

***Guide to VD (Virtual Disk) Cloning  
For  
Syne-iSCSI-12/16/24SS4G IPSAN RAID Subsystems  
V1.0 August 2010***

## Introduction

This article introduces the VD (Virtual Disk) clone feature for new Syne-iSCSI-12/16/24SS4G IPSAN RAID Subsystems. The users could use VD cloning function to backup data from source VD to target VD, set up backup schedule, and deploy the clone rules. The biggest advantage to this is the fact data can move between different RAID levels for both higher reliability and in some cases high performance.

**Example:** A virtual disk RAID10 made of a 600GB size with 4x300Gb SAS 15K has much higher performance than a 1TB RAID5 made of 4x250Gb SATA 72K. Users can allocate the SAS RAID10 as Primary VD to I/O and Random Access hungry applications, and the 1TB SATA VD RAID5 as the Backup or Secondary VD.

This defines the true concept of TCO (Total Cost of Ownership) and eliminate the need of continues increase of more expensive hard drives.

### The procedures of VD clone are on the following:

1. Fully copy data from source VD to target VD at the beginning.
2. Using Snapshot technology to perform the incremental copy afterwards. Please be fully aware that the incremental copy needs to use snapshot to compare the data difference. Therefore, the enough snapshot space for VD clone is very important.

The following contents will demonstrate a RAID5 virtual disk (Source VD\_Raid5) clone to RAID6 virtual disk (TargetVD\_Raid6).

## Contents

### Part 1: Start VD clone

1. Create RAID group (RG) in advance.

No.	Name	Total (GB)	Free (GB)	#PD	#VD	Status	Health	RAID	Enclosure
1	R5	148	128	3	1	Online	Good	RAID 5	Local
2	R6	222	202	5	1	Online	Good	RAID 6	Local

2. Create Source VD\_Raid5 and Target VD\_Raid6. The RAID type target needs to be set as “**BACKUP**”.

**/ Volume configuration / Virtual disk / Create**

**Name :** TargetVD\_Raid6

**RG name :** R6

**Capacity :** 20 GB

**Stripe height (KB) :** 64

**Block size (B) :** 512

**Read/Write :**  Write-through cache  Write-back cache

**Priority :**  High priority  Middle priority  Low priority

**Bg rate :** 4

**Readahead :** Enabled

**Erase :** None

**Type :** BACKUP

3. Here are the objects, a Source VD and a Target VD. Before starting clone process, it needs to deploy the VD Clone rule first. Click the "Configuration" button.

No.	Name	Size (GB)	Write	Priority	Bg rate	Status	Clone	Schedule	Type	Health	R %	RAID	#LUN	Snapshot space (GB)	#Snapshot	RG name
1	SourceVD_Raid5	20	WB	HI	4	Online	N/A	N/A	RAID	Optimal		RAID 5	0	0/0	0	R5
2	TargetVD_Raid6	20	WB	HI	4	Online	N/A	N/A	BACKUP	Optimal		RAID 6	0	0/0	0	R6

Create    **Configuration**

4. There are three clone configurations, describe on the following.

/ Volume configuration / Virtual disk / Clone Configuration

Snapshot space :

Threshold :

Restart the task an hour later if failed :

<< Back    Confirm

Snapshot space:

Snapshot space :

Threshold :

Restart the task an hour later if failed :

This setting is the ratio of source VD and snapshot space. The default ratio is 2 to 1. It means when the clone process is starting, the system will automatically use the free RG space to create a snapshot space which capacity is double the source VD.

Threshold: (*Become effective after enabling schedule clone*)

Snapshot space :

Threshold :

Restart the task an hour later if failed :

The threshold setting will monitor the usage amount of snapshot space. When the used snapshot space achieves its threshold, system will automatically take a clone snapshot and start VD clone process. The purpose of threshold could prevent the incremental copy fail immediately when running out of snapshot space.

For example, the default threshold is 50%, the system will check the snapshot space every hour, when the snapshot space used over 50%, and the system will automatically sync the source VD and target VD. Next time, when the rest snapshot space has been used 50%, in other words, the total snapshot space has been used 75%, and the system will sync the source VD and target VD again.

Restart the task an hour later if failed: (**Become effective after enabling schedule clone**)

Snapshot space :

Threshold :

**Restart the task an hour later if failed :**

When running out of snapshot space, the VD clone process will stop because there is no more available snapshot space. If this option has been checked, system will automatically clear the snapshots of clone in order to release snapshot space, and the VD clone will restart the task after an hour. This task will start a fully copy.

- After deploying the VD clone rule, the VD clone process can be started now. Firstly, Click “Set clone” to set the target VD at the VD name “SourceVD\_Raid5”.

