Path 172.16.64, 172.16.64, 172.16.64, 172.16.64, 172.16.65,	137./glu 137./glu 137./glu 137./glu 137./glu	ster/10 ster/19 ster/9e ster/9e ster/c3	687 9d0 67: acc	'e75-9cf3-4e60-a365-c96ae56c259a 116b-5548-4115-a292-2476ec89676e a61a-3e72-4411-b128-465954ed018 d76f-4cdd-4d7a-92ef-c911d4c592a6 3246-b52c-4a37-a039-8c46b08d2a4	T 4/ 5/ 83/ 1/ 1/2/
Hostname 172.16.64.137 172.16.64.137 172.16.64.137 172.16.65.137 172.16.65.143 172.16.65.143	T	Brick Path 172.16.64, 172.16.64, 172.16.64, 172.16.64, 172.16.65, 172.16.65,	137:/glu: 137:/glu: 137:/glu: 137:/glu: 143:/glu: 143:/glu:	ster/f0 ster/f9 ster/9e ster/9e ster/c9	687 9d0 9d0 9d0 9d0 9d0 9d0 9d0 9d0 9d0 9d0	'e75-9cf3-4e60-a365-c96ae56c259a 116b-5548-4f15-a292-2476ec89676e a61a-3e72-4411-b128-465954ed018 d76f-4cdd-4d7a-92ef-c911d4c592a6 3246-b52c-4a37-a039-8c46b08d2a4 857c-63ba-4c17-b60b-c5fe4a7f6c9b	T 4/ 83/ 1/ 1/2/ 1/
Hostname 172.16.64.137 172.16.64.137 172.16.64.137 172.16.64.137 172.16.65.143 172.16.65.143	T	Brick Path 172.16.64, 172.16.64, 172.16.64, 172.16.64, 172.16.65, 172.16.65,	137:/glu: 137:/glu: 137:/glu: 137:/glu: 143:/glu: 143:/glu:	ster/10 ster/19 ster/9e ster/c3 ster/c9	b87 9d0 eaco ea3	'e75-9cf3-4e60-a365-c96ae56c259a 116b-5548-4f15-a292-2476ec89676e a61a-3e72-4411-b128-465954ed018 d76f-4cdd-4d7a-92ef-c911d4c592a6 3246-b52c-4a37-a039-8c46b08d2a4 857c-63ba-4c17-b60b-c5fe4a7f8c9b	T 4/ 533/ 1/ 1/2/ 1/
Hostname 172.16.64.137 172.16.64.137 172.16.64.137 172.16.65.137 172.16.65.143 172.16.65.143	T	Brick Path 172.16.64, 172.16.64, 172.16.64, 172.16.64, 172.16.65, 172.16.65,	137./glu: 137./glu: 137./glu: 137./glu: 143./glu: 143./glu:	ster/10 ster/19 ster/9¢ ster/c3 ster/c9	587 9d0 9d0 9d0 9d0 9d0	'e75-9cf3-4e60-a365-c96ae56c259a 116b-5548-4115-a292-2476ec896764 a61a-3e72-4411-b128-465954ed018 d76f-4cdd-4d7a-92ef-c911d4c592a6 3246-b52c-4a37-a039-8c46b08d2a4 857c-63ba-4c17-b60b-c5fe4a7f8c9b	T 4/ 5/ 33/ 1/ 1/2/ 1/

Steps:

1. Input Volume Name: It is going to use this name to create the shared folder. Let's take "firstSCvolume" input as an example.

General Settings			
Volume Nam		firstSCvolume	
volume ivame	17	Insiscioniume	

2. Replica: This is the setting for how many data copies that are going to be created per volume group. The default value is 3. So from this example, the total bricks count is 6 (N2810 x2 and N12910SASp2 x4). If using the default value 3, then this volume will have 2 groups and each group having 3 data copies.



3. Cache size: Size of the read cache, default value is 32MB.

General Settings					
Volume Name		firstSCvolun	ne		
Replica		3		2	
Replica		3	v	-	
Cache Size	L	32	🛔 MB 🔻	(Minimum: 4MB)	2

4. Write Behind Cache Size: Size of the write-behind bufferDefault value is 1MB.



5. IO (Input/Output) Thread Count: Number of threads in IO threads translator which are concurrently performed at a given time, default value is 16.

General Settings	
Volume Name	firstSCvolume
Replica	3 2
Cache Size	32 MB v (Minimum: 4MB) <u>?</u>
Write Behind Cache Size	1 MB v 2
IO Thread Count	16 (Valid Range: 1~64) ?

