XCubeNAS Series Application Note

Achieve DR Solution with XCubeNAS on VMware with Snapshot Consistency

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DR Solution on VMware

Executive Summary

This application note provides technical guidance for setting up DR (Disaster Recovery) solution in VMware environment and making sure that the replicated data will be consistent with special script implemented in ESXi server, and it leads XCubeNAS products being able to achieve real DR with snapshot consistency, it is no longer necessary to install any agent in the environment before achieving this.

Audience

This document is applicable for QSAN customers and partners who are interested in learning about DR solution on VMware. It assumes the reader is familiar with QSAN products and has general IT experience, including knowledge as a system or network administrator. If there is any question, please refer to the user manuals of products, or contact QSAN support for further assistance.

Overview

Nowadays, backup has been considered as one of the most important parts of implementing Data Center environment, backing up data in a single location is no longer enough to prevent disaster, IT manager may need to prepare another copy of the important data in a remote site, DR (Disaster Recovery) solution has become the Top-1 option to be chosen. Virtualization environment may have its own DR application, but usually it is more expensive. Storage vendors have the same backup function supported natively without additional charge, but the headache here is the cached data stored in the server's memory.

It is not a problem for those A-brand vendors as they have implemented an additional tool to be installed in the environment, supporting the feature of requesting the server to queue its I/O while the snapshot is being taken on the storage side, that makes the taken snapshot being complete with the full image of the written data, the replicated data won't be consistent without this kind of function, but the efforts to install the agent is another story.

This document will help you to set up the environment with the result as the above, but you won't need to install any agent in the environment before achieving this, this can easily be implemented with a simple script and XCubeNAS' Snapshot Replica.

Configurations

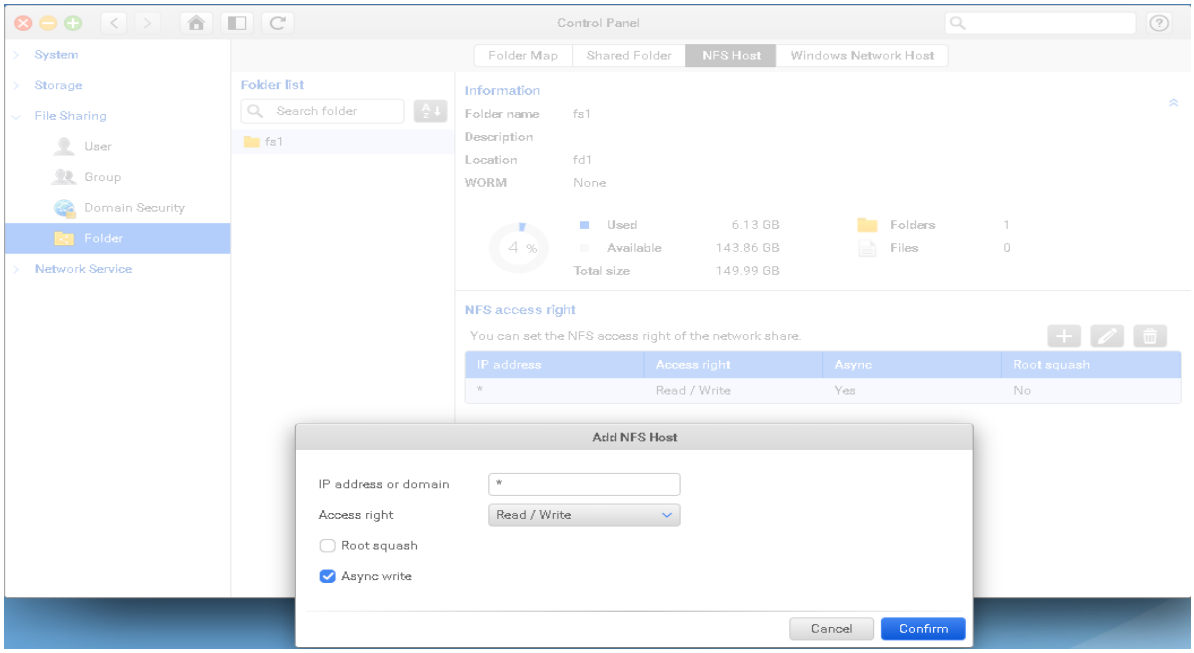
ESXi Server Settings

It's very simple, the environment we prepared here is an ESXi 6.5 server, installed with a 10G HBA card, connecting directly to XCubeNAS, and make sure that this ESXi server will be managed by a vCenter, and that's all!

