

Huawei Storage Certification Training

# HCIA-Storage

## Scenario-based Practice of Basic Storage Service Configurations (for Block)

ISSUE: 5.0

(For Trainees)



HUAWEI TECHNOLOGIES CO., LTD.

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Huawei Technologies Co., Ltd.

Address:           Huawei Industrial Base Bantian, Longgang Shenzhen 518129  
                         People's Republic of China

Website:           <https://e.huawei.com>

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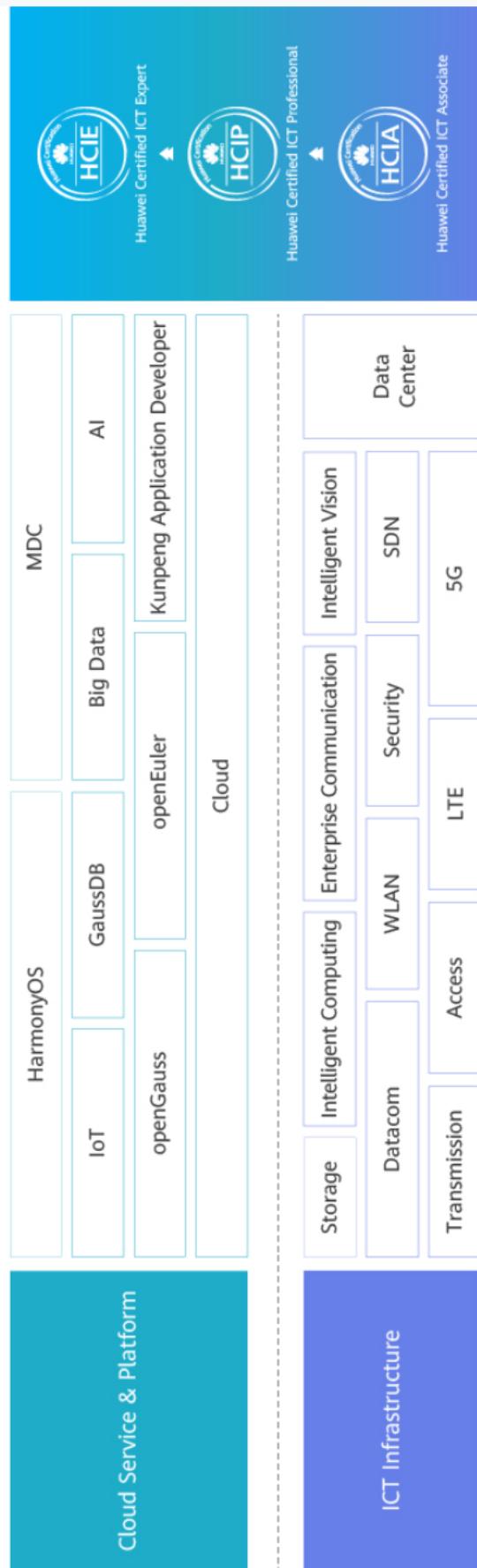
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## Huawei Certification



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# 1

# References and Tools

## 1.1 References

Commands and documents listed in this document are for reference only, and actual ones may vary with product versions.

1. Huawei OceanStor Dorado all-flash series product documentation

 **NOTE**

Features supported by Huawei OceanStor Dorado all-flash products vary between product models. For details, see the product documentation specific to the product model. Log in to the Huawei technical support website (<https://support.huawei.com/enterprise/en/index.html>) and type the name of a documentation or tool in the search box to browse and download the desired documentation or tool.

## 1.2 Software Tools

1. Huawei UltraPath

 **NOTE**

Log in to the Huawei technical support website (<https://support.huawei.com/enterprise/en/index.html>) and type **UltraPath** in the search box to search for, browse, and download the desired documentation or tool.

2. PuTTY

 **NOTE**

You are advised to use open-source software PuTTY to log in to a terminal. You can use the common domain name ([putty.org](http://putty.org)) of PuTTY to browse or download the desired document or tool.

## 1.3 Version Description

Name	Version	Quantity	Remarks
OceanStor Dorado V6	6.1.3	1	Recommended
Windows operating system (OS)	Windows Server 2012, Windows Server 2016	--	Recommended
Linux OS	SUSE, Red Hat, CentOS, and EulerOS	--	Recommended
S5700 switch	--	2	
UltraPath	31.0.1	--	Recommended

# 2 Scenario-based Practice of Basic Storage Service Configurations (for Block)

## 2.1 Course Overview

This course provides case studies and scenario-based practices to help trainees consolidate their knowledge on initial configuration and basic service deployment and implementation of Huawei OceanStor all-flash storage.

## 2.2 Objectives

- To understand common networking modes of storage services
- To plan and design networks
- To complete the initial configuration of the storage system
- To install UltraPath
- To plan and configure block services

## 2.3 Case Background

### NOTE

Cases in this document are for reference only, and configurations may vary according to the actual environment. For details, see the product documentation specific to the product model and version.

Company W needs a high-performance storage system to support new services. The planned upper-layer services are OLTP transactional databases. Company W purchases a Huawei OceanStor all-flash storage system to meet service development requirements and deploys two test servers to ensure proper service running. Server A runs the Windows OS, server B runs the Linux OS, and storage devices provide block storage services for the two servers over an IP network.

As a storage engineer, you are responsible for network planning and design, initial configuration, and block service configuration of the storage system.

## 2.4 Tasks and Suggested Answers

### 2.4.1 Scenario 1: Requirement Analysis, Planning, and Design

#### 2.4.1.1 Background

As a storage engineer, how do you plan networks?

#### 2.4.1.2 Question

1. Please analyze the business requirements of company W.

2. What operations must be performed to meet the requirements of company W? (For example, what needs to be planned?)

[Suggested Procedure]

For details, see **Install and Initialize > Installation Guide > Storage System Delivered Not as Bay > Installation Planning** in the desired product documentation.

3. What are the common networking modes of storage service? How do you avoid a single point of failure?

[Suggested Procedure]

For details, see **Install and Initialize > Installation Guide > Storage System Delivered Not as Bay > Installation Planning** in the desired product documentation.

#### 2.4.1.3 Task 1: Obtaining Device User Information

Plan and record the IP address and user information of the storage device based on the actual lab environment.

Device Name	Management IP Address	Subnet Mask	Gateway	Username	Password
Storage001					
Host001					
Host002					

[Suggested Procedure]

For details, see **Install and Initialize > Installation Guide > Storage System Delivered Not as Bay > Installation Planning** in the desired product documentation.

 **NOTE**

The following is for reference only, and actual information may vary depending on lab environment.

#### 2.4.1.4 Task 2: Designing the Service Network Topology

Draw lines to indicate the service network topology for this scenario based on the case background.



Linux host



Windows host



Ethernet switch



Huawei OceanStor all-flash storage

[Suggested Procedure]

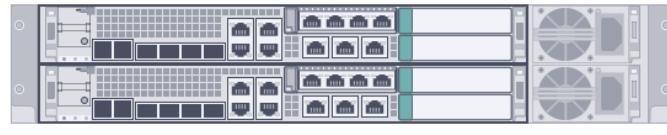
For details, see **Install and Initialize > Installation Guide > Storage System Delivered Not as Bay > Installation Planning** in the desired product documentation.