There are available bricks listed for the associated Scale-Out server group.

Available	Bricks	ofcl	luster(healthy	and	degrade	RAID):
-----------	--------	------	----------------	-----	---------	--------

Hostname	T	Brick Path
172.16.64.137		172.16.64.137:/gluster/f0b87e75-9cf3-4e60-a365-c96ae56c259a/
172.16.64.137		172.16.64.137:/gluster/f99d016b-5548-4f15-a292-2476ec89676e/
172.16.64.137		172.16.64.137:/gluster/9eb7a61a-3e72-4411-b128-465954ed0183/
172.16.64.137		172.16.64.137:/gluster/9eacd76f-4cdd-4d7a-92ef-c911d4c592a6/
172.16.65.143		172.16.65.143:/gluster/c3ea3246-b52c-4a37-a039-8c46b08d2a42/
172.16.65.143		172.16.65.143:/gluster/c9e7857c-63ba-4c17-b60b-c5fe4a7f6c9b/

Click Apply to confirm the settings, then you will have your first Scale-Out volume created, please look at the screenshot below.

Add	d Edit	Operation -					Refres
	Status	Volume Name	Capac	ty	Replica	Brick C	Health
4	On	firstSCvolume		0.00% 67.87 MB / 2.72 TB	3	6	Normal
	Gr	Hostname	RAID Name	Brick Path			Status
	1 172.16.64.137 1N		1N1291	/gluster/f0b87e75-9cf3-4e60-a36 c96ae56c259a/firstSCvolume	Online		
	1	172.16.65.143	1N2810s	/gluster/c3ea3246-b52c-4a37-a0 8c46b08d2a42/firstSCvolume)39-		Online
	1	172.16.64.137	1N1291	/gluster/f99d016b-5548-4f15-a29 2476ec89676e/firstSCvolume		Online	
	2	172.16.65.143	1N2810s	/gluster/c9e7857c-63ba-4c17-b60b- c5fe4a7f6c9b/firstSCvolume			Online
	2 172.16.64.137 1N1		1N1291	/gluster/9eb7a61a-3e72-4411-b128- 465954ed0183/firstSCvolume			Online
	2	172.16.64.137	1N1291	/gluster/9eacd76f-4cdd-4d7a-92e c911d4c592a6/firstSCvolume	ef-		Online

This volume has 2 groups and each group contains three data copies.

NOTE

The system will allocate bricks to volume groups automatically. This cannot be assigned manually.

The Scale-Out volume capacity is optimized through thin-provisioning. Users can create as many Scale-Out volumes as needed.

Let's create the 2nd Scale-Out volume with the name "secondSCvolume" at replica level 2. Same steps as above have been taken as can be seen below.

First Scale-Out volume "firstSCvolume" in two groups, three data copies.

Status	Volume Name	Capad	tity	Replica	Brick C	Health
On	firstSCvolume		0.00% 67.93 MB / 2.72 TB	3	6	Normal
Gr	Hostname	RAID Name	Brick Path			Status
1	172.16.64.137	1N1291	/gluster/f0b87e75-9cf3-4e60-a36 c96ae56c259a/firstSCvolume	5-		Online
1	172.16.65.143	1N2810s	/gluster/c3ea3246-b52c-4a37-a0 8c46b08d2a42/firstSCvolume		Online	
1	172.16.64.137	1N1291	/gluster/f99d016b-5548-4f15-a29 2476ec89676e/firstSCvolume	92-		Online
2	172.16.65.143	1N2810s	/gluster/c9e7857c-63ba-4c17-b6 c5fe4a7f6c9b/firstSCvolume	Online		
2	172.16.64.137	1N1291	/gluster/9eb7a61a-3e72-4411-b128- 465954ed0183/firstSCvolume			Online
2	172.16.64.137	1N1291	/gluster/9eacd76f-4cdd-4d7a-92 c911d4c592a6/firstSCvolume	ef-		Online

Second Scale-Out volume "secondSCvolume" in three groups, two data copies.

