# How to perform
# VD clone function

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Version 1.4 (NOV, 2010)

# Introduction

This article introduces a new VD clone feature. The user can use VD clone to backup data from source VD to target VD, set up backup schedule, and deploy the clone rules.

The procedures of VD clone are on the following:

1. Copy all data from source VD to target VD at the beginning (full copy).
2. Using QSnap 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 take an example of a RAID 5 virtual disk (SourceVD_Raid5) clone to RAID 6 virtual disk (TargetVD_Raid6).

# Contents

## Part 1: Start VD clone

1. Create a 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 |

/ Volume configuration / RAID group

2. Create two virtual disks (VD) "SourceVD_Raid5" and "TargetVD_Raid6". The raid type of backup target needs to be set as **"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"**.



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



· **Snapshot space:**

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: (The setting will be effective after enabling schedule clone)**



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 is used over 50%, the system will synchronize the source VD and target VD automatically. Next time, when the rest snapshot space has been used 50%, in other words, the total snapshot space has been used 75%, the system will synchronize the source VD and target VD again.

- **Restart the task an hour later if failed: (The setting will be effective after enabling schedule clone)**



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

5. 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".

6.  Select the target VD. Then click **"Confirm"**.



7.  Now, the clone target "TargetVD_Raid6" has been set.



8.  Click **"Start clone"**, the clone process will start.

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



10. After initiating the snapshot space, it will start cloning.



11. Click **"Schedule clone"** to set up schedule.

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 in VD configuration will take effect after clone schedule has been set.



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

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



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



3. 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.

4. Next time, when trying to start clone, it will get a warning message "This is not enough of snapshot space for the operation".
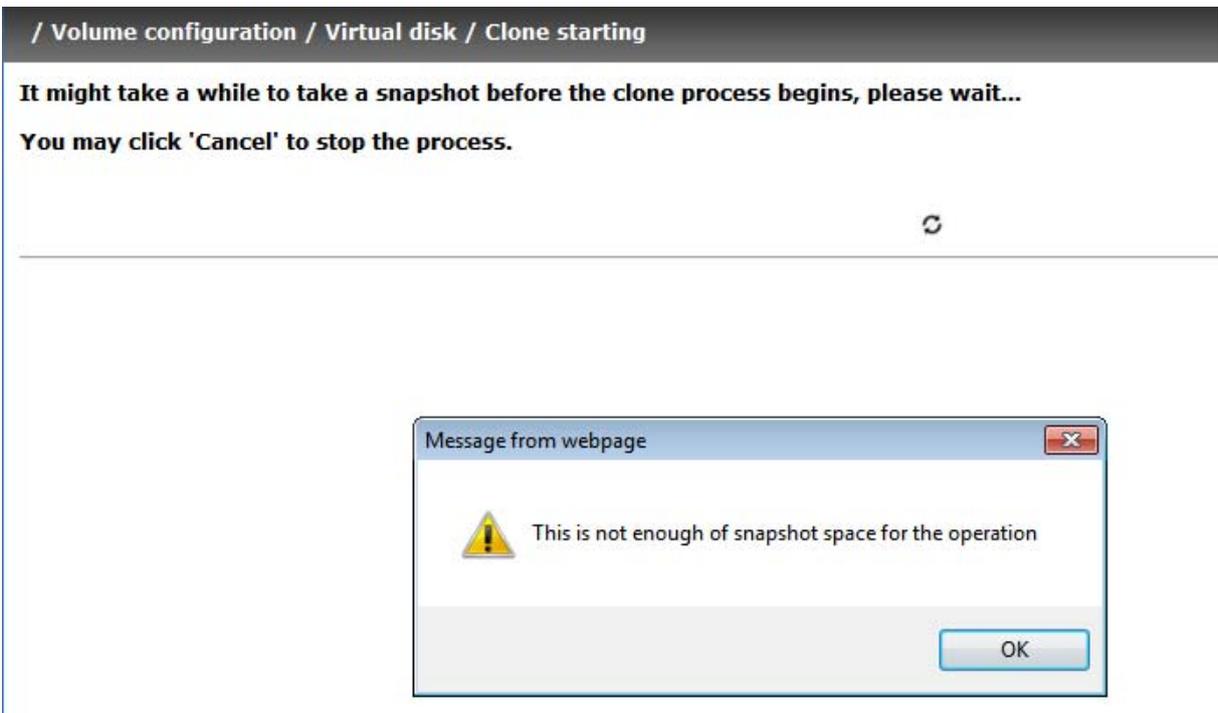


