

# Configure iSCSI on VMware using QSAN XCubeNAS

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### Preface

### About This Guide

This best practice document provides technical guidance for optimizing the configuration and trying to get the best performance of QSAN's XCubeNAS products in the VMware virtualization environment, and it is intended for use by system administrators, NAS designers, storage consultants, or anyone who has purchased these products and is familiar with server and computer network, network administration, storage system installation and configuration, network attached storage management, and relevant protocols.



#### CAUTION:

Do NOT attempt to service, change, disassemble or upgrade the equipment's components by yourself. Doing so may violate your warranty and expose you to electric shock. Refer all servicing to authorized service personnel. Please always follow the instructions in this owner's manual.

### **Technical Support**

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

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- Via Telephone: +886-2-7720-2118 extension 136 (Service hours: 09:30 - 18:00, Monday - Friday, UTC+8)
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- Via Email: <a href="mailto:support@qsan.com">support@qsan.com</a>



### Information, Tip and Caution

This manual uses the following symbols to draw attention to important safety and operational information.



#### **INFORMATION:**

INFORMATION provides useful knowledge, definition, or terminology for reference.



#### TIP:

TIP provides helpful suggestions for performing tasks more effectively.



#### CAUTION:

CAUTION indicates that failure to take a specified action could result in damage to the system.

### 1.1. Environment

| Host:            | VMware ESXi server 6.x   |
|------------------|--|
| NICs:            | VMnic2 (management)<br>VMnic0/VMnic1 (used for connecting to XCubeNAS) |
| Storage:         | QSAN XCubeNAS  |
| Firmware:        | V3.0.0   |
| iSCSI data port: | 172.16.135.10/24<br>172.16.136.10/24                                   |
| LUN attached:    | Target0  |
| Host:            | VMware ESXi server 6.x   |



### 1.2. Diagram



### 2.1. Create iSCSI target and LUN on XCubeNAS

Please follow the attached <u>Tutorial</u> to setup iSCSI target(s) and LUN(s) you need for the VMware environment. Please be reminded that the Allow multiple sessions from one or more iSCSI initiators must be checked when creating an iSCSI target on XCubeNAS.

|                      |            |           | Create a targe     | t and map a LUN     |      |      |
|----------------------|------------|-----------|--------------------|---------------------|------|------|
| Target n             | iame       | Test1     |                    |                     |      |      |
| IQN iqn.2            |            | iqn.2004  | -08.com.qsan:xn    | -fffffffff:iscsi.Te | st1  |      |
| 🗌 Enab               | ble CHAP   |           |                    |                     |      |      |
| User 1               |            |           |                    |                     |      |      |
| User 2               |            |           |                    |                     |      |      |
| User 3 No selected ( |            |           |                    |                     |      |      |
|                      |            |           |                    |                     |      |      |
|                      |            |           |                    |                     |      |      |
|                      |            |           |                    |                     |      |      |
| CRC Che              | ecksum     |           | 🗌 Header digest    | 🗌 Data digest       |      |      |
| 🕑 Allov              | w multiple | esessions | from one or more i | SCSI initiators.    |      |      |
|                      |            |           |                    |                     |      |      |
|                      |            |           |                    | Cancel              | Back | Next |



#### 2.2. Login iSCSI target using software iSCSI initiator on VMware

Users can either use VMware vSphere client or VMware Web client to configure the software iSCSI initiator. We are using VMware vSphere client to connect to the ESXi server directly as an example here.

1. Disk Dr Login the ESXi server from VMware vSphere Client.



 In Configuration tab, modify Networking setting to add a VMkernel network (It is the TCP/IP stack which handles traffic for ESXi server services, such as vMotion, iSCSI, and NFS).



| Hardware          | View  | vSphere Standard Swit      | ch   |                  |               | 23 |
|-------------------|-------|----------------------------|--|------------------|---------------|----|
| Health Status     | Netw  | vorking                    |  | Refresh A        | dd Networking | P  |
| Processors        |       |                            |  |                  |               |    |
| Memory            | Stand | and Switch: vSwitch0       |  | Remove Pro       | operties      |    |
| Storage           |       | Virtual Machine Port Group |  | hysical Adapters |               |    |
| Networking        |       | VM Network                 | 0  | 🕳 🌆 vmnic2 1000  | Full 🖓        |    |
| Storage Adapters  | E 1   | 1 virtual machine(s)       | and the second s |                  |               |    |
| Network Adapters  | 1     | WIN2K8R2                   | <b>B</b> +   |                  |               |    |
| Advanced Settings | E T   | VMkernel Port              |  |                  |               |    |
| Power Management  | 무미    | Management Network         | <b>Q</b>   |                  |               |    |

3. Make sure the **VMkernel** connection is selected.

| Connection Type | - Connection Types   |
|-----------------|--|
|                 | connection rypes   |
|                 | C Virtual Machine  |
|                 | Add a labeled network to handle virtual machine network traffic.                                     |
|                 | • VMkernel   |
|                 | The VMkernel TCP/IP stack handles traffic for the following ESXi services: vSphere vMotion, iSCSI, f |

4. Create the first virtual switch and make sure to choose the right network interface which is connected to the same network with XCubeNAS.

| Ietwork Access | Select which vSphere standard switch will handle<br>vSphere standard switch using the unclaimed ne | e the network t<br>twork adapters | raffic for this connection. You may also crea<br>s listed below. | ate a new |
|----------------|--|-----------------------------------|--|-----------|
|                | Create a vSphere standard switch<br>Intel Corporation 82574L Gigabit N                             | Speed<br>etwork Conn              | Networks   |           |
|                | Vmnic0   | 1000 Full                         | None   |           |
|                | Vmnic1   | 1000 Fuli                         | None   |           |
|                | G Use vSwitch0   | Speed                             | Networks   |           |
|                | Intel Corporation 82572EI Gigabit  | Ethernet Con                      | troller  |           |
|                | vmnic2   | 1000 Full                         | 192, 168.0, 1-192, 168, 255, 254                                 |           |
|                | Preview:   |                                   |  |           |
|                | VMkernel Port  | Physical Adapters                 | 0  |           |
|                |  |                                   |  |           |
|                |  |                                   |  |           |
|                |  |                                   |  |           |
|                |  |                                   |  |           |



5. Specify **Network Label** and setup a proper **VMkernel** network IP which is used to connect to the iSCSI data port of XCubeNAS.

