

How to Adjust Performance in VMware

XCubeNXT Series Best Practice

July 2020

OVERVIEW

This document will guide customers how to use the XCubeNXT storage system to adjust performance in VMware ESXi server. The correct settings will make the application more powerful. The applicable models are XN8024D and XN8016D.

CONFIGURE STORAGE

Before configuring the storage, follow some guidelines to get the best performance.

 Disable Memory cache protection: If you can tolerate a short RPO (Recovery Point Objective), disabling Memory cache protection setting will increase IOPS by 2 times and write throughput by up to 5 times. Please go Control Panel -> General Settings -> System, uncheck Memory cache protection checkbox, and then click the Apply button.



CAUTION

TIP

Disabling the **Memory cache protection** function will improve performance, but risk the short tolerance of RPO (Recovery Point Objective). Default is enabled.



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is recommended to con

It is recommended to connect a UPS (uninterruptible power supply) or generator to prevent power outages.

- 2. **Create two pools:** The XCubeNXT series features Dual-Active controller architecture. Both controllers concurrently provide storage services in real time. Active-Active architecture doubles the available host bandwidth and cache-hit ratio which ensures there is no wasted resource in the system. Therefore, the best practice is to create at least two pools assigned to each controller, and let both controllers work together.
- Create a RAID 50 pool if disks > 8: If the number of member disks is larger than 8, it is recommended to create a RAID 50 pool for best performance. Otherwise, create a RAID 5 for optimal.



4. **Enable hybrid SSD cache:** Except uses all flash (all SSDs), putting some SSDs in a traditional HDD pool and enabling hybrid SSD cache can improve performance.

Now you have the entire plan to configure storage. The following are the steps to configure storage settings.

1. Follow this video clip - <u>QSAN NAS Tutorial: NAS Storage Overview and connecting CIFS</u> <u>from Windows</u> to create a pool and a volume.

CONFIGURE ISCSI IN VMWARE ESXI

Make sure that all the IP addresses of the NIC ports to be used for iSCSI connection can ping to the LAN ports on the XCubeNXT system, please consider configuring different network segments for each NIC port and LAN port, this will make it easier to distinguish and troubleshoot afterward. If there are 4 NIC ports on the server side, the example of the configurations are on the following.

- Server1 NIC1 (192.168.1.1/24) -->> XCubeNXT CTRL1-LAN1 (192.168.2.1/24)
- Server1 NIC2 (192.168.2.1/24) -->> XCubeNXT CTRL2-LAN2 (192.168.2.2/24)
- Server2 NIC1 (192.168.3.1/24) -->> XCubeNXT CTRL1-LAN1 (192.168.3.2/24)
- Server2 NIC2 (192.168.4.1/24) -->> XCubeNXT CTRL2-LAN2 (192.168.4.2/24)





The following are the steps to configure iSCSI in VMware ESXi server.

1. For the network configuration in VMware ESXi server, it is recommended to set the IP addresses to the different network segment.



INFORMATION

It is unable to specify the source NIC port to log in to the target iSCSI portal defined on Linux in a standard manner. If all IP addresses are in the same network segment, the operating system will always use the same NIC as the source to login to a different iSCSI portal, the overall performance of the source NIC will be limited.

 Follow this video clip - <u>Quick Installation setup with XCubeNXT(Cluster CIFS/NFS, MPIO</u> <u>iSCSI LUN)</u> and <u>Virtualizing Your iSCSI LUN in VMware with the Simplest Way</u> to log in to the iSCSI target and complete the login process. Read this white paper - <u>How to</u> <u>configure iSCSI initiator in ESXi 6.x</u> page 18 to learn and configure MPIO from the ESXi server side.



INFORMATION

Please DO NOT create a 4K block size volume if you are going to use this volume in VMware ESXi environment, Because VMware does not yet support 4K block size external storage (Feb. 2020).

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TIP

It is recommended to set the PSP (path selection plug-in) to Round Robin, and remember to use VMware Knowledge Base - <u>Adjusting Round Robin</u> <u>IOPS limit from default 1000 to 1 (2069356)</u> to adjust the IOPS value from 1000 to 1.



3. If you want to add another HBA (Host Bus Adapter), please make sure to follow the instructions below for proper configuration. Assign the PCIE device in the ESXi server to the VM.

Protocol Endpoints					2.	2.	
I/O Filters	DirectPath I/O PCI	Devices Available to v	MIS		REFRESH	EDIT	
 Networking 	ID	▼ Status	Y Vendor Name	Т	Device Name	Ŧ	
Virtual switches	0000:84:00.0	Available	Intel Corporation		Ethernet Controller 10 Gigabit X5	540-AT2 ^	
VMkernel adapters	0000:84:00:1	Available	Intel Corporation		Ethernet Controller 10 Gigabit X5	540-AT2	
Physical adapters							
TCP/IP configuration							
 Virtual Machines 							
VM Startup/Shutdo							
Agent VM Settings							
Default VM Compati							
Swap File Location							
 System 							
Licensing							
Host Profile							
Time Configuration							
Authentication Servi						-	
Certificate							
Power Management							
Advanced System S							
System Resource Re.							
Firewall							
Services							
Security Profile							
System Swap							
- Hardware			No items selected				
Processors			No Remb Beleeted				
1 Memory							
PCI Devices							
T CT D'CTICCD							