[Extension]

To ensure the security and stability of company W's services, use dual-switch networking to build the storage system. Draw the dual-switch networking topology.

### 2.4.1.5 Task 3: Planning the Front-End Service Network

Plan the device connections of the front-end service network.

Device Name	Device Connection Diagram
IP_Switch001	
IP_Switch002	
Host001	
Host002	
Storage001	

[Suggested Procedure]

For details, see Huawei Storage Networking Assistant  
(<https://support.huawei.com/onlinetoolsweb/sna/#/home>).

### 2.4.1.6 Task 4: Planning Service IP Addresses

Plan front-end service IP addresses based on the network topology.

Device Name	Port Location	IP Address	Subnet Mask	Gateway
Storage001				
Host001				
Host002				



NOTE

The following is for reference only, and actual information may vary depending on lab environment.

[Suggested Procedure]

For details, see **Install and Initialize > Installation Guide > Storage System Delivered Not as Bay > Installation Planning** in the desired product documentation.

## 2.4.2 Scenario 2: Initial Configuration

### 2.4.2.1 Background

After the network planning and design are complete, perform initial configuration on the storage system.

### 2.4.2.2 Question

What can be done in the initial configuration wizard of the Huawei OceanStor all-flash storage system?

### 2.4.2.3 Task 1: Performing Initial Configuration

After logging in to DeviceManager, perform initial configuration on the storage system in the initial configuration wizard, including: configuring basic information and creating a storage pool (excluding scanning for UltraPath hosts and allocating storage resources). Then, fill in the following form.

 **NOTE**

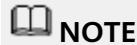
The initial configuration address is **<https://XXX.XXX.XXX.XXX:8088/initialize>**, where **XXX.XXX.XXX.XXX** indicates the IP address of the management network port of the storage system.

The following is for reference only, and actual information may vary depending on lab environment.

Basic Information	Result
Device name	
Device location	
Device time	
Storage pool name, capacity alarm threshold, and capacity used up alarm threshold	

### [Suggested Procedure]

For details, see **Install and Initialize > Initialization Guide > Logging In and Starting Initialization > Initially Configuring a Storage Device** in the desired product documentation.



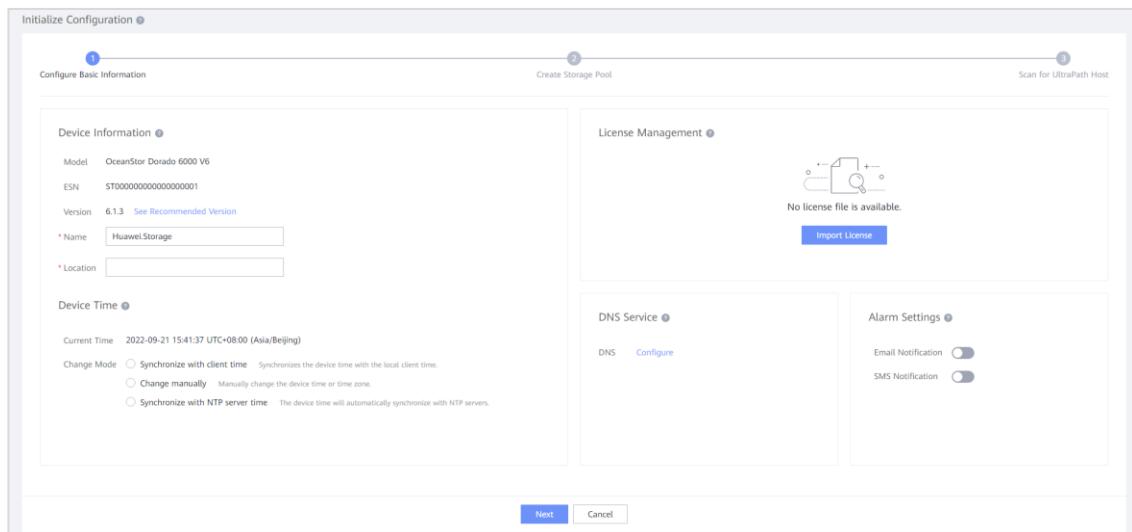
A license file is a credential for using basic storage features or value-added features. Before practices, check whether the license file is valid.

In this scenario, a license file has been imported and activated. You can manage the license on the initial configuration wizard.

### Step 1 Log in to DeviceManager and start the initial configuration.

If you log in to DeviceManager for the first time, the **Configure Basic Information** page is displayed.

To access the initial configuration wizard, enter <https://XXX.XXX.XXX.XXX:8088/initialize> in the web browser on your maintenance terminal. In this address, **XXX.XXX.XXX.XXX** indicates the IP address of the management network port.



### Step 2 In the **Device Information** area, configure the basic information of the storage device.



### Step 3 In the **Device Time** area, set the device time.

 NOTE

You can set the device time using any of the following methods: **Synchronize with client time**, **Change manually**, and **Synchronize with NTP server time**.

The first method is used in this lab test. Set the correct time zone and time. Otherwise, the time recorded in alarms or logs may differ from the actual time.

Device Time 

Current Time 2022-09-21 14:26:46 UTC+08:00 (Asia/Beijing)

Change Mode  Synchronize with client time Synchronizes the device time with the local client time.  
 Change manually Manually change the device time or time zone.  
 Synchronize with NTP server time The device time will automatically synchronize with NTP servers.

\* Client Time Zone    
Time After Change: 2022-09-21 14:29:38 UTC+08:00 (PRC)

#### Step 4 Import the license.

Click **Import License**. The **Import License** page is displayed on the right.

License Management 

No license file is available.

Click .

Import License 

You can activate the current or a new license file.  
After the license is activated, the DeviceManager GUI will change according to the features in the license. Please refresh your browser in time.

\* License File

License Status

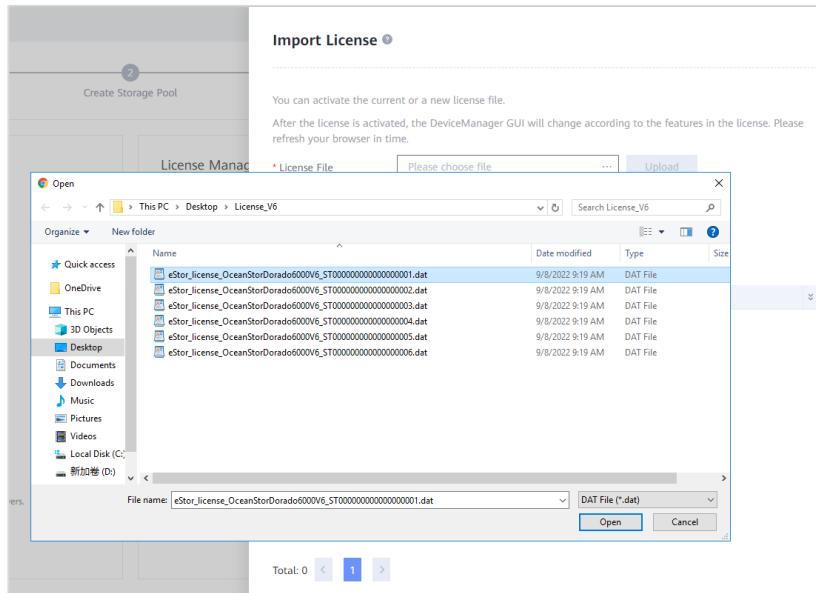
License Validity Period

Feature	Total Capacity	Invalid Date
		

No data.