| Connection Type     | Port Group Properties |   |
|---------------------|-----------------------|---|
| Connection Settings | Network Label:        | VMkernel-ISCSI 1                                |
|                     | VLAN ID (Optional):   | None (0)  |
|                     |                       | ☐ Use this port group for vMotion               |
|                     |                       | Use this port group for Fault Tolerance logging |
|                     |                       | Use this port group for management traffic      |
|                     | Preview:              |   |
|                     | VMkernel Port         | Physical Adapters                               |
|                     | which best            |   |
|                     |                       |   |
|                     |                       |   |
|                     |                       |   |
|                     |                       |   |
|                     |                       |   |
|                     |                       |   |
|                     |                       |   |

| VMkernel - IP Connection<br>Specify WMkernel IP set<br>Connection Type<br>Network Access<br>Connection Settings<br>IP Settings<br>Summary | on Settings ttings ttings C Obtain IP settings automatically C Use the following IP settings: IP Address: IP Address: I72 Subnet Mask: 255 VMkernel Default Gateway: I72 Preview: VMkernel Port VMkernel-ISCSI I I72.16.136.1 | . 16 . 136 . 1<br>. 255 . 255 . 0<br>. 16 . 136 . 254 Edit |
|---|---|--|
|   |   | < Back Next > Cancel                                       |



6. Check all configurations are correct, and then click **Finish** button.

| Connection Type<br>Network Access     | Host networking will include the following new and modified standard switches:  |  |
|---------------------------------------|---|--|
| <u>Connection Settings</u><br>Summary | Wikemel Port     Physical Adapters       VMkernel-ISCS11     Image: Comparison of the second |  |
|                                       |   |  |

7. In order to create a multipath I/O session to the iSCSI target(s), it's necessary to add another **VMkernel** network, and we suggest to add another vSwitch for separating the network segment and preventing getting user confused



| onnection Type |   |  |  |  |
|----------------|---|--|--|--|
|                |   |  |  |  |
|                | Add a labeled network to handle virtual machine network traffic.  |  |  |  |
|                | • VMkernel  |  |  |  |
|                | The VMkernel TCP/IP stack handles traffic for the following ESXi services: vSphere vMotion, iSCSI, NFS,<br>and host management. |  |  |  |
|                |   |  |  |  |
|                |   |  |  |  |
|                |   |  |  |  |
|                |   |  |  |  |
|                |   |  |  |  |
|                |   |  |  |  |
|                |   |  |  |  |
|                |   |  |  |  |
|                |   |  |  |  |
|                |   |  |  |  |
|                |   |  |  |  |

| Connection Type<br>Network Access | Select which vSphere standard switch will handle the network traffic for this connection. You may also create a new<br>vSphere standard switch using the unclaimed network adapters listed below. |                                    |  |  |  |  |
|-----------------------------------|---|------------------------------------|--|--|--|--|
|                                   | Create a vSphere standard switch Spec<br>Intel Corporation 82574L Gigabit Network   | ed Networks<br>c Connection        |  |  |  |  |
|                                   | Vmnic1 1000   | 0 Full None                        |  |  |  |  |
|                                   | Use vSwitch0 Spee   | ed Networks                        |  |  |  |  |
|                                   | Intel Corporation 82572EI Gigabit Etherne   | et Controller                      |  |  |  |  |
|                                   | 🔽 🐨 vmnic2 1000   | 0 Full 192.168.0.1-192.168.255.254 |  |  |  |  |
|                                   | C Use vSwitch1 Spec   | ed Networks                        |  |  |  |  |
|                                   |   | 0 Full None                        |  |  |  |  |
|                                   | Proviour  |                                    |  |  |  |  |
|                                   | Microel Det Divisio   | Advance                            |  |  |  |  |
|                                   | VMkernel 😡  | vmnic1                             |  |  |  |  |
|                                   |   |                                    |  |  |  |  |
|                                   |   |                                    |  |  |  |  |
|                                   |   |                                    |  |  |  |  |
|                                   |   |                                    |  |  |  |  |
|                                   |   |                                    |  |  |  |  |
|                                   |   |                                    |  |  |  |  |
|                                   |   |                                    |  |  |  |  |

| huele Assess      | Port Group Properties |  |
|-------------------|-----------------------|--|
| nnection Settings | Network Label:        | VMkernel-iSCSI2  |
|                   | VLAN ID (Optional):   | None (0)   |
|                   |                       | ☐ Use this port group for vMotion  |
|                   |                       | ☐ Use this port group for Fault Tolerance logging  |
|                   |                       | ☐ Use this port group for management traffic   |
|                   | Preview:              |  |
|                   | VMkernel-ISCSI2       | Comparison of the second secon |
|                   |                       |  |
|                   |                       |  |

| VMkernel - IP Connecti<br>Specify VMkernel IP se<br>Connection Type<br>Network Access | On Settings<br>ttings<br>C Obtain IP settings automatically                                   |   |
|---|---|---|
| Connection Settings     IP Settings     Summary                                       | Use the following IP settings:     IP Address:     Subnet Mask:     VMkernel Default Gateway: | 172       16       .135       .1         255       .255       .255       .0         172       .16       .135       .251         Edt |
|   | Viliamel Port<br>VMkernel-ISCSI2<br>172.16.135.1  | Physical Adapters   |
|   |   | < Back Next > Cancel  |

| Ready to Complete<br>Verify that all new and                          | nodified vSphere standard switches are configured appropriately.  |  |
|---|---|--|
| Connection Type<br>Network Access<br>* Connection Settings<br>Summary | Host networking will include the following new and modified standard switches: Preview: VMkernel-iSCSI2 VMkernel-iSCSI2 172.16.135.1 Vmnic1 |  |
|   |   |  |



8. In **Configuration** tab, select **Storage Adapters** to list all available storage adapters. Choose **iSCSI Software HBA** and click **Properties** to modify the settings.