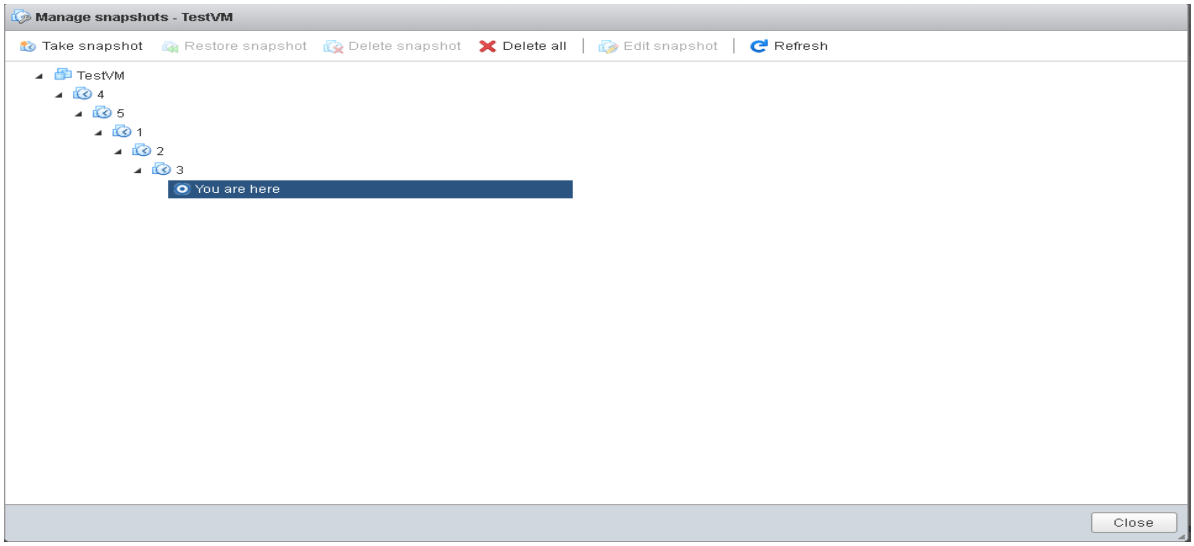
XCubeNAS Settings on NAS-a and NAS-b

As the purpose here is to achieve DR solution, you will need to set up two XCubeNAS systems, the available space must be the same on both units; otherwise the Snapshot Replica function may fail due to the insufficient storage space.

1. Connect one of 10G ports from NAS-a to NAS-b.
2. Create a volume and a shared folder on NAS-a.
3. Visit NFS Shared Folder to assign RW permission for all connected hosts.



4. Create a volume (only) on NAS-b with the same size as the volume on NAS-a.
5. Mount the created shared folder of NAS-a on the prepared ESXi server.
6. Create a VM (Virtual Machine) based on the mounted / created Datastore on the ESXi server, here we use Ubuntu16.04.
7. Visit NAS-a, go to **Backup Manager**, create a snapshot reaplica task by choosing the volume in NAS-b.
8. Open the console of VM in ESXi server, making a robocopy task running periodically to keep increasing data.
9. Create schedule snapshot on this VM from vCenter UI, in this example we take 5 snapshots.