Total: 0   

Select the desired license file and click **Open**.



**Click Upload.**



**View Feature, Total Capacity, and Invalid Date** of the imported license in the information display area.

**Click Activate.**

**Import License** 

You can activate the current or a new license file. After the license is activated, the DeviceManager GUI will change according to the features in the license. Please refresh your browser in time.

\* License File

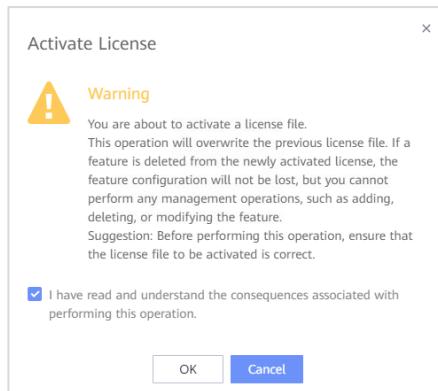
License Status **Expired**

License Validity Period **Temporary**

Feature	Total Capacity	Invalid Date
Management Console	Unlimited	2022-11-11
SmartThin	Unlimited	2022-11-11
SmartMigration	Unlimited	2022-11-11
SmartQoS	Unlimited	2022-11-11
HyperSnap (Snapshot)	Unlimited	2022-11-11
HyperReplication (Remote Repli...	Unlimited	2022-11-11

Total: 17    

Confirm your operation as prompted.



Click **Next**. The system saves the current settings and then displays the **Create Storage Pool** page.

Initialize Configuration @

1 Configure Basic Information      2 Create Storage Pool      3 Provision

**Device Information**

Model: OceanStor Dorado 6000 V6  
ESN: ST000000000000000000  
Version: 6.1.3 See Recommended Version

\* Name: Storage001  
\* Location: Hangzhou

**Device Time**

Current Time: 2022-09-21 14:30:51 UTC+08:00 (Asia/Beijing)

Change Mode:

- Synchronize with client time: Synchronizes the device time with the local client time.
- Change manually: Manually change the device time or time zone.
- Synchronize with NTP server time: The device will automatically synchronize with NTP servers.

\* Client Time Zone: UTC+08:00 (PRC)  
Time After Change: 2022-09-21 14:33:43 UTC+08:00 (PRC)

**License Management**

License File SN: LIC20220614EGCG50  
License File Format Version: AdaptiveLMV100R005C10SPC047  
Created: 2022-06-14 16:53:45  
[Update License](#)

**DNS Service**

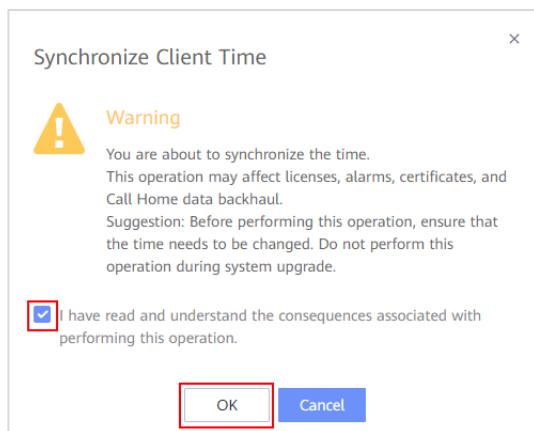
DNS      [Configure](#)

**Alarm Settings**

Email Notification:   
SMS Notification:

[Next](#)      [Cancel](#)

Confirm your operation as prompted.



The **Execution Result** dialog box is displayed. Click **Close**.

Execution Result

Total 3 Successful 3 Failed 0

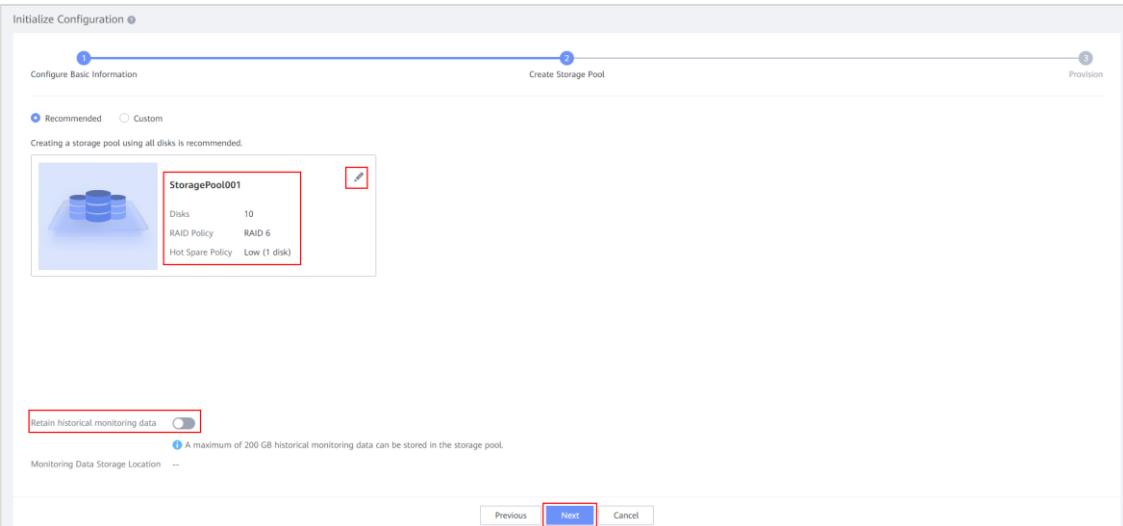
Operation	Status	Details
Modifying system information	Successful	--
Modifying the device time	Successful	--
Changing the device time zone	Successful	--

Total: 3 < 1/1 >

[Close](#)

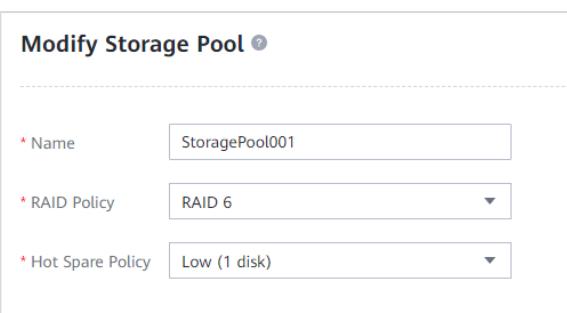
## Step 5 Create a storage pool in **Recommended** mode.

Select **Recommended**. The system creates a storage pool based on the default recommended value.



### NOTE

To modify parameter settings, click  . In the displayed **Modify Storage Pool** dialog box, set the storage pool parameters.



Determine whether to enable **Retain historical monitoring data**.

### NOTE

If you enable this function, historical monitoring data will be saved to the created storage pool. In this lab test, monitoring data is not saved. Therefore, disable **Retain historical monitoring data**.

Click **Next**. The system goes to the **Provision** page and displays the **Execution Result** of storage pool creation. Click **Close**.