| ardware   | Storage Adapters  |                       | Add.                | Remove          | Refresh Resca  | an All |
|---|---|-----------------------|---------------------|-----------------|----------------|--------|
| Health Statue   | Device  | Туре                  | WWN                 |                 |                | -      |
| Pressente   | iSCSI Software Adapter  |                       |                     |                 |                |        |
| Processors  | Q vmhba34   | ISCSI                 | ign.1998-01.com.    | vmware:antony-e | sxi6-4a27394b: |        |
| Memory  | ICH10 2 port SATA IDE Cor   | atroller              |                     |                 |                |        |
| Storage   | 🕝 vmhba1  | Block SCSI            |                     |                 |                |        |
| Networking  | 🚱 vmhba33   | Block SCSI            |                     |                 |                |        |
| Storage Adapters  | ICH10 4 port SATA IDE Cor   | ntroller              |                     |                 |                |        |
| Network Adapters  | C vmbba0  | Block SCSI            |                     |                 |                |        |
| Advanced Settings   | wmhba32   | Block SCSI            |                     |                 |                |        |
| Power Management  |   |                       |                     |                 |                |        |
| DNS and Routing   |   |                       |                     |                 |                |        |
| Licensed Features   |   |                       |                     |                 |                |        |
| DNS and Routing   |   |                       |                     |                 |                | 100    |
| Authentication Services   | vmhba34   |                       |                     |                 | Prope          | erties |
|   | Model: iSCS   | SI Software Adapter   |                     |                 |                |        |
| Virtual Machine Startup/Shutdown  |   | 1998-01.com.vmware:an | tony-esxi6-4a27394b |                 |                |        |
| Virtual Machine Startup/Shutdown  | iSCSI Name: iqn.  |                       |                     |                 |                |        |
| Virtual Machine Startup/Shutdown<br>Virtual Machine Swapfile Location<br>Sequrity Profile   | iSCSI Name: iqn.<br>iSCSI Alias:  | Devisee 0             | Dathar 0            |                 |                |        |
| Virtual Machine Startup/Shutdown<br>Virtual Machine Swapfile Location<br>Security Profile<br>Host Cache Configuration   | iSCSI Name: iqn.<br>iSCSI Alias:<br>Connected Targets: 0                                | Devices: 0            | Paths: 0            |                 |                |        |
| Virtual Machine Startup/Shutdown<br>Virtual Machine Swapfile Location<br>Security Profile<br>Host Cache Configuration   | iSCSI Name: iqn.<br>iSCSI Alias:<br>Connected Targets: 0<br>View: Devices Paths         | Devices: 0            | Paths: 0            |                 |                |        |
| Virtual Machine Startup/Shutdown<br>Virtual Machine Swapfile Location<br>Security Profile<br>Host Cache Configuration<br>System Resource Reservation                      | iSCSI Name: iqn.<br>iSCSI Alias:<br>Connected Targets: 0<br>View: Devices Paths         | Devices: 0            | Paths: 0            |                 |                | 1.     |
| Virtual Machine Startup/Shutdown<br>Virtual Machine Swapfile Location<br>Security Profile<br>Host Cache Configuration<br>System Resource Reservation<br>Agent VM Settings | iSCSI Name: iqn.<br>iSCSI Alias:<br>Connected Targets: 0<br>View: Devices Paths<br>Name | Devices: 0            | Paths: 0            | ntifier         |                | F      |

9. In **iSCSI initiator Properties**, select **General** tab and click **Configure** to enable iSCSI initiator.

| <ul> <li>iSCSI Initiator (vmhba34)</li> </ul> | ) Properties                                  |           |
|---|---|-----------|
| General Network Configura                     | ation   Dynamic Discovery   Static Discovery  |           |
| Name:<br>Alias:                               | iqn. 1998-01.com.vmware:antony-esxi6-4a27394b |           |
| Target discovery method                       | ds: Send Targets, Static Target               |           |
| Software Initiator Propert                    | ies   |           |
| Status:                                       | Enabled                                       |           |
|   |   |           |
|   |   |           |
|   |   |           |
|   |   |           |
|   |   |           |
|   |   |           |
|   |   |           |
|   |   |           |
|   |   |           |
|   |   |           |
| Advance                                       | ed  | Configure |
|   |   | Glose     |



10. Next, please add another VMkernel port (default is one only) into the iSCSI initiator, so that the multipath session can be created smoothly.

|   | <ul> <li>VMkernel Adapter</li> </ul>           | Port Group Policy     | Path Status |
|---|--|-----------------------|-------------|
| VMkernel-iSCSI2 (vS                                       | witc vmk2                                      | Compliant             | Not Used    |
| 1   | m  |                       |             |
|   |  |                       |             |
|   |  | Add                   | . Remove    |
| Ikernel Port Binding Details                              | s:   | -                     |             |
| /irtual Network Adapt                                     | er   |                       |             |
| VMkernel:   | vmk2   |                       |             |
| Switch:   | vSwitch2                                       |                       |             |
| Port Group:   | VMkernel-iSCSI2                                |                       |             |
| Port Group Policy:  | 📀 Compliant                                    |                       |             |
| IP Address:   | 172.16.135.1                                   |                       |             |
| Subnat Mask   | 255.255.255.0                                  |                       |             |
| Subfict Husky   | oter   |                       |             |
| Physical Network Adap                                     |  |                       |             |
| Physical Network Adap<br>Name:                            | vmnic1   |                       |             |
| Physical Network Adap<br>Name:<br>Device:                 | vmnic1<br>Intel Corporation 82574              | L Gigabit Network Cor | nnection    |
| Physical Network Adap<br>Name:<br>Device:<br>Link Status: | vmnic1<br>Intel Corporation 82574<br>Connected | L Gigabit Network Cor | nnection    |