10. The preparation has been finished here.

Create a Script on ESXi server via SSH

Yes as you can see from the above actions that we are going to firstly take snapshot on the VM from ESXi server itself and replicate the .VMDK file along with the taken snapshots together to the remote site, after the data (.VMDK + snapshots) is replicated to the remote site, register and rollback the taken snapshot after mounting the Volume of NAS-b, everything will be consistent with this method. However, the taken snapshot(s) won't be automatically deleted / rotated by VMware, and keeping lots of snapshot images will lead to the situation of terrible performance in long term, so the Script here is to specify a fixed quantity of snapshot that the ESXi server can keep for rotation, preventing from the situation that the VM performance impact due to too many snapshots.

1. Create a "Crontabs" folder in the Datastore mounted from NAS-a.
2. Upload the following script "SnapshotAutoDelete.sh" into the "Crontabs" folder.

```
# cat SnapshotAutoDelete.sh

#!/bin/sh

LOG_PATH="/var/log/Schedule_Snapshot.log"
[ -f "$LOG_PATH" ] && rm $LOG_PATH;

QTY=2 # Reserved quantity
for i in `vim-cmd vmsvc/getallvms 2>/dev/null | awk '{print $1}' | grep -e "[0-9]"`
# Grab all Vmid on esxi
```



```
do
    SNAPSHOT_COUNT=`vim-cmd vmsvc/snapshot.get $i | egrep -- '--\|-CHILD|^\|-ROOT'
| wc -l`
         GuestName=$(vim-cmd vmsvc/get.summary $i | grep name | awk '{ print $3 }'
| cut -d \" -f 2)
    if [ $SNAPSHOT_COUNT -gt $QTY ]; then  # If the number of snapshots is greater
than the number of reservations
                  DELETE_COUNT=$(($SNAPSHOT_COUNT-$QTY))
                  OLD_SNAPSHOT_ID=`vim-cmd vmsvc/snapshot.get $i | grep Id | head -
$DELETE_COUNT | awk -F: '{print $2}'`
                  for n in $OLD_SNAPSHOT_ID
                  do
                           vim-cmd vmsvc/snapshot.remove $i $n; ret=$?
                                    sleep 30s
                                             if [ $ret -eq 0 ];then
                                                      echo "$(date "+%F %T") :
$GuestName snapshot $n Delete Success.." >> $LOG_PATH # Output to log path after
deletion
                                             else
                                                      echo "$(date "+%F %T") :
$GuestName snapshot $n Delete FAILED.." >> $LOG_PATH
                                             fi
                  done
    else
        echo "$(date "+%F %T") : $GuestName snapshot not found." >> $LOG_PATH
    fi
done
```

3. Change the permission of the script to 777, from the SSH session of ESXi server.
4. Locate the NFS Datastore by the below command from the SSH session.

```
# esxcli storage filesystem list
```

```
[root@localhost:/var/spool/cron/crontabs] esxcli storage filesystem list
Mount Point                                        Volume Name  UUID                                 Mounted  Type
          Size         Free
-------------------------------------------------  -----------  -----------------------------------  -------  -----
-  ------------  ------------
/vmfs/volumes/d9565750-1aae2d81                    Test1        d9565750-1aae2d81                        true  NFS
   846946435072  844231999488
/vmfs/volumes/5b3faeaf-e14dcae1-6068-1866da6f7d94  datastore1   5b3faeaf-e14dcae1-6068-1866da6f7d94     true  VMFS-
5  492042190848  467142705152
/vmfs/volumes/09a7bd7e-350f48df-e0e0-c1e5d139266a              09a7bd7e-350f48df-e0e0-c1e5d139266a     true  vfat
      261853184     111235072
/vmfs/volumes/5b569d17-262270e0-73c0-001b21bd5ed0              5b569d17-262270e0-73c0-001b21bd5ed0     true  vfat
     4293591040    4267245568
/vmfs/volumes/158e0b75-4cf7a1d6-8025-163a9e69c638              158e0b75-4cf7a1d6-8025-163a9e69c638     true  vfat
      261853184     111226880
/vmfs/volumes/5b569d10-09e1c583-0226-001b21bd5ed0              5b569d10-09e1c583-0226-001b21bd5ed0     true  vfat
      299712512      83927040
```