Status	Volume Name Capac		ity	Replica	Brick C	Health		
On	firstSCvolume		0.00% 67.92 MB / 2.72 TB	3	6	Normal		
On	secondSCvolume	e	0.00% 68.74 MB / 4.54 TB	2	6	Normal		
Gr	Hostname	RAID Name	Brick Path			Status		
1	172.16.64.137	1N1291	/gluster/f0b87e75-9cf3-4e60-a36 c96ae56c259a/secondSCvolum	i5- e		Online		
1	172.16.65.143	1N2810s	/gluster/c3ea3246-b52c-4a37-a0 8c46b08d2a42/secondSCvolum	/gluster/c3ea3246-b52c-4a37-a039- 8c46b08d2a42/secondSCvolume				
2	172.16.64.137	1N1291	/gluster/f99d016b-5548-4f15-a29 2476ec89676e/secondSCvolum	92- e		Online		
2	172.16.65.143	1N2810s	/gluster/c9e7857c-63ba-4c17-b6 c5fe4a7f6c9b/secondSCvolume	0b-		Online		
3	172.16.64.137	1N1291	/gluster/9eb7a61a-3e72-4411-b1 465954ed0183/secondSCvolum	128- e		Online		
3	172.16.64.137	1N1291	/gluster/9eacd76f-4cdd-4d7a-92 c911d4c592a6/secondSCvolume	ef- e		Online		

Volume Expansion and Repairing

The great thing about Scale-Out is the capability of dynamic expansion. There is a tab on the menu bar named "Operation". Click on it and it will show options dedicated to global capacity expansion and repairing.

Sca	ale Out Sei	ttings	Storage Poo	Volume	2S	Auto Management					
Ad	d Edit	Ope	eration 👻								Refres
	Status	Exp	and Capacity		cit	ý	Re	plica	Brick C	Healt	h
4	On	Exp	and All Volume	es Capacity		0.00% 67.93 MB / 2.72 TB	3		6	Norm	al
		Rep	air								
	Gr	Rep	air All Volume	s Capacity Name		Brick Path				Sta	atus
	1	172.1	6.64.137	1N1291		/gluster/f0b87e75-9cf3-4e60-a c96ae56c259a/firstSCvolume	365-			On	line
	1	172.1	6.65.143	1N2810s		/gluster/c3ea3246-b52c-4a37- 8c46b08d2a42/firstSCvolume	a039-			On	line
	1	172.1	6.64.137	1N1291		/gluster/f99d016b-5548-4f15-al 2476ec89676e/firstSCvolume	292-			On	line
	2	172.1	6.65.143	1N2810s		/gluster/c9e7857c-63ba-4c17-t c5fe4a7f6c9b/firstSCvolume	060b-			On	line
	2	172.1	6.64.137	1N1291		/gluster/9eb7a61a-3e72-4411- 465954ed0183/firstSCvolume	b128-			On	line
	2	172.1	6.64.137	1N1291		/gluster/9eacd76f-4cdd-4d7a-9 c911d4c592a6/firstSCvolume	2ef-			On	line
•	On	sec	ondSCvolume			0.00% 68.75 MB / 4.54 TB	2		6	Norm	al

If the expansion is performed for a particular volume, select the associated volume and click on "Expand Capacity", then the system will auto check available bricks and proceed with the volume expansion. If it is required, expand capacity for all volumes by choosing "Expand All Volume Capacity".

Other than using available bricks to expand volume capacity, it can be used to repair damage in bricks. Following the same scenario as above, the user can select a particular one or perform the operation for all volumes.

In the example below, one bricks is damaged on Peer 172.16.65.143 and the system has detected the issue, the volume status will show that the Scale-Out volume is 'Abnormal" and also list the damaged brick.

d Edit	Operation -					Ref
Status	Volume Name	Capac	łły	Replica	Brick C	Health
On	firstSCvolume		0.00% 38.27 MB / 2789.5 GB	3		Abnormal
Gro	up1: Part bricks of on disconned unused brick	group is offline o t peer let bricks s.	or damaged, increased risk of data online, then repair volume to replace	loss. Please e damaged	e start scale o I brick with	out
Gr	Hostname	RAID Name	Brick Path			Status
1	172.16.64.137	1N1291	/gluster/f0b87e75-9cf3-4e60-a36 c96ae56c259a/firstSCvolume	5-		Online
1	172.16.65.143		/gluster/c3ea3246-b52c-4a37-a0 8c46b08d2a42/firstSCvolume	39-		Damage
1	172.16.64.137	1N1291	/gluster//99d016b-5548-4f15-a29 2476ec89676e/firstSCvolume	12.		Online
2	172.16.65.143	1N2810s	/gluster/c9e7857c-63ba-4c17-b6 c5fe4a7f6c9b/firstSCvolume	0b-		Online
2	172.16.64.137	1N1291	/gluster/9eb7a61a-3e72-4411-b1 465954ed0183/firstSCvolume	28-		Online
-	172 15 64 137	101201	/gluster/9eacd76f-4cdd-4d7a-92	ef-		Online

Let's repair the brick by replacing it with a new one. So we have created a new volume named "1N2810SCrepair".

