

XCubeNAS Series Application Note

Achieve DR Solution with XCubeNAS on VMware with Snapshot Consistency



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Executive Summary

This application note provides technical guidance for setting up DR (<u>Disaster Recovery</u>) solution in <u>VMware</u> 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 <u>Snapshot</u> <u>Replica</u> 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.



	C	(Control Panel			Q.	(?)
> System		Folder Map	Shared Folder	NFS Host	Windows Network Host		
 > Storage > File Sharing Q User Q Group Q Domain Security Q Folder > Network Service 	Fokler list Q Search folder 41	Information Folder name Description Location WORM	fs1 fd1 None Used Available	6.13 GB 143.86 GB	Files	1 0	
		Total size 149.99 GB NFS access right You can set the NFS access right of the network share. IP address Access right Async * Read / Write Yes					+ 🖉 🛱
			Add NFS Hos	t			
	IP address or domain Access right Root squash Async write	* Read / Writ	e v				
					Cancel Confirm	n	

- 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 <u>firstly take snapshot on the</u> <u>VM from ESXi server itself and replicate the .VMDK file along with the taken snapshots</u> <u>together to the remote site, after the data (.VMDK + snapshots) is replicated to the remote</u> <u>site, register and rollback the taken snapshot after mounting the Volume of NAS-b</u>, 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 $i | egrep -- '--\|-CHILD|^\|-ROOT'
| wc -1`
        GuestName=$(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] <mark>esxcli s</mark> Mount Point	storage filesy Volume Name		Mounted	Tvpe
Size Free	votume Name	0010	nounteu	Type
/vmfs/volumes/d9565750-1 aa e2d81	Test1	d9565750-1 aa e2d81	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 299712512 83927040		5b569d10-09e1c583-0226-001b21bd5ed0	true	vfat

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-
laae2d81/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.



🐼 Manage snapsho	its - TestVM					
🔯 Take snapshot	🍙 Restore snapshot	🚱 Delete snapshot	🗙 Delete all	🛛 🎲 Edit snapshot 🛛	C Refresh	
▲ 🚰 TestVM ▲ 🔞 2 ▲ 🐼 3						
O Yo	u are here					
						_
					Close	

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

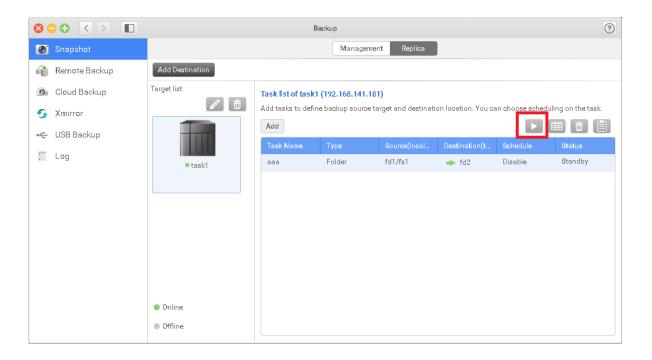
9. The configuration from ESXi server side has been completed.

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.

8			Back	nb					?
0	Snapshot			Mana	gement	Replica			
2	Remote Backup	Folder and LUN list	Information						
9	Cloud Backup		fd2/replica			Last access status	2019, Frida	y, Jun. 28, 10:39:	:08
5	Xmirror			📕 Usi	ecl	8.62GB	Туре	Folder	
÷	USB Backup	Search	6%	Sn	apshot	OGB	Max snapshot	128	Ø
n	Log	System/UserHome fd2/replica	0 %	📒 Fre	е	141.37GB	Schedule	Disable	Ø
		1		Са	acity	149.99GB	Clone from	<u> </u>	
			Snapshot list						
						Backup time		Total snap	shots: 2
						019, Friday, Jun. 28, 1			
					2	019, Friday, Jun. 28, 1	0:39:08		

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



	C	C	Control Panel			(Q,	0
> System		Folder Map	Shared Folder	NFS Host	Windows Netwo	ork Host		
✓ Storage	Create							
Overview	Fokler list	Location	fd2					
Disk	* ~	WORM	None					
🕋 Pool	Q Search folder		 Used 	8.61 GB	-	Folders	1	
Volume	Clonedata_clone	6 %	Available	132.76 GB		Files	0	
🙀 Virtual Volume			Total size	141.37 GB	i			
📓 Block Storage		Threshol	d notification					
ssp Cache		Use	rhas					Ŭ
Deduplication		Use	d 6%		ormation 80%		 Warning 	90%
Performance Tuning		Permission						
 File Sharing 		Owner	admin		*			
👤 User		Owning group	Administrator_G	roup	×			
👷 Group		Account	User	~		(Q Search u	ser and group
🧟 Domain Security		Username	Pre	view	🔵 Read / Writ	e 🗸 Re	ead onl y	Deny access
🛃 Folder		admin	Rea	d only	0		Ø	0
> Network Service			•	« < <mark>1</mark>	of 1	> >>		·
								Apply

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



	C		Control Panel			٩	?
> System		Folder Map	Shared Fold	n NFS Host	Windows Network Host		
 Storage File Sharing 	Folder list	Information Folder name	fs1				*
Luser R Group Comain Security Folder	fa1	Description Location WORM	fd1 None Used	6.13 GE	Folders	1	
Network Service		4 % NFS access rig You can set the		143.86 GE 149.99 GE t of the network sh		0	
		IP address *		ocess right ead / Write	Async Yes	Root so No	juash
			Add NFS H	st			
	IP address or domain Access right Root squash Zaync write	* Read / Writ	e	~			
					Cancel Confir	m	

- 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		🚞 snapshotvm		늘 snapshotvm-2019-06-27_10-18-17		snapshotvm_0.vmdk			
📁 @recycle		🧾 snapshotvm_0.vmdk				🗿 snapshotvm.vmx			
🚞 snapshotvm		snapshotvm-2b5a				STATUS.ok		snapshotvm.v 3.06 KB	
		snapshotvm-aux.xml						3.06 KB Thursday, June 27	
		snapshotvm.nvram							
		snapshotvm.vmsd							
		🎒 snapshotvm.vmx							
		snapshotvm.vmx.lck							
		📄 vmware.log							
		vmx-snapshotvm-7							
_			Ш		III				
[clonevm] snapshotvm/snapshotvm/snapshotvm-2019-06-27_10-18-17/snapshotvm.vmx									
📄 (clonevm) snapshotvm/	onah:	shownyshapshown-2019-00	5-27						
						R	egis	ter 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
- <u>Compatibility Matrix</u>
- White Papers
- <u>Application Notes</u>

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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