5. Using below command to add a cron job to execute the script at 23:30 everyday (you may specify the time point based on your scenario, this time point should be earlier than the scheduled snapshot task created via vCenter mentioned above), or you may edit this file directly.

```
# echo "30    23    *    *    *    sh /vmfs/volumes/d9565750-
1aae2d81/Crontabs/SnapshotAutoDelete.sh" >> /var/spool/cron/crontabs/root
```

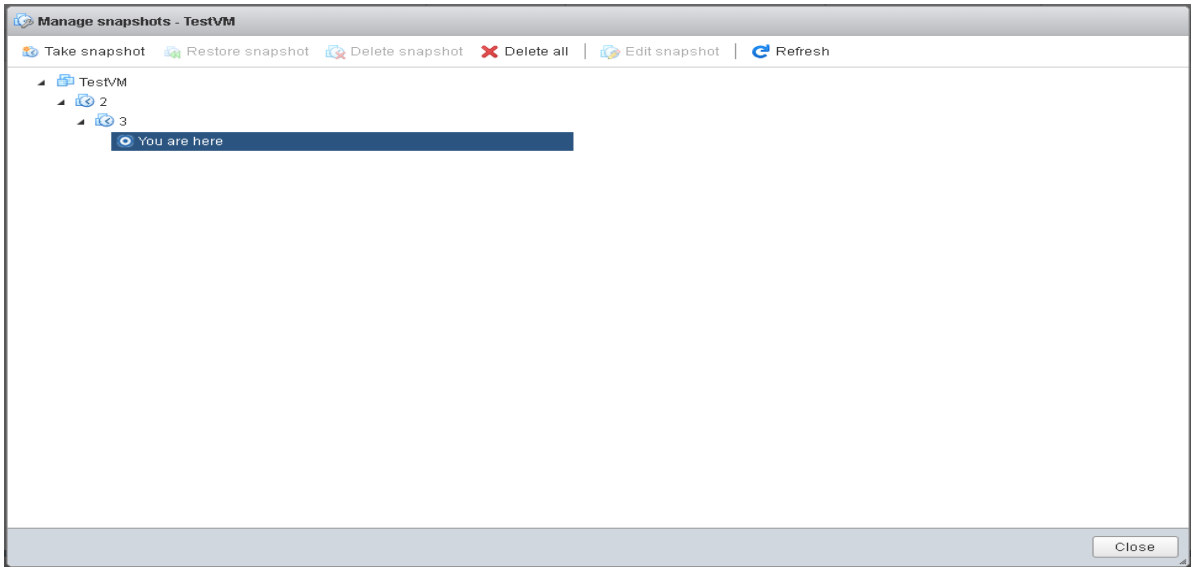
INFORMATION:
The YELLOW'ed word above is the UUID of the NFS Datastore, please check yours by the above command.

6. Edit the native cron job of ESXi server (vi /etc/rc.local.d/local.sh), and add below commands at the end of the configuration file.

```
# /bin/echo "30    23    *    *    *    sh /vmfs/volumes/ d9565750-
1aae2d81/Crontabs/SnapshotAutoDelete.sh" >>/var/spool/cron/crontabs/root
# /bin/kill $(cat /var/run/crond.pid)
# /usr/lib/vmware/busybox/bin/busybox crond
```

TIP:
As the configuration will be clear after a reboot of ESXi server, you need to add the above commands to save the configuration permanently.