/ Volume configuration / Virtual disk

No.	Name	Size (GB)	Write	Priority	Bg rate	Status	Clone	Schedule	Type
1	SourceVD_Raid5	20	WB	HI	4	Online	N/A	N/A	RAID
	Extend	20	WB	HI	4	Online	N/A	N/A	BACKUP

- Extend
- Parity check
- Delete
- Set property
- Attach LUN
- Detach LUN
- List LUN
- ▶ Set clone**
- Set snapshot space
- Cleanup snapshot
- Take snapshot
- Auto snapshot
- List snapshot
- More information

- Select the target VD. Then click “Confirm”.

/ Volume configuration / Virtual disk / Set clone

Name :

- Now, the clone target “TargetVD\_Raid6” has been set.

/ Volume configuration / Virtual disk

No.	Name	Size (GB)	Write	Priority	Bg rate	Status	Clone	Schedule	Type	Health	R %	RAID	#LUN	Snapshot space (GB)
1	SourceVD_Raid5	20	WB	HI	4	Online	TargetVD_Raid6	N/A	RAID	Optimal		RAID 5	0	0/0
2	TargetVD_Raid6	20	WB	HI	4	Online	N/A	N/A	BACKUP	Optimal		RAID 6	0	0/0

8. Click “Start clone”, the clone process will start.

/ Volume configuration / Virtual disk

No.	Name	Size (GB)	Write	Priority	Bg rate	Status	Clone	Schedule	Type	Health	R %	RAID	#LUN	Snapshot space (GB)	#Snapshot
1	SourceVD_Raid5	20	WB	HI	4	Online	TargetVD_Raid6	N/A	RAID	Optimal		RAID 5	0	0/0	0
	Extend	20	WB	HI	4	Online	N/A	N/A	BACKUP	Optimal		RAID 6	0	0/0	0

- Extend
- Parity check
- Delete
- Set property
- Attach LUN
- Detach LUN
- List LUN
- Clear done
- Start done**
- Stop done
- Schedule clone
- Set snapshot space
- Cleanup snapshot
- Take snapshot
- Auto snapshot
- List snapshot
- More information

Create Configuration

9. The default setting will automatically create a snapshot space which capacity is double size of VD space. Before starting clone, system will initiate the snapshot space.

/ Volume configuration / Virtual disk

No.	Name	Size (GB)	Write	Priority	Bg rate	Status	Clone	Schedule	Type	Health	R %	RAID	#LUN	Snapshot space (GB)
1	SourceVD_Raid5	20	WB	HI	4	Initiating	TargetVD_Raid6	N/A	RAID	Optimal	36	RAID 5	0	0/40
2	TargetVD_Raid6	20	WB	HI	4	Online	N/A	N/A	BACKUP	Optimal		RAID 6	0	0/0

10. Start cloning. System will issue an Info level event “VD SourceVD\_Raid5 starts cloning process.”

/ Volume configuration / Virtual disk

No.	Name	Size (GB)	Write	Priority	Bg rate	Status	Clone	Schedule	Type	Health	R %	RAID	#LUN	Snapshot space (GB)
1	SourceVD_Raid5	20	WB	HI	4	Cloning	TargetVD_Raid6	N/A	RAID	Optimal	8	RAID 5	0	0/40
2	TargetVD_Raid6	20	WB	HI	4	Online	N/A	N/A	BACKUP	Optimal		RAID 6	0	0/0

11. Click “Schedule clone” to set up schedule.

/ Volume configuration / Virtual disk

No.	Name	Size (GB)	Write	Priority	Bg rate	Status	Clone	Schedule	Type
1	SourceVD_Raid5	20	WB	HI	4	Online	TargetVD_Raid6	N/A	RAID
	Extend	20	WB	HI	4	Online	N/A	N/A	BACKUP

- Extend
- Parity check
- Delete
- Set property
- Attach LUN
- Detach LUN
- List LUN
- Clear done
- Start done
- Stop done
- Schedule clone**
- Set snapshot space
- Cleanup snapshot
- Take snapshot
- Auto snapshot
- List snapshot
- More information

12. There are “Set Clone schedule” and “Clear Clone schedule” in this page.

(Please remember that “**Threshold**” and “**Restart the task an hour later if failed**” options from VD configuration will take effect after clone schedule has been set.)