| If a targeted VMkernel   | listed.<br>I adapter is no<br>olicy.   | t listed, go to Host > Confi                              | iguration > | Networking to update |
|--|--|---|-------------|----------------------|
| ect VMkernel adapter to b  | and with the is  | SCSI adapter:   |             |                      |
| ort Group  |  | VMkernel Adapter  | Physi       | cal Adapter          |
| Management Networ  | rk(vSwitch0)   | vmk0  | EQ.         | vmnic2 (1000, Full)  |
| VMkernel-iSCSI1 (vS  | witch1)  | vmk1  | <b>1</b>    | vmnic0 (1000, Full)  |
| work Adapters Details:<br>irtual Network Adapte  | er   |   |             |                      |
| twork Adapters Details:<br>irtual Network Adapte   | er<br>umk1   |   |             |                      |
| twork Adapters Details:<br>irtual Network Adapter<br>VMkernel:<br>Switch-  | er<br>vmk1<br>vSwitch1   |   |             |                      |
| work Adapters Details:<br><b>irtual Network Adapt</b><br>VMkernel:<br>Switch:<br>Part Group:   | er<br>vmk1<br>vSwitch1<br>VMkernel   | -ISOST1   |             |                      |
| work Adapters Details:<br><b>irtual Network Adapt</b><br>VMkernel:<br>Switch:<br>Port Group:<br>IP Address:  | er<br>vmk1<br>vSwitch1<br>VMkernel-<br>172.16.13   | -iSCSI1<br>6.1  |             |                      |
| work Adapters Details:<br><b>irtual Network Adapt</b><br>VMkernel:<br>Switch:<br>Port Group:<br>IP Address:<br>Subnet Mask:  | er<br>vmk1<br>vSwitch1<br>VMkernel<br>172.16.13<br>255.255.2   | -iSCSI1<br>6.1<br>55.0                                    |             |                      |
| work Adapters Details:<br><b>irtual Network Adapt</b><br>VMkernel:<br>Switch:<br>Port Group:<br>IP Address:<br>Subnet Mask:<br><b>hysical Network Adap</b>                         | er<br>vmk1<br>vSwitch1<br>VMkernel-<br>172.16.13<br>255.255.2  | -iSCSI1<br>6.1<br>55.0                                    |             |                      |
| work Adapters Details:<br>irtual Network Adapter<br>VMkernel:<br>Switch:<br>Port Group:<br>IP Address:<br>Subnet Mask:<br>hysical Network Adap<br>Name:                            | er<br>vmk1<br>vSwitch1<br>VMkernel-<br>172.16.13<br>255.255.2<br>Ster<br>vmnic0                            | -iSCSI1<br>6.1<br>55.0                                    |             |                      |
| work Adapters Details:<br>irtual Network Adapter<br>VMkernel:<br>Switch:<br>Port Group:<br>IP Address:<br>Subnet Mask:<br>hysical Network Adap<br>Name:<br>Device:                 | er<br>vmk1<br>vSwitch1<br>VMkernel-<br>172.16.13<br>255.255.2<br>Ster<br>vmnic0<br>Intel Corp              | -iSCSI1<br>6.1<br>55.0<br>poration 82574L Gigabit N       | etwork Co   | nnection             |
| work Adapters Details:<br>irtual Network Adapter<br>VMkernel:<br>Switch:<br>Port Group:<br>IP Address:<br>Subnet Mask:<br>hysical Network Adap<br>Name:<br>Device:<br>Link Status: | er<br>vmk1<br>vSwitch1<br>VMkernel-<br>172.16.13<br>255.255.2<br>oter<br>vmnic0<br>Intel Corp<br>Connecte: | -iSCSI1<br>6.1<br>55.0<br>poration 82574L. Gigabit N<br>d | etwork Co   | nnection             |



11. Go to **Static Discovery** tab, click **Add** button to set iSCSI target IP, here is iSCSI data port of XCubeNAS, two paths will be added here.

| 2 C  | 3  |
|--|--|
| ISCSI Server: 172.16.136.10 Port: 3260 ISCSI Target Name: [qn.2004-08.com Parent: Authentication may need to be be established with the specifie | e configured before a session can<br>ed target.<br>CHAP<br>4<br>OK<br>Cancel |

| CSI Server Location | Target !                      | Name  |                                    |          |
|---------------------|-------------------------------|---|------------------------------------|----------|
| 72.16.136.10:3260   | iqn.200                       | 4-08.com.qsar                                     | X05                                |          |
| Ø A                 | dd Static Target              | Server  |                                    | ×        |
| IS<br>Pi            | CSI Server:<br>ort:           | 172.16.135.10<br>3260                             |                                    |          |
| is<br>Pi            | CSI Target Name:<br>arent:    | .qsar   | ibe00:dev                          | 10.ctr4  |
| Q                   | Authentication be established | on may need to be con<br>ed with the specified to | figured before a sess<br>rget.<br> | sion can |
|                     |                               |   |                                    | court    |



12. A **Rescan** window will pop up after the configuration is finished, click **Yes** button to rescan all devices.



13. After rescanning, the available LUNs will be listed in the **Details** column when selecting the **iSCSI software adapter**. Although only one LUN is created on XCubeNAS, there are two different physical paths to the same LUN, therefore the system displays two different records to the same LUN here.





### 2.3. Add a new storage using the iSCSI LUN

1. The LUN will be used as a virtual disk of the created guest OS. In **Configuration** tab, select **Storage** and click **Add Storage**.

| Hardware   | View: Datastores | Devices           |            |            |         |         |
|--|------------------|-------------------|------------|------------|---------|---------|
| Health Status  | Datastores       |                   |            | Refresh De | ete Add | Storage |
| Processors   | Identification   | / Device          | Drive Type | Capacity   | Free    | Туре    |
| Memory<br>• Storage<br>Networking<br>Storage Adapters<br>Network Adapters<br>Advanced Settings<br>Power Management | datastore1       | Local ATA Disk (t | Non-SSD    | 1.81 TB    | 1.70 TB | VMFS5   |

2. Select **Disk/LUN**, and click **Next** button.

| hsk/LUN | Storage Type   |
|---------|--|
|         | Disk/LUN<br>Create a datastore on a Fibre Channel, iSCSI, or local SCSI disk, or mount an existing VMFS volu             |
|         | C Network File System<br>Choose this option if you want to create a Network File System.                                 |
|         | Adding a datastore on Fibre Channel or iSCSI will add this datastore to all hosts that have access to the storage media. |
|         |  |

3. Select **Qsan iSCSI Disk**, and click **Next** button.

| Current Disk Layout      | Name                            | Path ID         | LUN / | Drive Type | Capacity |
|--------------------------|---------------------------------|-----------------|-------|------------|----------|
| Properties<br>Formatting | Qsan iSCSIDisk (naa.209a0013789 | iqn.2004-08.com | 0     | Non-SSD    | 2.93 TB  |
| Ready to Complete        |                                 |                 |       |            |          |
|                          |                                 |                 |       |            |          |
|                          |                                 |                 |       |            |          |
|                          |                                 |                 |       |            |          |
|                          |                                 |                 |       |            |          |
|                          | •                               |                 |       |            | ,        |

| Disk/LUN<br>Select Disk/LUN<br>Current Disk Layout<br>Properties<br>Formatimg<br>Ready to Complete | Review the current disk layout:   |                                     |                     |                      |            |
|--|---|-------------------------------------|---------------------|----------------------|------------|
|  | Device<br>Qsan iSCSI Disk (naa.209a001<br>Location<br>/vmfs/devices/disks/naa.209a00<br>Partition Format<br>Unknown | Drive Type<br>Non-SSD<br>137890be00 | Capacity<br>2.93 TB | Available<br>2.93 TB | LUN<br>0   |
|  |   | The hard disk is                    | blank.              |                      |            |
|  | There is only one layout configuration<br>pages.  | available. Use th                   | e Next button to p  | proceed with the ot  | her wizard |
|  | A partition will be created an  | d used                              |                     |                      |            |
|  |   |                                     |                     |                      |            |

