QSAN
Official Document

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.

1. **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

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

TIP

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.
3. **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 - QSAN NAS Tutorial: NAS Storage Overview and connecting CIFS from Windows 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)

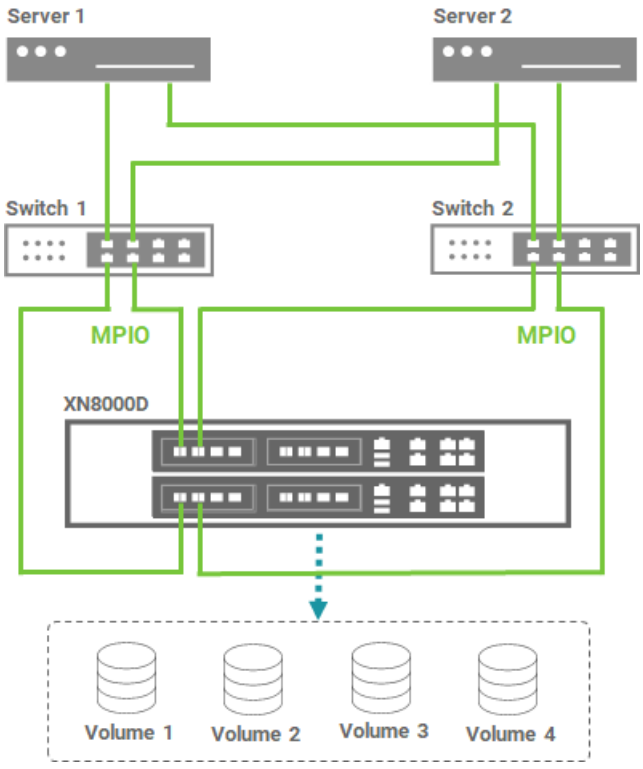

Figure 1 Topology for iSCSI

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.