/ Volume configuration / Virtual disk / Schedule

**Virtual disk:SourceVD\_Raid5**

**Set Clone schedule**

Scheduled time : 00:00

**Back up everyday**

**Back up on a selected day in a week**

Sunday       Monday       Tuesday       Wednesday  
 Thursday       Friday       Saturday

**Back up on the 1st day in a month**

**Clear Clone schedule**

### Part 2: Run out of snapshot space while VD clone

1. User can set up snapshot space by themselves for VD clone.

/ Volume configuration / Virtual disk

No.	Name	Size (GB)	Write	Priority	Bg rate	Status	Clone	Schedule	Type	Health	R %	RAID	#LUN	Snapshot space (GB)
1	SourceVD_Raid5	20	WB	HI	4	Online	TargetVD_Raid6	N/A	RAID	Optimal		RAID 5	0	0/0
	Extend	20	WB	HI	4	Online	N/A	N/A	BACKUP	Optimal		RAID 6	0	0/0

- Extend
- Parity check
- Delete
- Set property
- Attach LUN
- Detach LUN
- List LUN
- Clear clone
- Start clone
- Stop clone
- Schedule clone
- Set snapshot space**
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- List snapshot
- More information

Create    Coi

2. For example, set up 5GB snapshot space and start clone process.

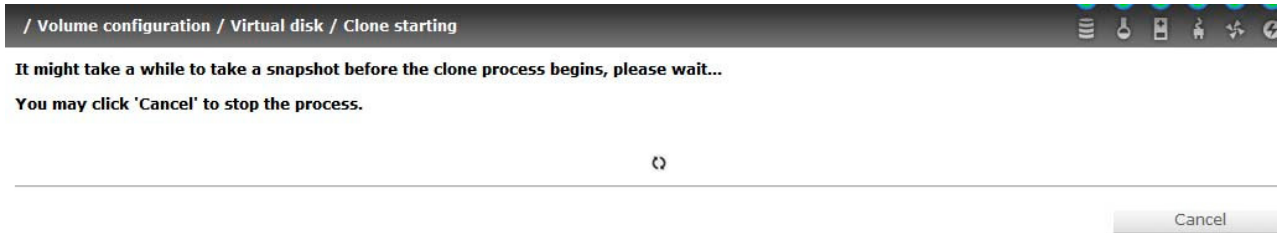
/ Volume configuration / Virtual disk

No.	Name	Size (GB)	Write	Priority	Bg rate	Status	Clone	Schedule	Type	Health	R %	RAID	#LUN	Snapshot space (GB)
1	SourceVD_Raid5	20	WB	HI	4	Online	TargetVD_Raid6	N/A	RAID	Optimal		RAID 5	1	0/5
	Extend	20	WB	HI	4	Online	N/A	N/A	BACKUP	Optimal		RAID 6	0	0/0

- Extend
- Parity check
- Delete
- Set property
- Attach LUN
- Detach LUN
- List LUN
- Clear clone
- Start clone**
- Stop clone
- Schedule clone
- Set snapshot space
- Cleanup snapshot
- Take snapshot
- Auto snapshot
- List snapshot
- More information

Create    Coi

- While the clone is processing, the increment data of this VD is over the snapshot space. The clone will complete, but the clone snapshot will fail.



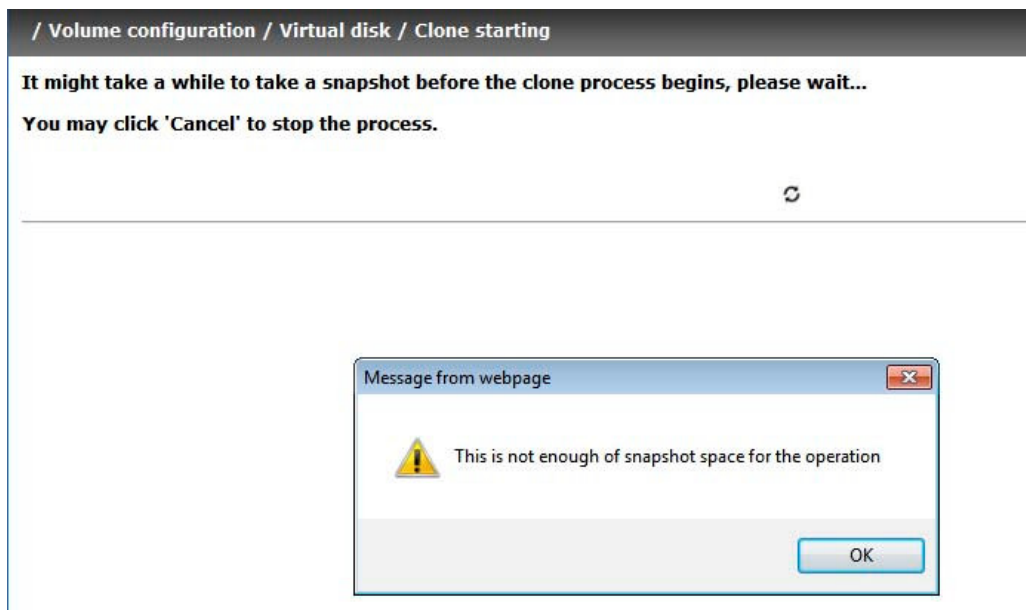
/ Volume configuration / Snapshot

Linked snapshot for VD: - SourceVD\_Raid5 -

No.	Name	Used (GB)	Health	Exposure	Right	#LUN	Created time
1	CLONE20033	4	Failed	No	N/A	N/A	Tue Jul 27 18:14:43 2010

<< Back   Cleanup   Auto snapshot   Take snapshot

- Next time, when user tries to start clone will get a ***"This is not enough of snapshot space for the operation"*** message.