**Execution Result**

**Create Storage Pool**

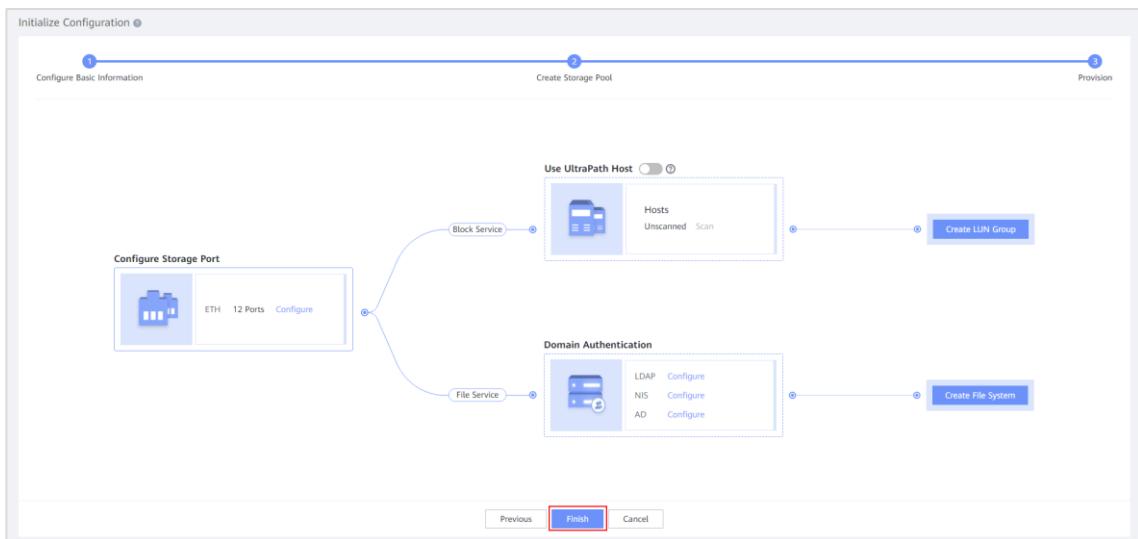
Progress: 75%

A background task has been created. You can close this page at any time and choose Insight > Task Center to view or operate the task.

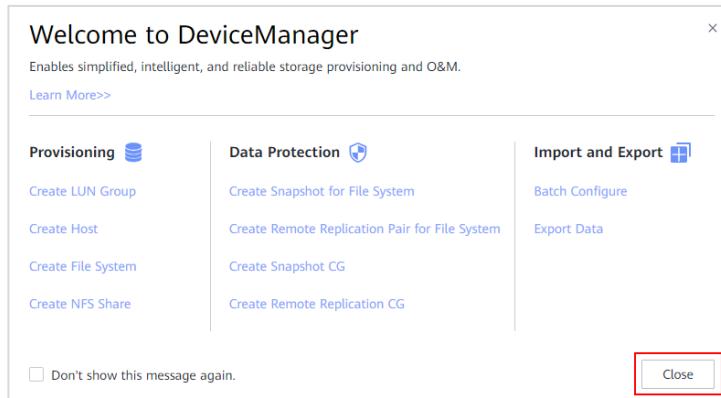
Name	Execution Times	Target	Status	Duration
Creating a storage pool	1/1	StoragePool001	Running	22s
Checking disk domain stat...	1/1	StoragePool001	Successful	4s
Creating a disk domain	1/1	StoragePool001	Successful	8s
Initializing the task	1/1	--	Successful	3s

Total: 4 | 1/1 | [Close](#)

**Click Finish.**



After the initial configuration is complete, the welcome page is displayed. Click **Close**.



## 2.4.3 Scenario 3: Basic Service Planning and Configuration

### 2.4.3.1 Background

After the tasks in scenarios 1 and 2 are complete, plan and configure the block service.

### 2.4.3.2 Question

Plan the storage capacity and answer the following questions.

Storage Pool Name	Disk Type	Disk Quantity	Hot Spare Policy	RAID Policy
StoragePool001				
LUN Name	ID	Type	Capacity	/
LUN001				
LUN002				

1. What factors need to be considered during usable capacity planning?
2. How many RAID levels does Huawei OceanStor Dorado all-flash series support?
3. Does Huawei OceanStor Dorado all-flash series support thick LUNs?

[Suggested Procedure]

For details, see **Configure > Basic Storage Service Configuration Guide > Planning Basic Storage Services** in the desired product documentation.

### 2.4.3.3 Task 1: Planning Mapping Views

Plan mapping views based on the case background.

Mapping View 1: to Windows Hosts					
LUN Name	Owning Storage Pool	LUN Capacity	Host Name	OS	IQN

Mapping View 2: to Linux Hosts					
LUN Name	Owning Storage Pool	LUN Capacity	Host Name	OS	IQN

Mapping View 1: Logical Ports (for Windows Hosts)					
Name	Role	Data Protocol	IP Address	Port Type	Home Port

Mapping View 2: Logical Ports (for Linux Hosts)					
Name	Role	Data Protocol	IP Address	Port Type	Home Port

#### 2.4.3.4 Question

Provide key steps of the block service configuration process.

[Suggested Procedure]

For details, see **Configure > Basic Storage Service Configuration Guide > Configuring Basic Storage Services > Configuration Process** in the desired product documentation.

#### 2.4.3.5 Task 2: Configuring Block Services

Based on the case background and planning, configure the block service on the Windows and Linux servers, and then use the storage space through the application servers, that is, write a test file, such as **test.txt**, to the servers, respectively.

## Step 1 Create a storage pool.

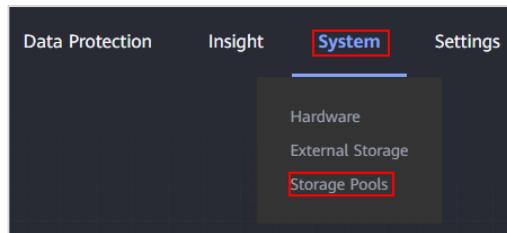
The storage space used by application servers is from the storage pool in the storage system. To ensure that application servers can use the storage space of the storage system, a storage pool is required. Because a storage pool has been created in the previous tasks, you do not need to create one again. You only need to ensure that the remaining capacity of the storage pool is sufficient.



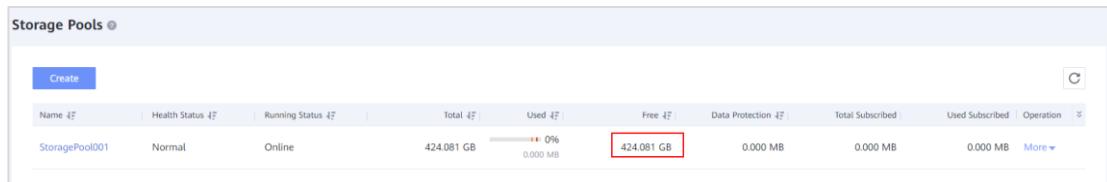
[Suggested Procedure]

For details, see **Configure > Basic Storage Service Configuration Guide > Configuring Basic Storage Services > Creating a Storage Pool** in the desired product documentation.