4. Enter a name for the new datstore, and click **Next** button.

| Select Disk & UN                  | Enter a datastore name |  |
|-----------------------------------|------------------------|--|
| Current Disk Layout<br>Properties | SCSI storage           |  |
|                                   |                        |  |
|                                   |                        |  |
|                                   |                        |  |
|                                   |                        |  |
|                                   |                        |  |
|                                   |                        |  |
|                                   |                        |  |

5. Click **Next** button.

| Disk/LUN - Formatting<br>Specify the maximum file   | size and capacity of the datastore                                   |
|---|--|
| <u>Disk/LUN</u> <u>Select Disk/LUN</u> <u>Current Disk Layout</u> <u>Properties</u> <b>Formatting</b> Ready to Complete | Capacity  C Maximum available space  C Custom space setting  G000.00 |
|   |  |
|   |  |
|   | < Back Next > Cancel   |

6. Check all settings, then click **Finish** button.

| NUMBER OF THE OWNER | Disk layout:  |
|--|---|
|  | Device         Drive Type         Capacity         Li           Qsan ISCSI Disk (naa.209a001378         Non-SSD         2.93 TB         0           Location         /vmfs/devices/disks/naa.209a00137890be00         Partition Format         0           Primary Partitions         Capacity         VMF5 (Qsan ISCSI Disk (naa.209a0         2.93 TB |
|  | File system:  Properties Datastore name: ISCSI storane  |
|  | Formatting<br>File system: vmfs-5<br>Block size: 1 MB<br>Maximum Resize: 2 00 TB  |

7. A new storage is added under **Datastores** of the ESXi server. The ESXi server provides settings to the multipath I/O. We can select the iSCSI storage and click **Properties** to modify the settings.

| Getting Started Summary Virtua                            | I Machines Resource Allocation Per | formance Configuration | Users Events | Permissions |              |            |
|---|------------------------------------|------------------------|--------------|-------------|--------------|------------|
| Hardware  | View: Datastores Devices           | 5                      |              |             |              |            |
| Health Status   | Datastores                         |                        | Refre        | sh Delete   | Add Storage  | Rescan All |
| Processors  | Identification                     | Device                 | Drive Type   | Capacity    | Free Type    | LastU      |
| Memory  | datastore1                         | Local ATA Disk (t      | Non-SSD      | 1.81 TB     | 1.70 TB VMF5 | 5 2015/4   |
| <ul> <li>Storage</li> </ul>                               | iSCSI storage                      | Qsan iSCSI Disk (      | Non-SSD      | 2.93 TB     | 2.93 TB VMF5 | 55 2015/4  |
| Network Adapters<br>Advanced Settings<br>Power Management |                                    |                        |              | /           |              |            |
| Software  |                                    |                        |              |             |              |            |
| Licensed Features<br>Time Configuration                   | •                                  | III.                   |              | 1           |              | ,          |
| DNS and Routing   | Datastore Details                  |                        |              |             |              | Properties |
| Authentication Services                                   | iSCST storage on P4000             |                        |              | 3 02 TP     | Canadity     | Louis and  |

8. Select Manage Paths button.

| olume Properties<br>General   | 5  |                     | Format   |  |
|---|--|---------------------|--|--|
| Datastore Name:   | ISCSI storage  | Rename              | File System: VMFS 5.   | 61   |
| Total Capacity:   | 2.93 TB  | Increase            | Maximum File Size: 2.00 TB<br>Block Size: 1 MB   |  |
| xtents<br>VMFS file system ca<br>ctents, to create as                                   | an span multiple hard disk p<br>single logical volume.                           | artitions, or       | Extent Device<br>The extent selected on the left reside<br>disk described below.   | s on the LUN or physical   |
| xtents<br>VMFS file system ca   | an span multiple hard disk p   | artitions, or       | Extent Device<br>The extent selected on the left reside  | s on the LUN or physical   |
| ktents<br>VMFS file system ca<br>itents, to create a<br>ixtent<br>(san iSCSI Disk (na   | an span multiple hard disk p<br>single logical volume.<br>na.209a00137890be00):1 | Capacity<br>2.93 TB | Extent Device<br>The extent selected on the left reside<br>disk described below.<br>Device<br>Qsan iSCSI Disk (naa. 209a0013                                   | s on the LUN or physical   |
| ktents<br>VMFS file system ca<br>ktents, to create a<br>Extent<br>Qsan iSCSI Disk (na   | an span multiple hard disk p<br>single logical volume.<br>aa.209a00137890be00):1 | Capacity<br>2.93 TB | Extent Device<br>The extent selected on the left reside<br>disk described below.<br>Device<br>Qsan iSCSI Disk (naa. 209a0013.                                  | s on the LUN or physical Consolar . 2.93 TB                            |
| xtents<br>VMFS file system ca<br>xtents, to create a :<br>Extent<br>2san ISCSI Disk (na | an span multiple hard disk p<br>single logical volume.<br>18.209a00137890be00):1 | Capacity<br>2.93 TB | Extent Device<br>The extent selected on the left reside<br>disk described below.<br>Device<br>Qsan ISCSI Disk (naa. 209a0013.<br>Primary Partitions            | s on the LUN or physical Connectiv 2.93 TB Connectiv                   |
| xtents<br>VMES file system co<br>xtents, to create a<br>Extent<br>Qsan iSCSI Disk (na   | an span multiple hard disk p<br>single logical volume.<br>a.209a00137890be00):1  | Capacity<br>2.93 TB | Extent Device<br>The extent selected on the left reside<br>disk described below.<br>Device<br>Qsan ISCSI Disk (naa. 209a0013.<br>Primary Partitions<br>1. VMFS | s on the LUN or physical<br>. 2.93 TB<br>Cloudly<br>2.93 TB            |
| ktents<br>VMFS file system cc<br>tents, to create a :<br>Extent<br>Qsan iSCSIDisk (na   | an span multiple hard disk p<br>single logical volume.<br>na.209a00137890be00):1 | Capacity<br>2.93 TB | Extent Device<br>The extent selected on the left reside<br>disk described below.<br>Device<br>Qsan ISCSI Disk (naa. 209a0013<br>Primary Partitions<br>1. VMFS  | s on the LUN or physical<br>Converse<br>2.93 TB<br>Converse<br>2.93 TB |