5. At this time, the user needs to clean up the snapshot space in order to operate the clone process.

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

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

```
                          ┌──────────────┐
                          │   VD Clone   │
                          └──────┬───────┘
                                 │
                                 ▼
          ┌─────┐         ◇─────────────◇          ┌────┐
          │ Yes │◄────────  Schedule clone  ────────►│ NO │
          └──┬──┘         ◇─────────────◇          └─┬──┘
             │                                        │
             ▼                                        ▼
    ┌─────────────────┐                     ┌─────────────────┐
    │ Check threshold │                     │ Manually start  │
    │   every hour    │                     │  clone by user  │
    └────────┬────────┘                     └────────┬────────┘
             │                                        │
             ▼                                        ▼
    ┌─────────────────┐                     ┌─────────────────┐
    │   Run out of    │                     │   Run out of    │
    │  snapshot space │                     │  snapshot space │
    └────────┬────────┘                     └────────┬────────┘
             │                                        │
             ▼                                        ▼
    ┌─────────────────┐                     ┌─────────────────┐
    │ Auto delete old │                     │ Manually release│
    │ clone snapshot  │                     │  snapshot space │
    └────────┬────────┘                     └────────┬────────┘
             │                                        │
             ▼                                        ▼
    ┌─────────────────┐                     ┌─────────────────┐
    │ Auto restart an │                     │  Restart clone  │
    │   hour later    │                     │    by user      │
    └────────┬────────┘                     └────────┬────────┘
             │              ▱──────────────▱          │
             └─────────────► Start clone    ◄─────────┘
                            │ process with  │
                            ▱ fully copy    ▱
                                  │
                                  ▼
                          ┌──────────────┐
                          │     Done     │
                          └──────────────┘
```
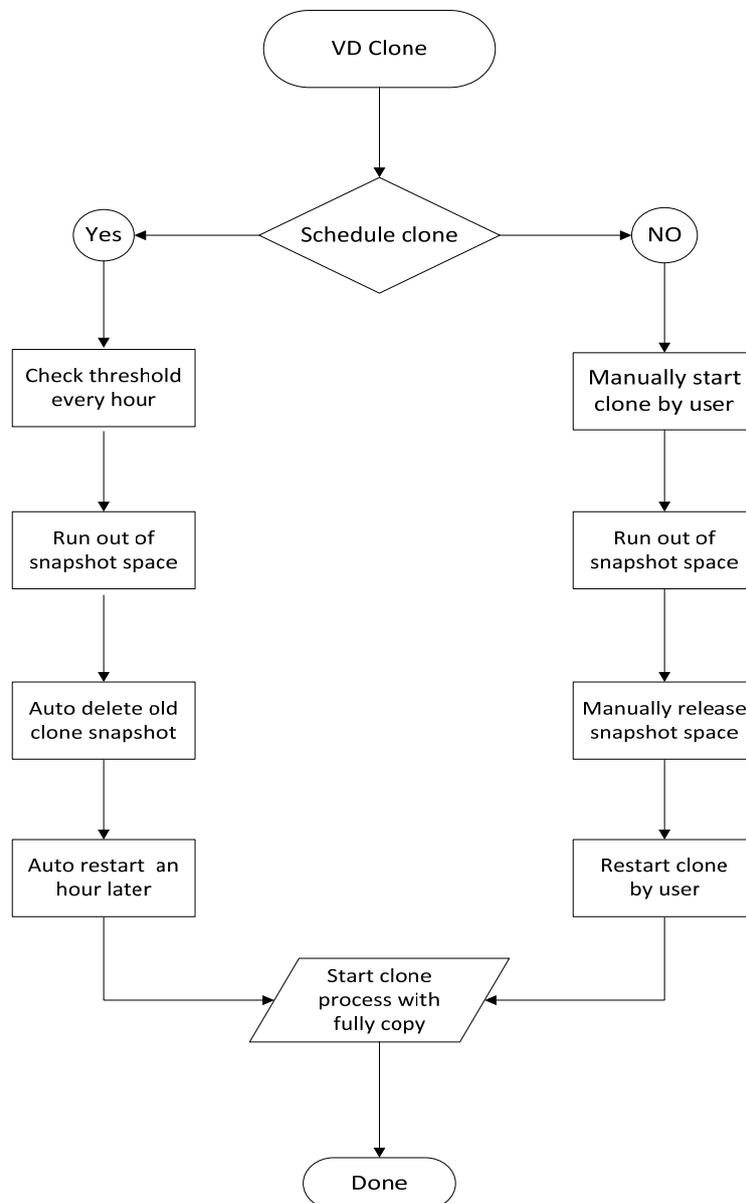
## Summary

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. It is very careful to prevent running out of snapshot space, otherwise it will cause any service failed. So user should arrange the proper snapshot space. The most conservative way is reserve two or three times larger than VD space for snapshot.

## Applies to

- **F200C**  FW 1.0.8p2 (20101118_1700)
- **P210C**  FW 1.0.8p2 (20101118_1700)
- **S510C**  FW 1.0.8p2 (20101118_1700)
- **F300H**  FW 2.0.0p1 (20101118_1200)
- **P300C**  FW 2.0.0p1 (20101118_1200)
- **P500H**  FW 2.0.0p1 (20101118_1200)
- **S300H**  FW 2.0.0p1 (20101118_1200)