On DeviceManager, choose **System > Storage Pools**.

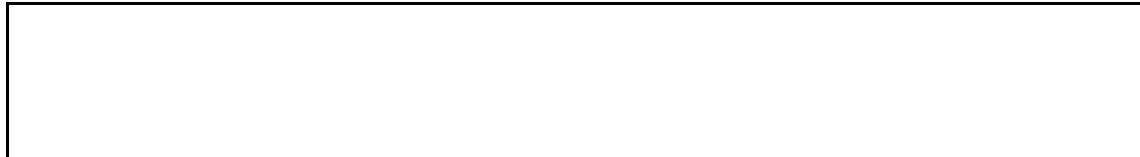


Ensure that the remaining capacity of the storage pool is sufficient.



## Step 2 Create LUNs.

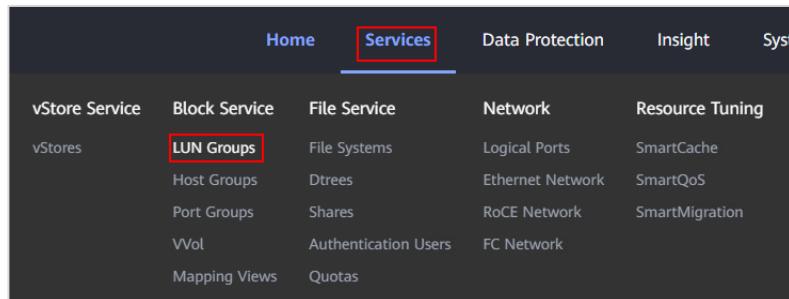
Create LUNs **LUN001** and **LUN002** and configure their capacities as planned.



[Suggested Procedure]

For details, see **Configure > Basic Storage Service Configuration Guide > Configuring Basic Storage Services > Creating a LUN** in the desired product documentation.

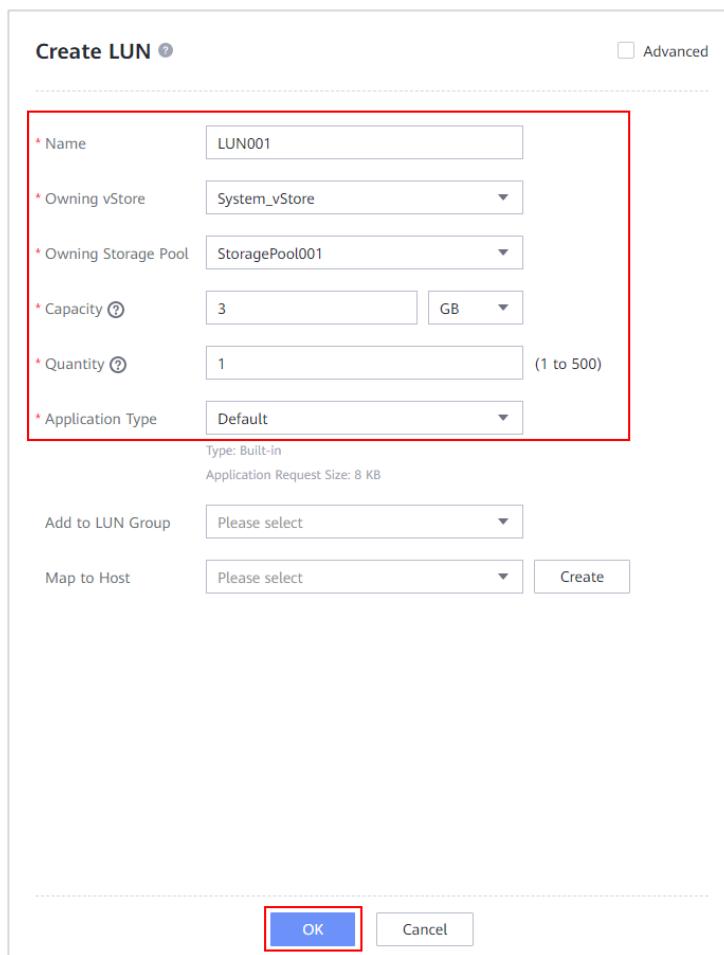
Choose **Services > Block Service > LUN Groups**.



Click the **LUNs** tab and then click **Create**.



The **Create LUN** page is displayed on the right. Set LUN parameters and click **OK**.



**Create LUN**

Advanced

\* Name: LUN001

\* Owning vStore: System\_vStore

\* Owning Storage Pool: StoragePool001

\* Capacity: 3 GB

\* Quantity: 1 (1 to 500)

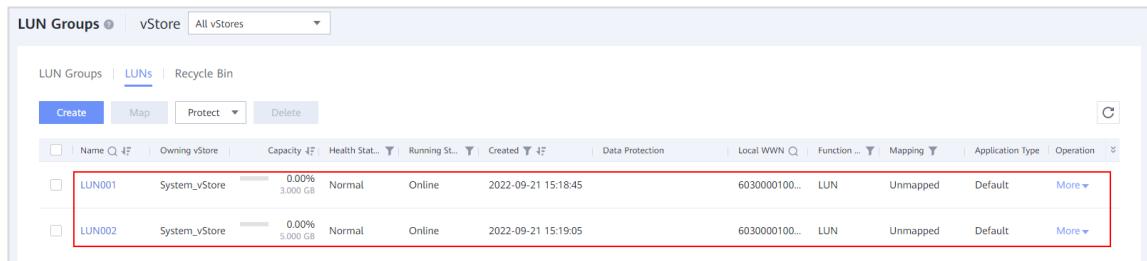
\* Application Type: Default

Type: Built-in  
Application Request Size: 8 KB

Add to LUN Group: Please select

Map to Host: Please select

Repeat the preceding operations to create the other LUN as planned. The following figure shows the result.



The screenshot shows the LUN Groups page in DeviceManager. The 'LUNs' tab is selected. There are two LUN entries listed:

Name	Owning vStore	Capacity	Health Status	Created	Local WWN	LUN	Mapping	Application Type	Operation
LUN001	System_vStore	3.000 GB	Normal	2022-09-21 15:18:45	6030000100...	LUN	Unmapped	Default	More
LUN002	System_vStore	5.000 GB	Normal	2022-09-21 15:19:05	6030000100...	LUN	Unmapped	Default	More

**LUN001** and **LUN002** are successfully created, and their **Health Status** is **Normal**.

### Step 3 Create hosts.

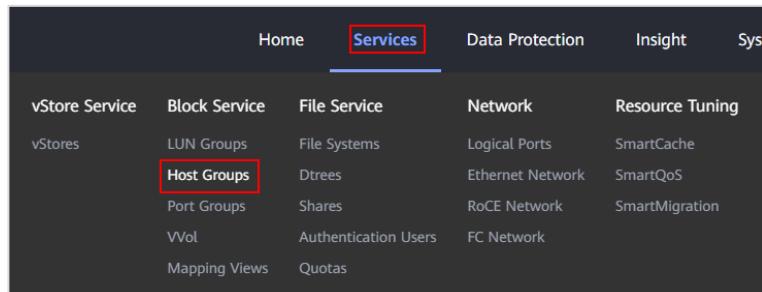
On DeviceManager, create virtual hosts **Host001** and **Host002** running Windows and Linux, respectively, for the storage system.