9. In Manage Paths window, it will display how many paths connect to this LUN and what path is active now. The policy is in Fixed mode by default, it can be modified by the drop-down menu. There are three types available, Fixed, Most Recently Used, and Round Robin. The difference between Fixed and Most Recently Used is that Fixed will make the active path to failback once the preferred path is restored from a failure status, but Most Recently Used policies will use only one path to transfer the iSCSI network traffic at the same time, whereas Round Robin policy will use all available paths to transfer the data. Remember to click Change button for applying the setting.

| Path Selection:<br>Storage Array Type<br>Paths | Round Robin (VMware)<br>Most Recently Used (VMware)<br>Round Robin (VMware) |                                   |     |        | • (      |
|--|---|-----------------------------------|-----|--------|----------|
| Paths  |   |                                   |     |        |          |
|  | (inter (vinter)   |                                   |     |        |          |
| Runtime Name                                   | Target  |                                   | LUN | Status | Preferre |
| vmhba34:C1:T2:L0                               | ign.2004-08.com.gsar  | be00:de                           | 0   | Active |          |
| Name: v  | mhba34:C1:T2:L0   |                                   |     |        |          |
| ISCSI<br>Adapter: iq<br>ISCSI Alias:           | n, 1998-01.com.vmware:antony-esxi6-<br>n. 2004-08.com.qsantechnology:p400q  | 4a27394b<br>-00090be00:dev10.ctr2 | 2   |        |          |

| Policy<br>Path Selection:                                   |                            | Round Robin (VMware)   |                     |        |      |              | •         | ange   |
|---|----------------------------|--|---------------------|--------|------|--------------|-----------|--------|
| Storage Array I   | ype:                       | VINV_SAIP_ALUA   |                     |        |      |              |           |        |
| Runtime Name  | Ta                         | rget   |                     | LUN    | Stat | us           | Preferred | -      |
| vmhba34:C1:T2   | :L0 iqr                    | n.2004-08.com.qsar   | ibe00:de            | 0      | •    | Active (I/O) |           |        |
| vmhba34:C0:T0   | :L0 iq                     | n.2004-08.com.qsar   | be00:de_            | 0      |      | Active (I/O) |           | -      |
|   |                            |  |                     |        |      |              |           |        |
| Name:<br>Runtime Name:                                      | vmhba<br>vmhba             | 134:C1:T2:L0<br>34:C1:T2:L0                                    |                     |        |      |              | R         | Refres |
| Name:<br>Runtime Name:                                      | vmhba<br>vmhba             | 134:C1:T2:L0<br>34:C1:T2:L0                                    |                     | 87<br> |      |              | R         | Refres |
| Name:<br>Runtime Name:<br>iSCSI<br>Adapter:<br>iSCSI Alias: | vmhba<br>vmhba<br>ign. 199 | 134:C 1:T2:L0<br>34:C 1:T2:L0<br>98-01.com.vmware:antony-esxit | 5-482739 <b>-</b> 6 |        |      |              | R         | lefres |



# 2.4. Add a new HDD to the created guest OS using the added datastore

 Now the datastore can be added as a virtual disk of guest OS. Right click on the guest OS and select Edit Settings.



2. In the Hardware tab, click Add button.



3. Select Hard Disk, and click Next button.



| Device Type         Select a Dak         Create a Dak         Advanced Options         Ready to Complete         CD/DVD Drive         CD/DVD Drive         USB Controller         ISB Device (unavailable)         CD/DVD Drive         USB Controller         ISB Device (unavailable)         Ethernet Adapter |             |
|--|-------------|
| SCSI Device  | al Machine. |

4. Choose Create a new virtual disk, and click Next button.



5. Select Specify a datastore or datastore cluster, and click Browse button.

| dvanced Options<br>eady to Complete | Disk Provisioning   Thick Provision Lazy Zeroed  Thick Provision Eager Zeroed  Thin Provision  Location  Store with the virtual machine  Specify a datastore or datastore cluster:  Browse |
|-------------------------------------|--|
|-------------------------------------|--|

6. Select **iSCSI storage**, and click **OK** button.

| lame                                  |                    | Drive Type           | Capacity   | Provisioned | Free    | Туре  | Thin Provisioning |
|---------------------------------------|--------------------|----------------------|------------|-------------|---------|-------|-------------------|
| datastor                              | re1                | Non-SSD              | 1.81 TB    | 150.90 GB   | 1.66 TB | VMFS5 | Supported         |
| iSCSI sto                             | orage              | Non-SSD              | 2.93 TB    | 987.00 MB   | 2.93 TB | VMFS5 | Supported         |
|                                       |                    |                      |            |             |         |       |                   |
|                                       |                    |                      |            |             |         |       |                   |
|                                       |                    |                      |            |             |         |       |                   |
|                                       |                    |                      |            |             |         |       |                   |
| Disable Sto                           | orage DRS          | S for this virtual n | nachine    |             |         |       |                   |
| Disable Sto                           | orage DRS<br>tore: | S for this virtual n | nachine    |             |         |       |                   |
| Disable Sto<br>elect a datast         | orage DRS<br>tore: | S for this virtual n | Capacity P | rovisioned  | Free    | Туре  | Thin Provisioning |
| Disable Sto<br>elect a datast<br>lame | orage DRS<br>tore: | 5 for this virtual n | Capacity P | rovisioned  | Free    | Туре  | Thin Provisioning |
| Disable Sto<br>elect a datast         | orage DRS<br>tore: | S for this virtual n | Capacity P | rovisioned  | Free    | Type  | Thin Provisioning |
| Disable Sto<br>elect a datast<br>lame | orage DRS<br>tore: | S for this virtual n | Capacity P | rovisioned. | Frée    | Type: | Thin Provisioning |

7. Leave all settings by default, click **Next** button.



| evice Type<br>elect a Disk<br>reate a Disk<br>dvanced Options<br>eady to Complete | Specify the advanced options for this virtual disk. These options do not normally need to be changed.           Virtual Device Node           SCSI (0:1)   |
|---|--|
|   | Mode Independent Independent Independent disks are not affected by snapshots. C Persistent Changes are immediately and permanently written to the disk. C Nonpersistent Changes to this disk are discarded when you power off or revert to the snapshot. |

8. Check all settings, then click **Finish** button.

| Device Type<br>Select a Disk                          | Options:   |  |  |
|---|--|--|--|
| recet a Disk<br>Advanced Options<br>Ready to Complete | Hardware type:<br>Create disk:<br>Disk capacity:<br>Disk provisioning:<br>Datastore:<br>Virtual Device Node:<br>Disk mode: | Hard Disk<br>New virtual disk<br>40 GB<br>Thick Provision Lazy Zeroed<br>datastore 1<br>SCSI (0:1)<br>Persistent |  |
|   |  |  |  |

9. Verify that the multipath is working by IOmeter on the created guest OS.





10. In this case we used only two iSCSI connections to the iSCSI target on XCubeNAS, so the maximum throughput we get is expected.