RAID Disk Spin D	Down						
Create							
RAID Name	Status	Level	Disk	Capacity	File S	FSCK Time	F
1N2810scV2	Healthy	JBOD	2	0.00% 0.03GB/928.55GB	xfs		
1N2810SCrepair	Healthy	JBOD	1	0.00% 0.03GB/3721.68GB	×fs		

Now we could go to the Scale-Out volume setting page and choose "Repair All Volumes Capacity".

Sca	ale Out Setti	ngs	Storage Pool	Volume:	s A	Auto Man	agement					
Ad	dEdit	Ope	ration 👻									Refresh
	Status	Exp	and Capacity		city				Replica	Brick C	Health	
×	On	Expand All Volumes Capacity		Capacity		0.00%	38.27 MB	2.72 TB	3	6	Abnon	mal
•	On	Repair				0.00%	39.09 MB	4.54 TB	2	6	Abnon	mal
		Rep	air All Volumes C	apacity								

Now the volume has been repaired and is back to a healthy status.

Status	Volume Name	Capac	ity	Replica	Brick C	Health
On	1sSCvolume		0.00% 68.95 MB / 3.63 TB	2	6	Normal
Gr	Hostname	RAID Name	Brick Path			Status
1	172.16.64.137	1N1291	/gluster/f0b87e75-9ct3-4e60-a36 c96ae56c259a/1sSCvolume	15-		Online
1	172.16.65.143	1N2810s	/gluster/d9bf57a4-ce52-4429-96 fe670039aab9/1sSCvolume	ef-		Online
2	172.16.64.137	1N1291	/gluster/f99dD16b-5548-4f15-a29 2476ec89676e/1sSCvolume	92+		Online
2	172.16.65.143	1N2810s	/gluster/c9e7857c-63ba-4c17-b6 c5fe4a7f6c9b/1sSCvolume	00-		Online
3	172.16.64.137	1N1291	/gluster/9eb7a61a-3e72-4411-b1 465954ed0183/1sSCvolume	128-		Online
3	172.16.64.137	1N1291	/gluster/9eacd76f-4cdd-4d7a-92/ c911d4c592a6/1sSCvolume	ef-		Online

Scale-Out Volume Editing:

The created Scale-Out volume can be edited by selecting it from the available list then clicking on the "Edit" button. The Scale-Out volume can be stopped by clicking on the Stop Volume" button. Once confirmed, the Scale-Out volume status will change to "Off" and it is inaccessible from the Scale-Out client. Alternatively, this Scale-Out volume can be changed through some advanced setting pertaining to cache size, Write Behind Cache Size and IO Thread.

Rules to accept or reject connections can also be specified for the Scale-Out volume . Click on "Security Setting" and the screen below appears.

Edit Volume			>	
General Settings	Security \$	ietting		
Add Rule				Remove All Rule
Mode	T	IP Address		т
Stop Volume			Apply	Cancel

Click on "Add Rule" to add a new connection definition or "Remove All Rules" to clear the list.

Auto Management

Scale-Out can be empowered to work smartly by enabling "Auto Management". There are 3 different settings that can be enabled.

Scale Out Settings	Storage Pool	Volumes	Auto Management								
Auto Managem	ent Settings										
Auto cre	ate RAID with un	used disks (T)	ype: JBOD, Filesystem	: btrfs.lf disks have data, won't do anything)							
When sy Filesystem:	When system detect disk be plugged, system will automatically build RAID with this disk (Type: JBOD, Filesystem: btrfs.lf disks have data, won't do anything)										
When yo repair dama	ou create/delete R ged brick in volur	RAID or RAID me, won't repa	damaged, system will air offline brick)	try to repair volume with unused brick (only							
Apply											

1. If scenario one is enabled, if the system is cold booted with a disk installed (clean), then the RAID volume will be crated automatically by default and this RAID volume will become an unused brick.

2. If the 2nd scenario is enabled, if a disk is plugged in (hot plug-in, disk clean), then the system will create a RAID volume automatically and this RAID volume will become unused brick.

3. If any brick from volume group is damaged, the system will use unused bricks to repair it.

Stop Scale-Out

In any case, if the Scale-Out server needs to stop, click on the "Stop Scale-Out" button. The status for the Scale-Out server will change to "Offline".