7. Check the reserved snapshot quantity from ESXi UI, confirmed that the snapshots have been kept with the latest two.



8. And you may check the log by the below command.

```
# cat /var/log/Schedule_Snapshot.log
```

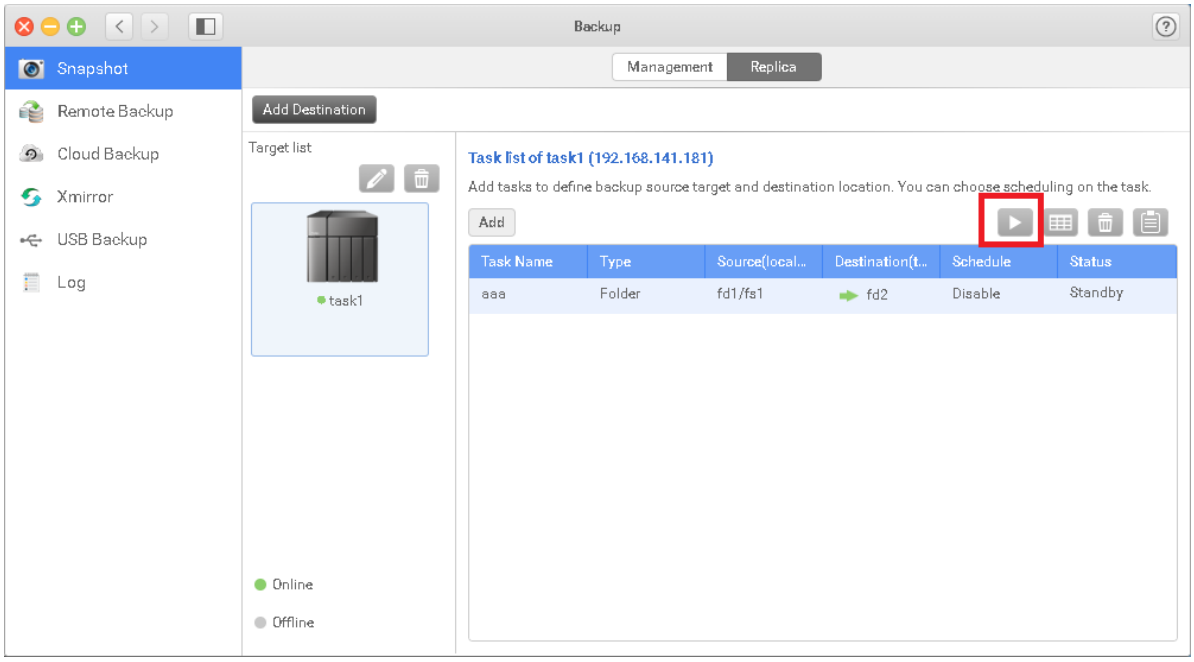
```
[root@localhost:/vmfs/volumes/d9565750-1aae2d81/Crontabs] cat /var/log/Schedule_Snapshot.log
2019-07-11 15:23:56 : TestVM snapshot 5 Delete Success..
2019-07-11 15:24:27 : TestVM snapshot 6 Delete Success..
2019-07-11 15:24:58 : TestVM snapshot 7 Delete Success..
```