#### **INFORMATION:**

If you have installed **10GbE** addon card, the maximum performance for a two-ports **10GbE** card is around **2000MB/s**, but please be sure that the installed HDDs are capable of delivering the performance up to **2000MB/s**.



### 2.5. Logging iSCSI target directly from the guest OS

Users may also login the iSCSI target on XCubeNAS directly from the created guest OS, however, before you try to do so, please make sure the LUN will only be used by this guest OS, otherwise you have to confirm that there is LUN masking well-configured on the XCubeNAS, to prevent any possibility of data inconsistency caused by multiple hosts log in the same LUN in the same time.

1. Remove the new added Hard disk on the guest OS.



2. Remove the new added datastore on ESXi server.



| Hardware  | -   | View: Datastores Devices   |  |  | 4           |             |
|---|-----|----------------------------|--|--|-------------|-------------|
| Health Status   | 1 3 | Datastores                 |  | Refresh                                    | Deleté      | Add Storage |
| Processors  |     | Identification             | Device   | Drive Type                                 | Capacity    | Free        |
| Memory  |     | datastore1                 | Local ATA Disk (t                                      | Non-SSD                                    | 1.81 TB     | 1.66 TB     |
| Storage   | 3   | iSCSI storage              | Qsan iSCSIDisk (                                       | Non-SSD                                    | 2.93 TB     | 2.89 TB     |
| Network Adapters<br>Advanced Settings<br>Power Management |     | Do you war<br>This operati | it to remove the selected<br>ion will permanently dele | datastore(s)?<br>te all the files associat | ed with the |             |
| Software  |     | virtual maci               | hines on this datastore.                               |  |             |             |
| Licensed Features   |     |                            |  |  |             |             |
| Time Configuration  | 10  | 1                          | 5  | Ver  | No          |             |
| DNS and Routing   |     | Da                         |  | res  | 140         |             |
| to the King Keep Consistent                               |     | Ua                         |  |  |             |             |

- 3. Log out the iSCSI target(s).
- 4. Add a new VM port group to each created vSwitch (VMkernel-iSCSI1, iSCSI2).



| nfiguration               | Summary  | VSphere Standard Switch Propertie | 25               |       |
|---------------------------|--|-----------------------------------|------------------|-------|
| vSwitch<br>VMkernel-iSC51 | 120 Ports  | Number of Ports:                  | 120              |       |
| - Winter i Debit          | in the second seco | Advanced Properties               |                  |       |
|                           |  | MTU:                              | 1500             |       |
|                           |  | Default Policies                  |                  |       |
|                           |  | Security                          |                  |       |
|                           |  | Promiscuous Mode:                 | Reject           |       |
|                           |  | MAC Address Changes:              | Accept           |       |
|                           |  | Forged Transmits:                 | Accept           |       |
|                           |  | Traffic Shaping                   |                  |       |
|                           |  | Average Bandwidth:                | -                |       |
|                           |  | Peak Bandwidth:                   |                  |       |
|                           |  | Burst Size:                       |                  |       |
|                           |  | Failover and Load Balancing       |                  |       |
|                           |  | Load Balancing:                   | Port ID          |       |
|                           |  | Network Failure Detection:        | Link status only |       |
|                           |  | Notify Switches:                  | Yes              | L. L. |
| 4                         | in the second  | Failback:                         | Yes              |       |
| Add                       | Edit Remove  | Active Adapters:                  | vmnic0           |       |

| Connection Type<br>Connection Settings<br>Summary | Connection Types  Virtual Machine Add a labeled network to handle virtual machine network traffic.  VMkernel The VMkernel TCP/IP stack handles traffic for the following ESXi services: vSphere vMotion, iSCSI, NFS, and host management. |
|---|---|
|---|---|



| nnection Type | Port Group Properties                  |                       |   |  |
|---------------|--|-----------------------|---|--|
| mmary         | Network Label:                         | VM Network 2 - iSCSI1 |   |  |
|               | VLAN ID (Optional):                    | None (0)              | • |  |
|               |  |                       |   |  |
|               | Preview:                               |                       |   |  |
|               | -Virtual Machine Port Group            | Physical Adapters     |   |  |
|               | -VMkernel Port                         |                       |   |  |
|               | VMkernel-iSCSI1<br>vmk1 : 172.16.136.1 | <u>.</u>              |   |  |
|               | 4                                      |                       |   |  |
|               |  |                       |   |  |
|               |  |                       |   |  |
|               |  |                       |   |  |
|               |  |                       |   |  |

5. And so on for the other vSwitch, there will be another 2 VM port group available for VM guest OS.

| Star | ndard Switch: vSwitch1                                   |          | Remove.                 | Propertie    | es       |
|------|--|----------|-------------------------|--------------|----------|
| þ    | VMkernel Port<br>VMkernel-iSCSI1<br>vmk1:172.16.136.1    | <u>@</u> | - Physical Adapters<br> | 1000 Full    | <b>P</b> |
| P    | Virtual Machine Port Group<br>VM Network 2 - iSCSI1      | 2        |                         |              |          |
| Star | idard Switch: vSwitch2                                   |          | Remove.                 | ., Propertie | es       |
| P    | -Wikernel Port<br>VMkernel-iSCSI2<br>vmk2 : 172.16,135.1 | <u>@</u> | - Physical Adapters<br> | 1000 Full    | P        |
| P    | -Virtual Machine Port Group                              |          |                         |              |          |