Example for stopping Scale-Out server on system IP 172.16.65.143:

Scale Out Settings	Storage Pool	Volumes	Auto Management		
Scale Out Sett	ngs				
Status		Activ	vate		
Role		Serv	/er		
Cluster Pas	sword			l. l	
Sync E-mai	Notification	Sy	nc E-mail Notification Setting	2	
Stop Scale	Out Reset S	scale Out			

If you now check on any member of the associated Scale-Out server group ex. 172.16.64.137 the status of the system IP 172.16.65.143 will be shown as "Offline".

S	Sca	le Out Settings	Storage Pool	Volun	es Auto Mana	gement				
4	Add	d Peer Remov								Refresh
		NAS Name		IP A	ddress	T	Brick Count	Ŧ	Status	т
•	,	N2810		172	.16.65.143		2		Offline	
•	,	N12910SASp2		172	.16.64.137		4		Online	

Stopping the Scale-Out server won't affect any data existing in the Scale-Out server volumes. Re-start the Scale-Out server will put this Scale-Out member back to online status.

Reset Scale-Out

If the Scale-Out server needs to be removed from the Scale-Out group, click on "Reset Scale-Out" to apply.

WARNING: Once it has been confirmed, all data inside the Scale-Out volumes will be destroyed completely and there is no way to get it back.

Scale Out Settings	Storage Pool	Volumes	Auto Management		
Scale Out Setti	ngs				
Status		Acti	vate		
Role		Sen	ver		
Cluster Pas	sword	•••	•••••)
Sync E-mail	Notification	S	nc E-mail Notification Setting	2	
Stop Scale	Out Reset S	cale Out			

Create Scale-Out Shared Folder

After the Scale-Out server group setup has been completed, the Scale-Out volume will be ready to use. Next, we will go through how a Scale-Out client can connect to a Scale-Out volume.

Let's take an N5810PRO with the IP <u>http://172.16.64.185</u> in Scale-Out client mode. The system default mode for the Scale-Out function is set to client, so there is no need to set it up separately. To connect with the Scale-Out volume, please go to "Share Folder" under "Privilege" in the Control Panel.

Setting Panel								- = ×
Q Function Search		Shared Folder	ĺ.					
Control	*	Create						
Privilege		Folder Name		Create	Eilo Su	Public	Description	
Shared Folder		Forder Ivanie		Greate	File Oy	r bonc	Description	
& Local Account		snapshot		1N581	xfs	No		
		NAS_Public		1N581	xfs	Yes		
ES AU		HOME		1N581	xfs	Yes		
LDAP		eSATAHDD		1N581	xfs	Yes		
Storage	*	USBHDD		1N581	xfs	Yes		
Services	Ŧ							
Backup								
		-						

Click on "Create" and screen appear as below.

reate								>
General Settings	User ACL	Group ACL	NFS					
RAID ID		1N	5810scV1		,	•		
Folder Name		PI	Please Input Folder Name Here					
Description		PI	Please Input Description Here					
Public								
Read-Only								
Browsable		ר						
Mount Sca	lue Out Volum	10						
								-

Steps:

1. Folder name: To be seen on file protocol level access, let's choose "firstSCfolder" as a folder name.

Create			
General Settings	User ACL	Group ACL	NFS
RAID ID		1N	5810scV
Folder Name			tSCfolde

- 2. Description: Fill in if needed.
- 3. Public/Read-Only/Browseable: enable/disable as needed.

4. Mount Scale-Out Volume: **Enable** this one and input the Scale-Out Volume IP address and Volume Name.



The IP address can be that of any Scale-Out server member, we have 172.16.64.137 and 172. 16.65.143. The volume names are those we have created earlier; they are "firstSCvolume" and "secondSCvolume". Let's fill in 172.16.65.143 and "firstSCvolume" then click Apply

Shared Folder										
Create										
Folder Name 🛛 🔻	Create on	File Sys	Public	Description						
snapshot	1N5810scV1	xfs	No							
NAS_Public	1N5810scV1	xfs	Yes							
HOME	1N5810scV1	xfs	Yes							
eSATAHDD	1N5810scV1	xfs	Yes							
USBHDD	1N5810scV1	xfs	Yes							
firstSCfolder	1N5810scV1	Scale Out	No							

Now in the shared folder list,"firstSCfolder" has been added. It can be used just like a standard shared folder. Let's connect via Windows and we see that "firstSCfolder" is there; please refer to the screenshot below. Surely you could use the same steps to create more Scale-Out folders, even using the same storage resources.



Support

If you have questions, encounter technical difficulties or need assistance with your NAS or setting up Scale-Out, please contact Thecus technical support under: <u>http://www.thecus.com/sp_tech.php</u>