[Suggested Procedure]

For details, see **Configure > Basic Storage Service Configuration Guide > Configuring Basic Storage Services > Creating a Host** in the desired product documentation.

Choose **Services > Block Service > Host Groups**.



The screenshot shows the Services > Block Service > Host Groups page. The 'Host Groups' tab is selected. Below it, there is a table with host-related options:

vStore Service	Block Service	File Service	Network	Resource Tuning
vStores	LUN Groups	File Systems	Logical Ports	SmartCache
	<b>Host Groups</b>	Dtrees	Ethernet Network	SmartQoS
	Port Groups	Shares	RoCE Network	SmartMigration
	VVol	Authentication Users	FC Network	
	Mapping Views	Quotas		

On the **Hosts** tab page, choose **Create > Create Host**.



The screenshot shows the Host Groups > Hosts page. The 'Create' button is highlighted with a red box. Below it, there is a table with host-related columns:

Host Groups	Hosts	Initiators
	<b>Create</b>	
	<b>Create Host</b>	
	Create Hosts	

Specify the **Name**, **OS**, and **IP Address**, and click **OK**.

Create Host

Basic Information

Name: Host001  
Owning vStore: System\_vStore  
OS: Windows  
IP Address: 192.168.0.44

Initiators

FC | iSCSI | NVMe over RoCE

WWPN Q Alias Q Status Type Status

No data.

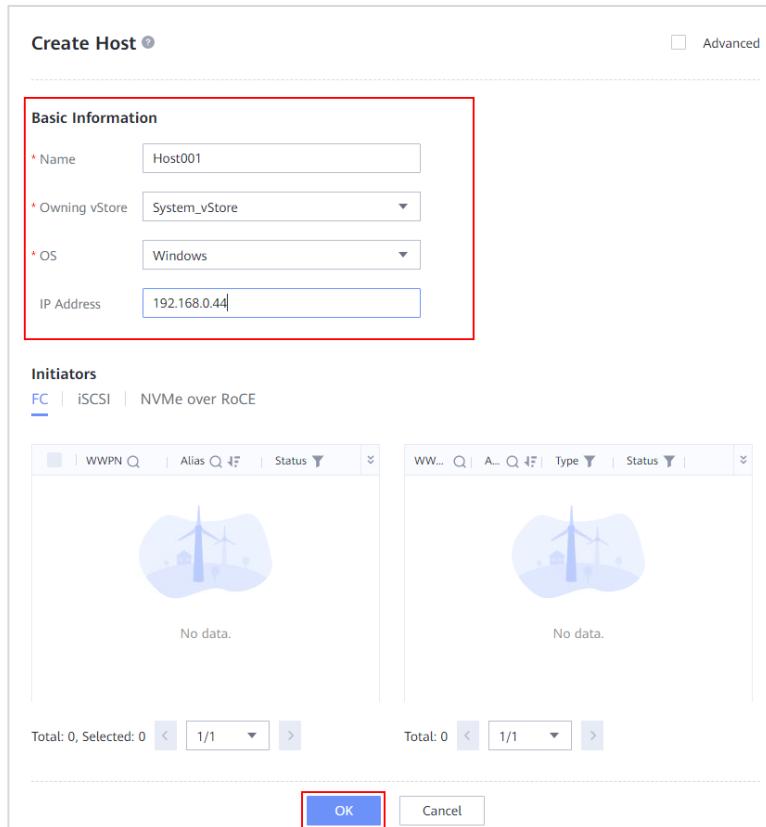
WWN Q A.. Q Type Status

No data.

Total: 0, Selected: 0 < 1/1 >

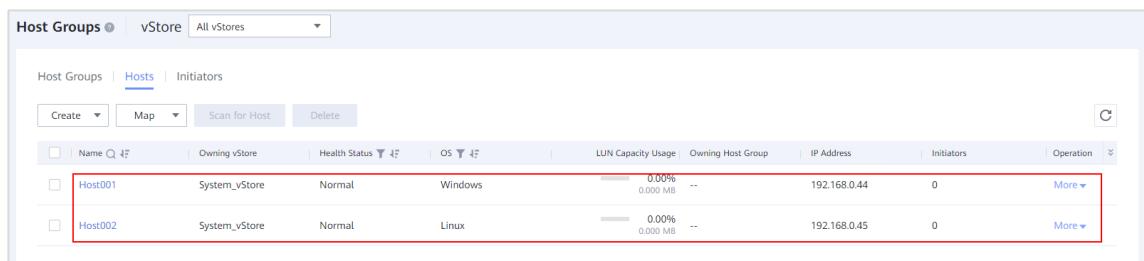
Total: 0 < 1/1 >

OK Cancel



Repeat the preceding operations to create the other host. The following figure shows the result.

Host Groups								
vStore All vStores								
Host Groups   Hosts   Initiators								
	Name	Owning vStore	Health Status	OS	LUN Capacity Usage	Owning Host Group	IP Address	Initiators
<input type="checkbox"/>	Host001	System_vStore	Normal	Windows	0.00% 0.000 MB	--	192.168.0.44	0
<input type="checkbox"/>	Host002	System_vStore	Normal	Linux	0.00% 0.000 MB	--	192.168.0.45	0



Hosts **Host001** and **Host002** are successfully created and their **Health Status** is **Normal**.

#### Step 4 Create mappings.

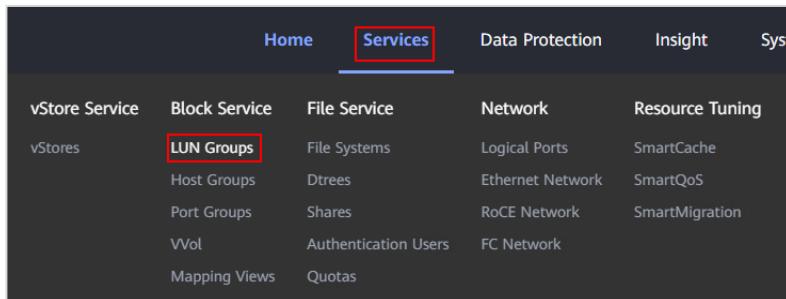
On DeviceManager, create mappings between the LUNs and hosts.



[Suggested Procedure]

For details, see **Configure > Basic Storage Service Configuration Guide > Configuring Basic Storage Services > Creating a Mapping** in the desired product documentation.

Choose **Services > Block Service > LUN Groups**.