6. Add 2 more Ethernet NIC to the created guest OS, using the VM port group that was created.

| Ø  | Add Hardware |  | ×                    |  |  |  |
|--|--------------|--|----------------------|--|--|--|
| Device Type<br>What sort of device do you wish to add to your virtual machine?   |              |  |                      |  |  |  |
| Device Type       Choose the type of device you wish to add.         Ready to Complete       Information         This device can be added to this Virtual Machine       Information         CD/DVD Drive       CD/DVD Drive         USB Controller       Controller         Ethernet Adapter       Hard Disk         SCSI Device       SCSI Device |              |  |                      |  |  |  |
|  |              |  | < Back Next > Cancel |  |  |  |

| Hardware Options Resources |                       | Virtual Machine Version: 11 |
|----------------------------|-----------------------|-----------------------------|
| Show All Devices           | Add Remove            |                             |
| Hardware                   | Summary               |                             |
| Memory                     | 4096 MB               |                             |
| CPUs                       | 1                     |                             |
| Uideo card                 | Video card            |                             |
| VMCI device                | Deprecated            |                             |
| SCSI controller 0          | LSI Logic SAS         |                             |
| CD/DVD drive 1             | [datastore1] ISO/7600 |                             |
| Hard disk 1                | Virtual Disk          |                             |
| 🔄 Floppy drive 1           | Client Device         |                             |
| Network adapter 1          | VM Network            |                             |
| New NIC (adding)           | VM Network 2 - iSCS   |                             |
| New NIC (adding)           | VM Network 3 - iSCS   |                             |
|                            |                       |                             |
|                            |                       |                             |
|                            |                       |                             |
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|                            |                       |                             |
|                            |                       |                             |

- Configure the new added 2 NICs on the guest OS, so that the guest OS can ping to iSCSI data port on the XCubeNAS, and log in the iSCSI target.
- 8. Verify the performance via IOmeter.

| <mark>≥ 8 <u>9</u> 7</mark>                              | 3 / 0 2 4   |   |
|--|---|---|
| Topology I<br>All Managers<br>WiN-0820MV45C:<br>Worker 1 | Disk Targets   Network Targets   Access Spec<br>Targets<br>C:""<br>Volume(85d6b9c4-ece7-11e4-a31<br>1: "Q:son | ifications Results Display Test Setup  <br>Maximum Disk Size<br>0 Sectors<br>Starting Disk Sector<br>0<br>f of Outstanding I/Os<br>64 per target<br>Use Fixed Seed<br>Fixed Seed<br>Fixed Seed Value<br>Test Connection Rate<br>Test Connection Rate<br>Mite 10 Data Pattern<br>Repeating bytes |



## 3. Gain the Maximum Performance

### 3.1. Create multiple iSCSI LUNs and assign to different purpose

Please check the illustration below to realize how the data of a virtualization environment is recommended to be implemented.



#### TIP:

In the example above we separated the data of APP and OS on each VM to be stored in different LUNs, which gives you a clear idea about how to create an optimal configuration for virtualization.

It is suggested to have one iSCSI target attached to one LUN to have a better performance and data flow management.



### 3.2. Adjust IOPS value

The default IOPS value (rr\_min\_io) on an ESXi server when using multipath is 1000, it is recommended to adjust the value from 1000 to 1 to get the best performance according to the KB described by VMware:

https://kb.vmware.com/selfservice/microsites/search.do?language=en\_US&cmd=displayK C&externalId=2069356

To adjust the IOPS parameter from the default 1000 to 1, run this command in ESXi 5.x/6.x:

for i in `esxcfg-scsidevs -c |awk '{print \$1}' | grep naa.xxxx`; do esxcli storage nmp psp roundrobin deviceconfig set --type=iops --iops=1 --device=\$i; done

### 3.3. Adjust path selection policy (PSP)

Adjust path select policy for multipath transmission. In the practice, we use Round-Robin to implement to achieve the best practice. Please refer to the information regarding to PSP:

**Round Robin (RR)**: The VMW\_PSP\_RR policy uses an automatic path selection, rotating through all available paths, enabling the distribution of load across the configured paths.

https://kb.vmware.com/selfservice/microsites/search.do?language=en\_US&cmd=displayK C&externalId=1011340

## 4. Support and Other Resources

### 4.1. Getting Technical Support

After installing your device, locate the serial number on the sticker located on the side of the chassis and register your product at <u>partner.qsan.com/</u> (End-User Registration). We recommend registering your product in QSAN partner website for firmware updates, document download, and latest news in eDM. To contact QSAN Support, please use the following information.

- 1. Via the Web: <u>http://www.qsan.com/en/contact\_support.php</u>
- Via Telephone: +886-2-7720-2118 extension 136 (Service hours: 09:30 - 18:00, Monday - Friday, UTC+8)
- Via Skype Chat, Skype ID: qsan.support (Service hours: 09:30 - 02:00, Monday - Friday, UTC+8, Summertime: 09:30 - 01:00)
- 4. Via Email: support@qsan.com

#### **Collect Information for Analysis**

- 1. Product name, model or version, and serial number
- 2. Firmware version
- 3. Error messages or screenshot images
- 4. Product-specific reports and logs
- 5. Add-on products or components installed
- 6. Third-party products or components installed

#### Information for Technical Support

The following system information is necessary for technical support, please refer to following for what and where to get the information of your XN3002T model.

If the technical support requests you to download the service log, please navigate to the QSM UI  $\rightarrow$  Control Panel  $\rightarrow$  System  $\rightarrow$  Maintenance  $\rightarrow$  Import/Export  $\rightarrow$  Export system diagnosis report, and then click the Export button.



|                            | C                                 | Control Panel                                      | ٩          | 0 |
|----------------------------|-----------------------------------|--|------------|---|
| <ul> <li>System</li> </ul> |                                   | System Update System Recovery Impor                | t / Export |   |
| General Settings           | Import configuration              | file   |            |   |
| Network                    | Select configuration file         | e from your system.                                |            |   |
| Security                   | Import                            |  |            |   |
| Connection                 | Export configuration              | file   |            |   |
| Notification               | Select the type and clic          | k 'Export' button to export the configuration file |            |   |
| Power                      | <ul> <li>Configuration</li> </ul> |  |            |   |
| Log                        | O Accounts                        |  |            |   |
| Maintenance                | Configuration and a               | accounts   |            |   |
| > Storage                  | Export                            |  |            |   |
| > File Sharing             | Export system diagno              | osis report  |            |   |
| > Network Service          | Click 'Export' outton to          | export the system diagnosis report to your system. |            |   |
|                            | Export                            |  |            |   |
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### Appendix

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