9. The configuration from ESXi server side has been completed.

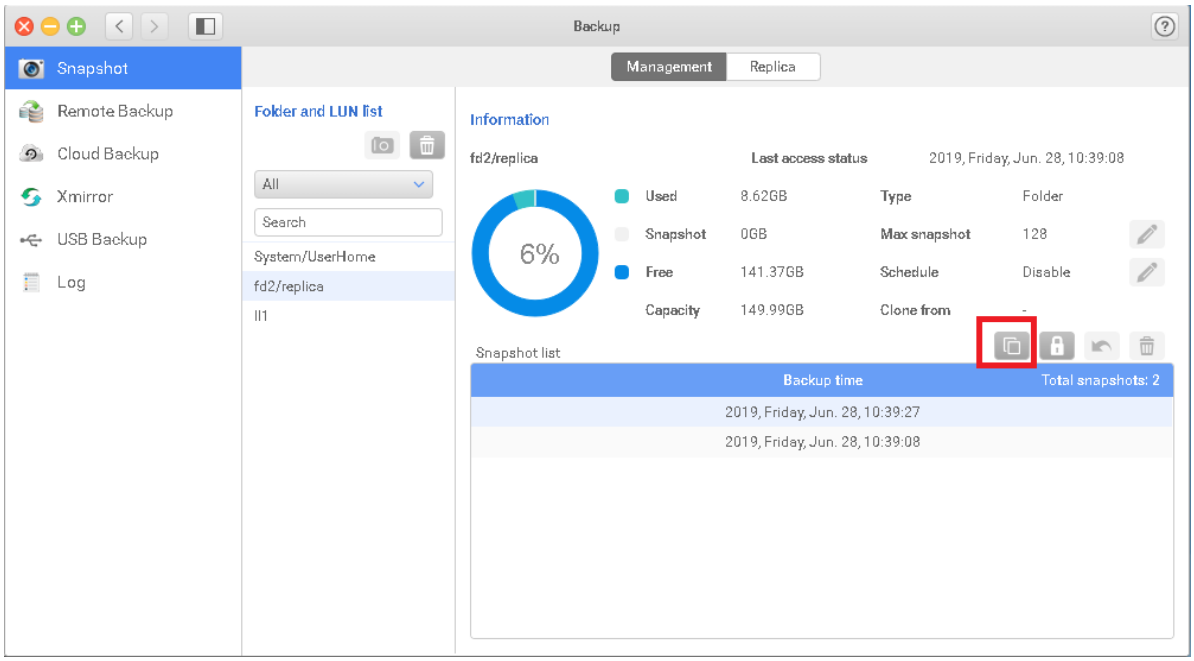
Execute Snapshot Replication from NAS-a to NAS-b

Now we are going to set up the remote replication by schedule from one to another unit, so that the VM (.VMDK file) can be replicated to the remote location along with the taken snapshot on the ESXi server.

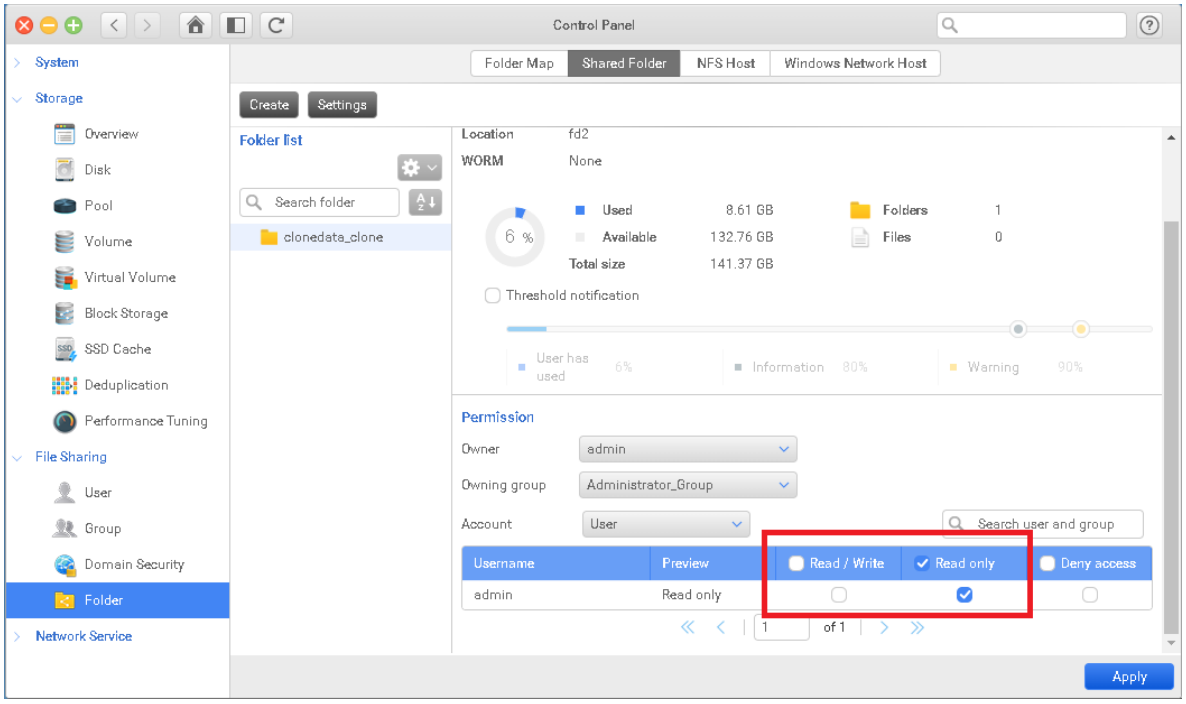
1. Visit **Backup Manager** on web UI of NAS-a, and execute the created snapshot replica task.