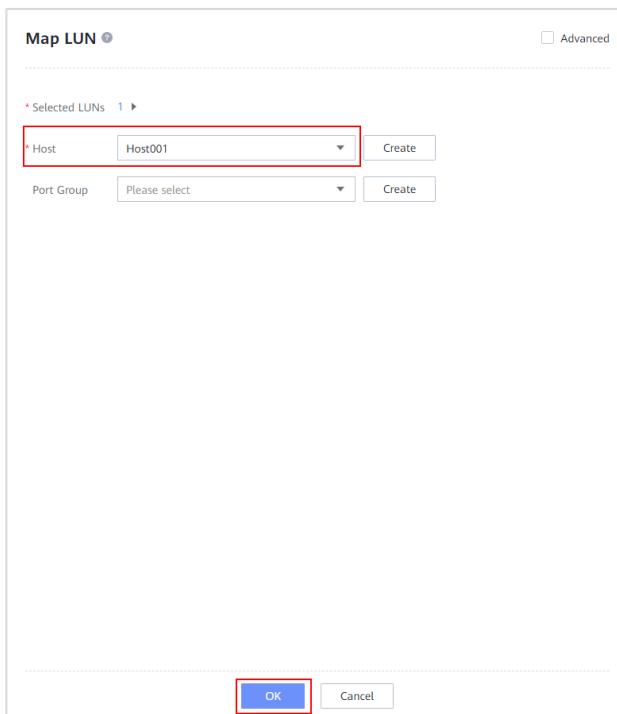


Click the **LUNs** tab, select the first LUN, and click **More > Map**.



Name	Owning vStore	Capacity	Health Status	Running Status	Created	Data Protection	Local WWN	Function	Mapping	Application Type	Operation
LUN001	System_vStore	3.000 GB	0.00%	Normal	Online	2022-09-21 15:18:45	6030000100...	LUN	Unmapped	Default	More
LUN002	System_vStore	5.000 GB	0.00%	Normal	Online	2022-09-21 15:19:05	6030000100...	LUN	Unmapped	Default	More

On the displayed **Map LUN** page, set the required parameters and click **OK**.



Map LUN

Selected LUNs: 1

Host: Host001

Port Group: Please select

OK Cancel

Repeat the preceding operations to map the other LUN to the other host. The following figure shows the result.

LUN Groups										
vStore All vStores										
LUN Groups LUNs Recycle Bin										
<a href="#">Create</a> <a href="#">Map</a> <a href="#">Protect</a> <a href="#">Delete</a>										
Name	Owning vStore	Capacity	Health Status	Running Status	Created	Data Protection	Local WWN	Function	Mapping	Application Type
LUN001	System_vStore	0.00% 3.000 GB	Normal	Online	2022-09-22 16:58:59		6020000100...	LUN	Mapped	Default
LUN002	System_vStore	0.00% 5.000 GB	Normal	Online	2022-09-22 16:59:11		6020000100...	LUN	Mapped	Default

## Step 5 Install Huawei UltraPath on the hosts.



Huawei OceanStor UltraPath is the multipathing software installed on application servers. It selects and manages the paths that application servers use to access the storage server.

If multipathing software is installed and configured after LUNs are mapped to the application server, you must restart the application server for the multipathing policies to take effect.

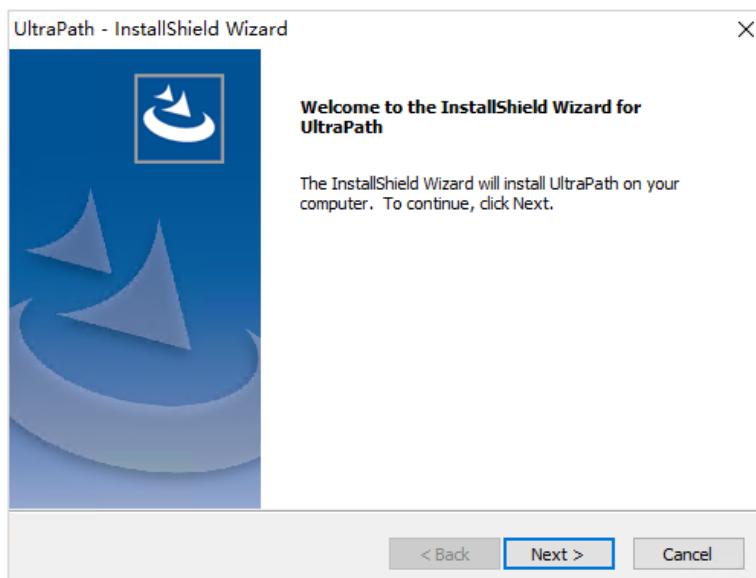
Install UltraPath on both the Windows and Linux hosts. (Obtain the UltraPath installation package from the trainer.)

### [Suggested Procedure]

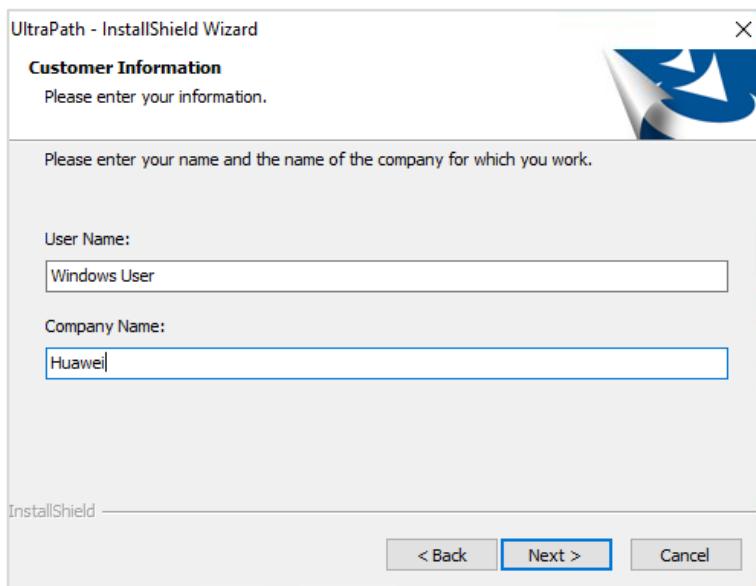
For details, see **Installing UltraPath** in the UltraPath user guide of the specific OS.

- Installing UltraPath on the Windows host

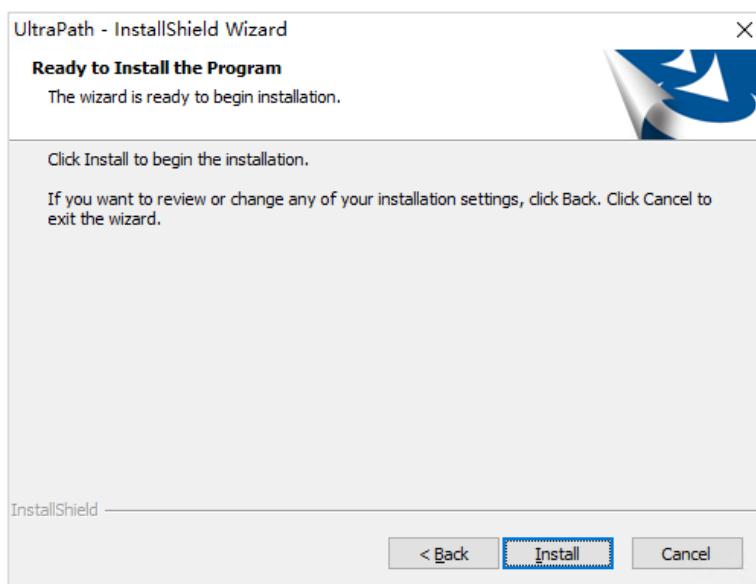
Run the UltraPath installation program on the Windows host. The welcome page is displayed.



Click **Next**. The **Customer Information** page is displayed.



Enter the **User Name** and **Company Name**. Click **Next**. The **Ready to Install the Program** page is displayed.