- User needs to clean up the snapshot space in order to operate the clone process next time.

/ Volume configuration / Snapshot

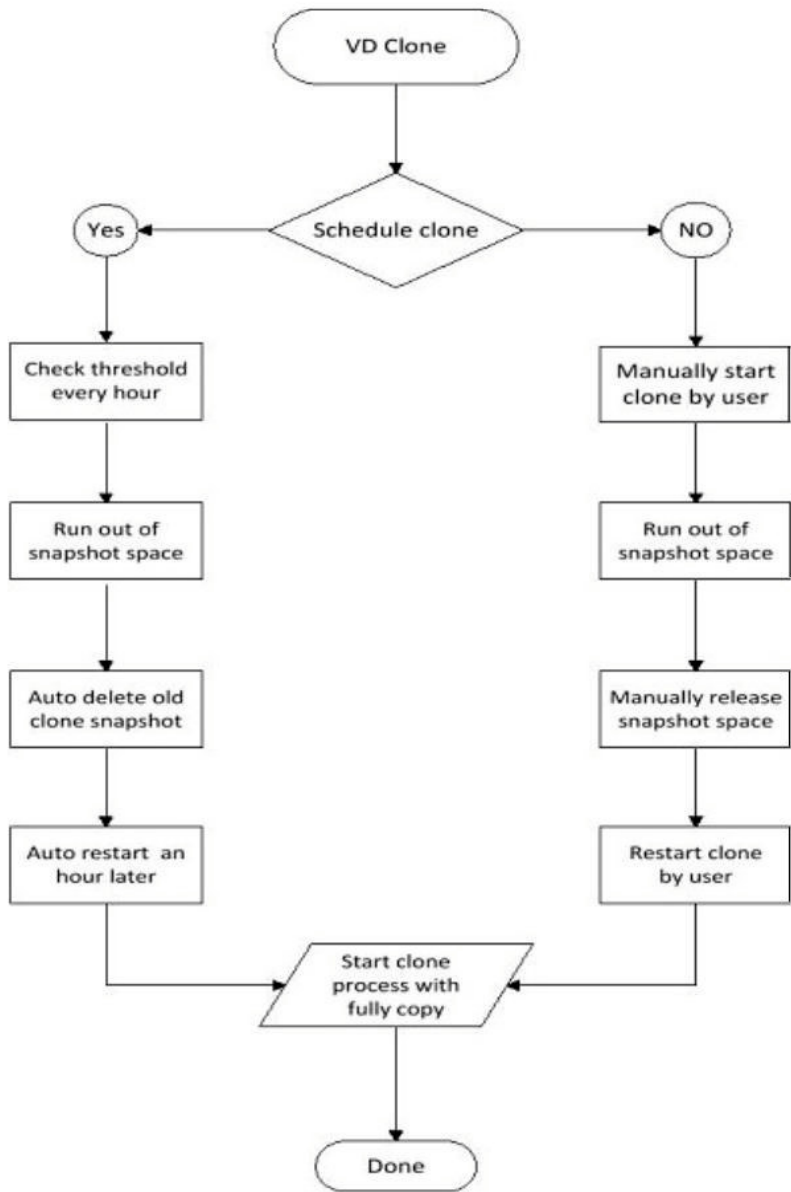
Linked snapshot for VD: - SourceVD\_Raid5 -

No.	Name	Used (GB)	Health	Exposure	Right	#LUN	Created time
1	CLONE20033	4	Failed	No	N/A	N/A	Tue Jul 27 18:14:43 2010

<< Back   Cleanup   Auto snapshot   Take snapshot

- Each time the clone snapshot failed, it means system loses the reference value of incremental data. So the next clone process will start a fully copy.

7. When running out of snapshot space, the VD clone procedure will like the flow diagram below.



**Summary**

It is very important to plan the snapshot space usage. Snapshot can be used for regular snapshot, VSS hardware provider, VD clone etc. Each service shares the same snapshot space. You need to be very careful to prevent running out of snapshot space, otherwise it will cause the service fail and backup is not correctly. So user should arrange the proper snapshot space and must interview the client for proper and correct use of data storage resources. The most conservative way is to reserve two or three times larger than VD space for each snapshot.