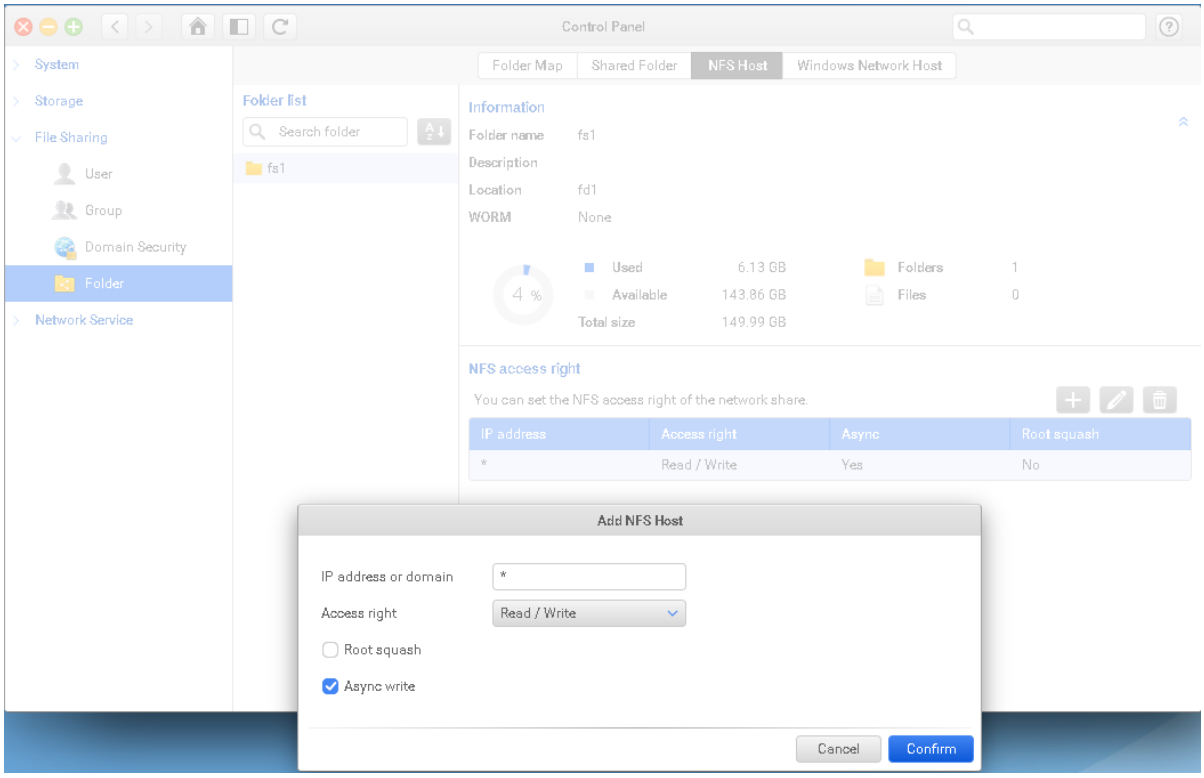
2. Visit **Backup Manager** on web UI of NAS-b, and clone the replicated snapshot into the volume.