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

TIP

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

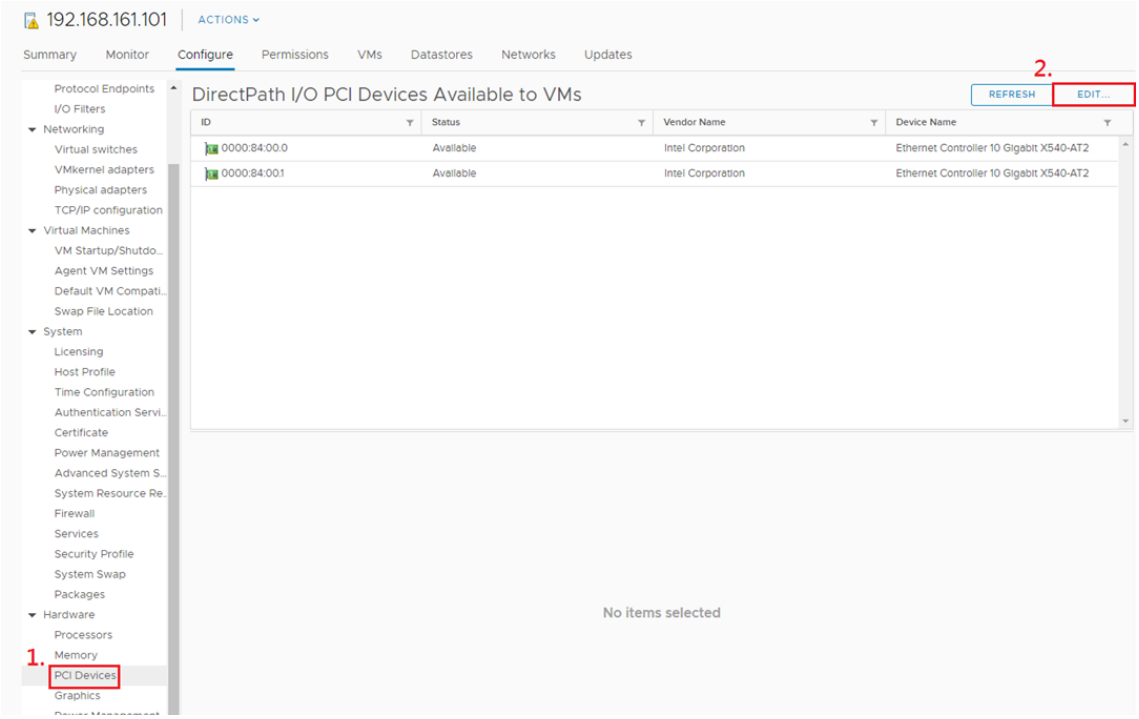

Figure 0-2 Add an HBA in ESXi Server

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

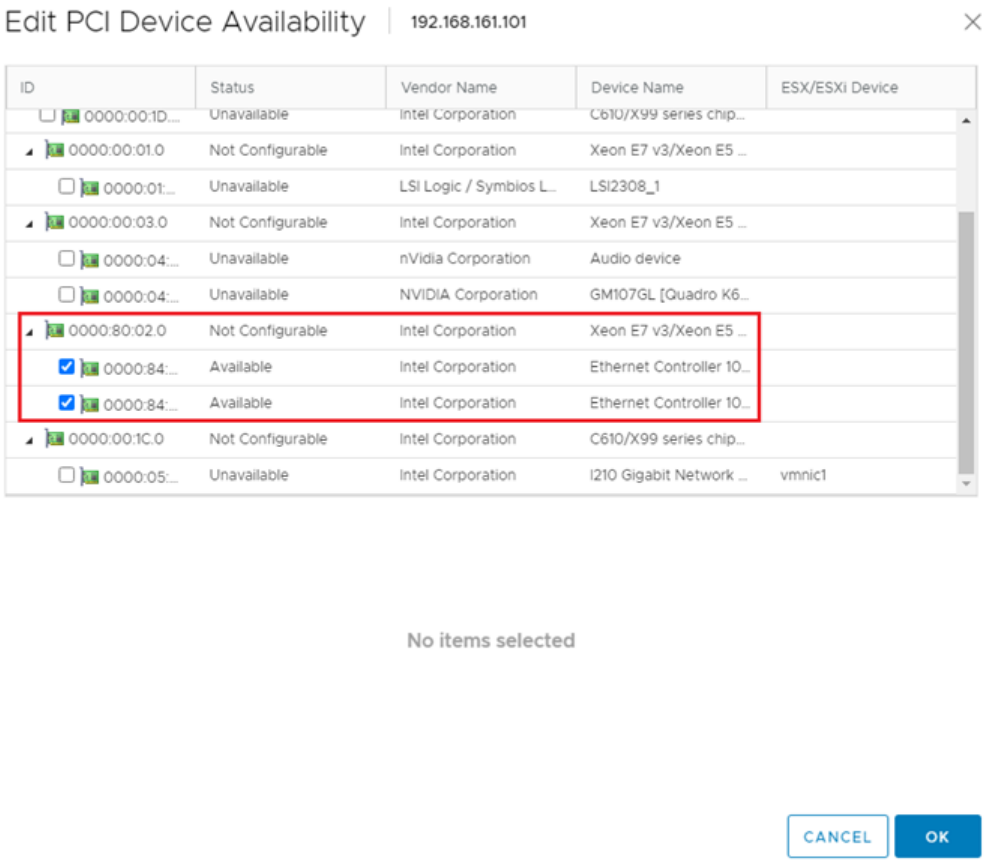

Figure 0-3 Check the PCI Devices

5. Visit the VM and edit the device.

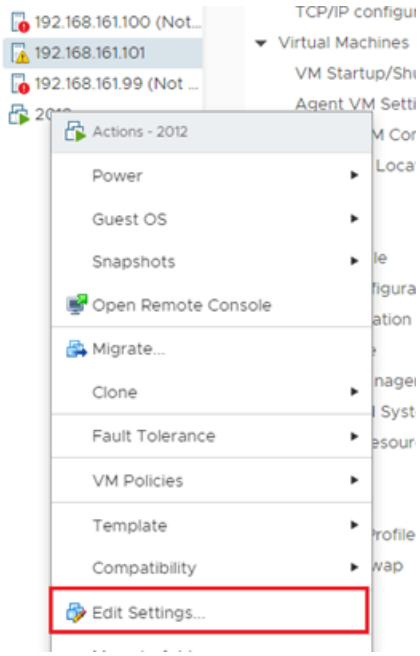

Figure 0-4 Edit the Device

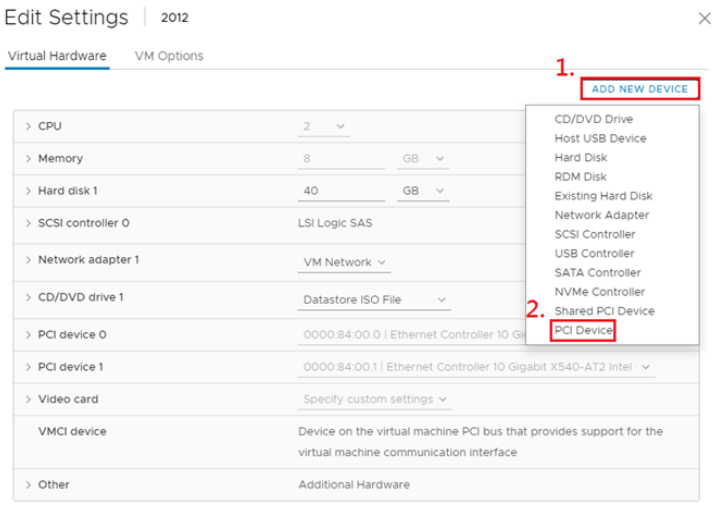

Figure 0-5 Add New PCI Device

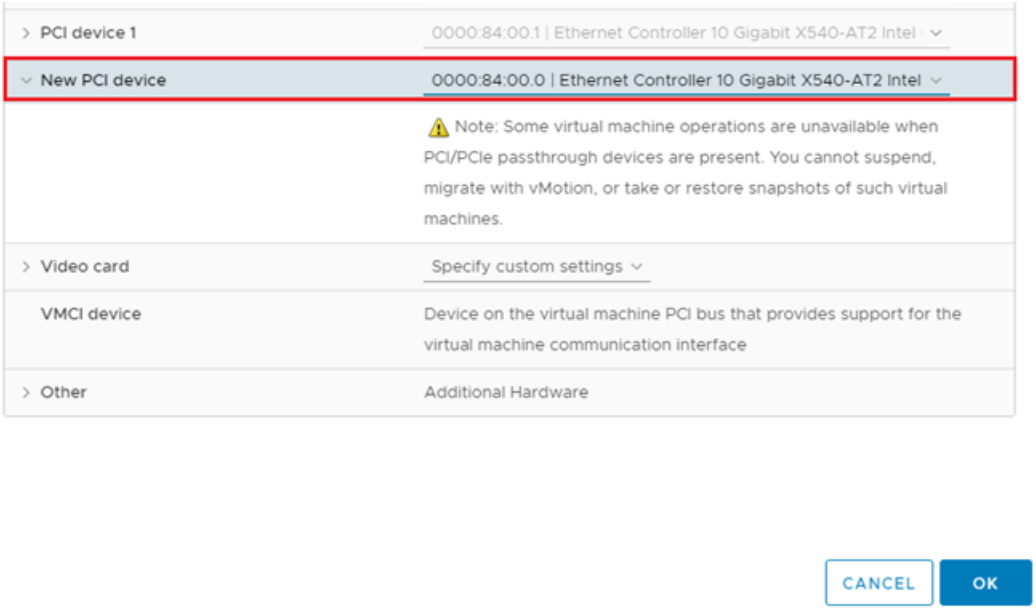

Figure 0-6 New PCI Device is Added

TIP

It is recommended add the HBA into VMware. Otherwise, performance may drop a lot if using the default settings.

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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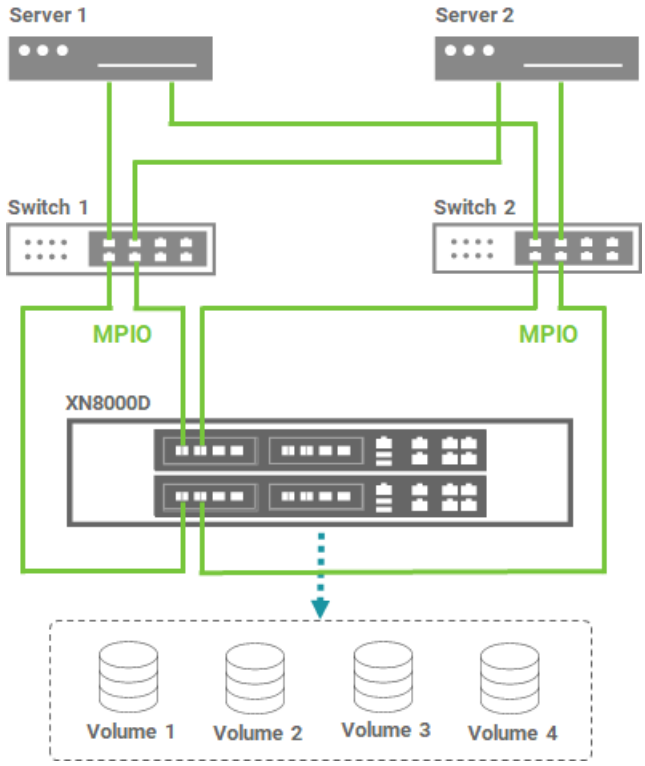

Figure 7 Topology for NFS

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

1. Follow this video clip - Quick Installation setup with XCubeNXT(Cluster CIFS/NFS, MPIO iSCSI LUN) and QSAN XCubeNAS Tutorial - Mounting NFS Shared Folder from VMware vSphere to mount NFS share folders.
2. If you experience performance degradation when testing performance, please refer to the Section - Configure iSCSI in VMware ESXi 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)
- QSAN NAS Tutorial: NAS Storage Overview and connecting CIFS from Windows
- 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 - How to configure iSCSI initiator in ESXi 6.x
- VMware Knowledge Base - Adjusting Round Robin IOPS limit from default 1000 to 1 (2069356)
- White Paper - XCubeNXT Performance Tuning