Figure 0-2 Add an HBA in ESXi Server



4. Check the PCI devices. After performing this operation, you have to reboot the ESXi server.

Edit PCI Devic	e Availability	192.168.161.101		
ID	Status	Vendor Name	Device Name	ESX/ESXi Device
🖵 🚺 0000:00:1D	Unavailable	Intel Corporation	C610/X99 series chip	
4 🔯 0000:00:01.0	Not Configurable	Intel Corporation	Xeon E7 v3/Xeon E5	
🗆 📴 0000:01:	Unavailable	LSI Logic / Symbios L	LSI2308_1	
4 🚺 0000:00:03.0	Not Configurable	Intel Corporation	Xeon E7 v3/Xeon E5	
🗆 📴 0000:04:	Unavailable	nVidia Corporation	Audio device	
🗆 📴 0000:04:	Unavailable	NVIDIA Corporation	GM107GL [Quadro K6	
4 🔃 0000:80:02.0	Not Configurable	Intel Corporation	Xeon E7 v3/Xeon E5	
🗹 📴 0000:84:	Available	Intel Corporation	Ethernet Controller 10	
Z 0000:84:	Available	Intel Corporation	Ethernet Controller 10	
▲ 📴 0000:00:1C.0	Not Configurable	Intel Corporation	C610/X99 series chip	
🗆 📴 0000:05:	Unavailable	Intel Corporation	1210 Gigabit Network	vmnic1

No items selected

CANCEL OK

Figure 0-3

Check the PCI Devices



5. Visit the VM and edit the device.



Figure 0-4 Edit the Device

dit Settings 2012			
tual Hardware VM Options	1		
	ADD NEW D	EVIC	
> CPU	2 V CD/DVD Drive	CD/DVD Drive	
> Memory	8 GB V Hard Disk		
Hard disk 1	40 GB V Existing Hard Disk		
SCSI controller 0	LSI Logic SAS Network Adapter SCSI Controller	Network Adapter	
> Network adapter 1	VM Network VM Net		
CD/DVD drive 1	Datastore ISO File VIMe Controller Shared PCI Device		
> PCI device 0	0000:84:00.0 Ethernet Controller 10 Giver PCI Device		
> PCI device 1	0000:84:00.1 Ethernet Controller 10 Gigabit X540-AT2 Intel - 🗸		
Video card	Specify custom settings \sim		
VMCI device	Device on the virtual machine PCI bus that provides support for the virtual machine communication interface		
> Other	Additional Hardware		

Figure 0-5 Add New PCI Device



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> PCI device 1	0000:84:00.1 Ethernet Controller 10 Gigabit X540-AT2 Intel : V
✓ New PCI device	0000:84:00.0 Ethernet Controller 10 Gigabit X540-AT2 Intel ${\scriptstyle \lor}$
	Note: Some virtual machine operations are unavailable when PCI/PCIe passthrough devices are present. You cannot suspend, migrate with vMotion, or take or restore snapshots of such virtual machines.
> Video card	Specify custom settings $ \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! $
VMCI device	Device on the virtual machine PCI bus that provides support for the virtual machine communication interface
> Other	Additional Hardware



Figure 0-6 New PCI Device is Added





INFORMATION

If you encounter any issues regarding the disconnection between the VMware ESXi server and the storage, VMware Support may ask you the question about the ACK delay function. QSAN products support delayed ACK. The storage side is the receiver of this function. We have our own mechanism to control the queue buffer, and then ACK to the initiator (client) for optimizing performance. In fact, disabling ACK on the ESXi server will not affect the iSCSI service at all. If this can help customers and make them satisfied, it can be adjusted on the ESXi side.

CONFIGURE NFS IN VMWARE ESXI

Make sure that all the IP addresses of the NIC ports to be used for NFS connection can ping to the LAN ports on the XCubeNXT system, please consider configuring different network segments for each NIC port and LAN port, this will make it easier to distinguish and troubleshoot afterward. If there are 4 NIC ports on the server side, the example of the configurations are on the following.

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- Server2 NIC1 (192.168.3.1/24) -->> XCubeNXT CTRL1-LAN1 (192.168.3.2/24)
- Server2 NIC2 (192.168.4.1/24) -->> XCubeNXT CTRL2-LAN2 (192.168.4.2/24)



The following are the steps to configure NFS in VMware ESXi server.

- 1. Follow this video clip <u>Quick Installation setup with XCubeNXT(Cluster CIFS/NFS, MPIO</u> <u>iSCSI LUN)</u> and <u>QSAN XCubeNAS Tutorial - Mounting NFS Shared Folder from VMware</u> <u>vSphere</u> to mount NFS share folders.
- 2. If you experience performance degradation when testing performance, please refer to the Section <u>Configure iSCSI in VMware ESXi</u> and follow the instructions.



REFERENCES

There are some related materials for references.

Video Clips

- Quick Installation setup with XCubeNXT(Cluster CIFS/NFS, MPIO iSCSI LUN)
- <u>QSAN NAS Tutorial: NAS Storage Overview and connecting CIFS from Windows</u>
- Virtualizing Your iSCSI LUN in VMware with the Simplest Way
- QSAN XCubeNAS Tutorial Mounting NFS Shared Folder from VMware vSphere

Documents

- Best Practice iSCSI Performance Tuning
- White Paper <u>How to configure iSCSI initiator in ESXi 6.x</u>
- VMware Knowledge Base <u>Adjusting Round Robin IOPS limit from default 1000 to 1</u> (2069356)
- White Paper <u>XCubeNXT Performance Tuning</u>