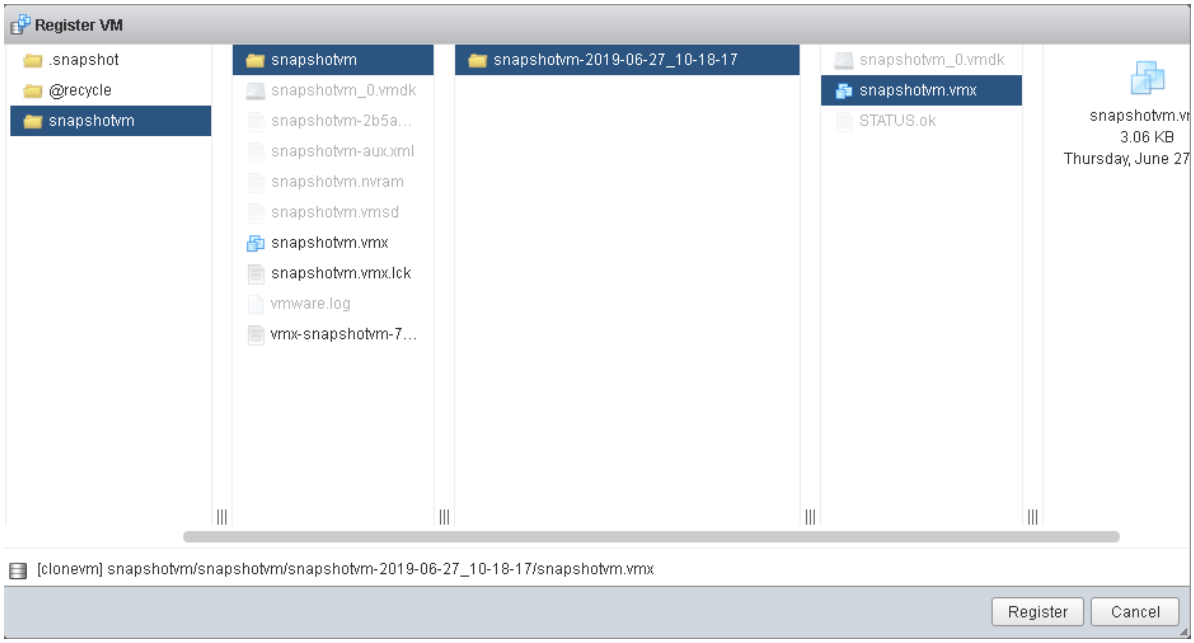
3. After the clone is completed, change the permission from RO to RW in shared folder page on web UI.



4. Assign the folder with RW permission for NFS protocol, like what we did for the NAS-a.



5. Go to ESXi server, mount the NFS shared folder of NAS-b as Datastore..
6. Right-click on the Datastore, you shall be able to see VM replicated from NAS-a, and you may then register this VM and try to boot it up after a rollback of the taken snapshot on VM.


Register VM
.snapshot
@recycle
snapshotvm
snapshotvm
snapshotvm_0.vmdk
snapshotvm-2b5a...
snapshotvm-aux.xml
snapshotvm.nvram
snapshotvm.vmsd
snapshotvm.vmx
snapshotvm.vmx.lck
vmware.log
vmx-snapshotvm-7...
snapshotvm-2019-06-27_10-18-17
snapshotvm_0.vmdk
snapshotvm.vmx
STATUS.ok
snapshotvm.vm
3.06 KB
Thursday, June 27
[clonevm] snapshotvm/snapshotvm/snapshotvm-2019-06-27_10-18-17/snapshotvm.vmx
Register
Cancel

7. Done.

Appendix

Related Documents

There are related documents which can be downloaded from the website.

- XCubeNAS QIG (Quick Installation Guide)
- XCubeNAS Hardware Manual
- XCubeNAS QSM 3.0 Software Manual
- Compatibility Matrix
- White Papers
- Application Notes

Technical Support

Do you have any questions or need help trouble-shooting a problem? Please contact QSAN Support, we will reply to you as soon as possible.

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- Via Skype Chat, Skype ID: qsan.support
  (Service hours: 09:30 - 02:00, Monday - Friday, UTC+8, Summer time: 09:30 - 01:00)
- Via Email: support@qsan.com