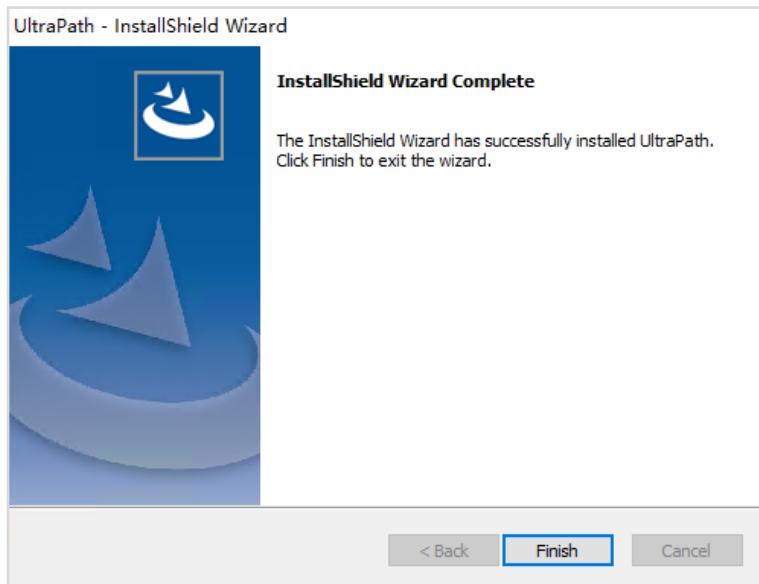


Click **Install**. The **Setup Status** page is displayed, showing the installation progress.

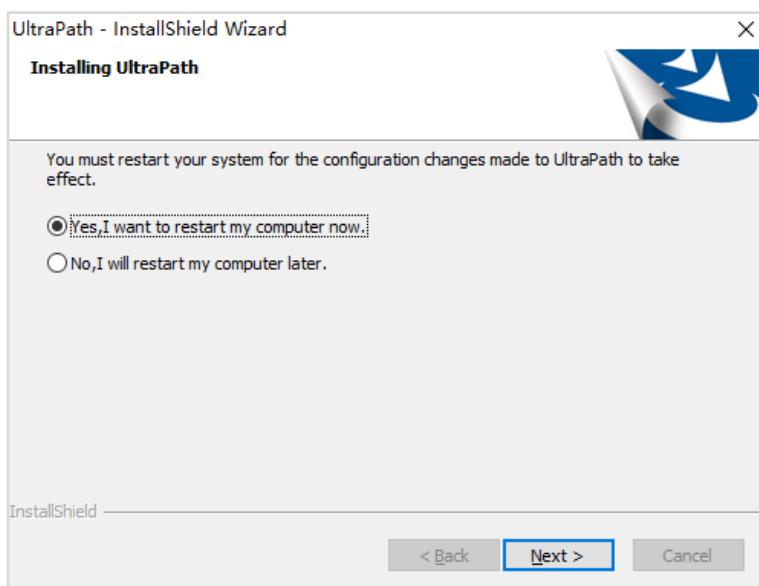
#### **NOTE**

If the option for ignoring driver signature is not selected, a dialog box is displayed many times. Click **Continue** or **Yes** to continue the UltraPath installation until the **InstallShield Wizard Complete** page is displayed. The dialog box is not displayed if you are using Windows Server 2016 or later versions.

After the installation is complete, the **InstallShield Wizard Complete** page is displayed.



Click **Finish**. The dialog box for restarting the computer is displayed.



Select **Yes,I want to restart my computer now.** and click **Next** to restart the application server.

- Installing UltraPath on the Linux host

Log in to the Linux host as user **root**, navigate to the software package directory, and run the **install.sh** script to install the software.

```
[root@Host002 CentOS]# chmod +x install.sh
[root@Host002 CentOS]# ./install.sh
complete iscsi checking.
complete FC checking.
Verify the UltraPath existence.
```

```
The UltraPath is not installed.  
Modify system configuration.[file:/etc/iscsi/iscsid.conf,item:node.startup ,value: automatic]  
Modify system  
configuration.[file:/etc/iscsi/iscsid.conf,item:node.session.timeout,replacement_timeout ,value: 1]  
Modify system  
configuration.[file:/etc/modprobe.d/nxupmodules.conf,module:qla2xxx,item:qlport_down_retry,value:5]  
Modify system  
configuration.[file:/etc/modprobe.d/nxupmodules.conf,module:lpfc,item:lpfc_nodev_tmo,value:5]  
Modify system configuration.[file:/etc/systemd/system.conf,item:DefaultTimeoutStartSec,value:600s]  
If the operating system is installed on a local drive of the server, you are advised  
to choose boot from local; if the operating system is installed on a SAN storage  
system, you must choose boot from san. Please choose the boot type of your system:  
<1>--boot-from-Local  
<2>--boot-from-SAN  
please input your select:
```

Type **1** and press **Enter**.

```
please input your select:1
```

The installation program prompts that the installation is complete and asks if you want  
to restart the system.

```
The installation is complete. Whether to restart the system now?  
<Y|N>:
```

Type **Y** and press **Enter** to restart the system.

Check whether UltraPath takes effect:

```
[root@Host002 ~]# upadmin check status
```

If the check result of each item is **Pass**, UltraPath has taken effect.

```
[root@Host002 ~]# upadmin check status
```

```
-----  
Checking path status:
```

```
There is no array information.
```

```
Pass
```

```
-----  
Checking environment and config:
```

```
Pass
```

```
-----  
Checking HBA Information:
```

```
complete iscsi checking.
```

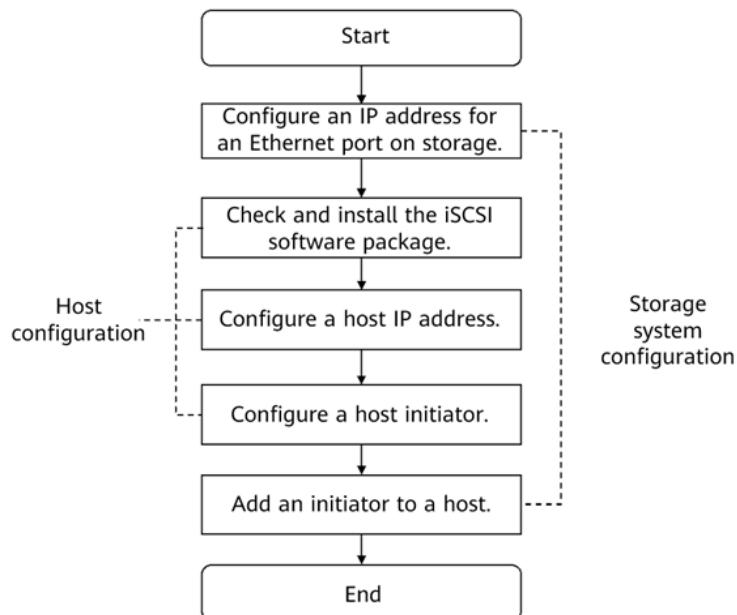
```
complete FC checking.
```

```
Pass
```

## Step 6 Configure connectivity between the hosts and the storage system.

- 1 Establish iSCSI connections.

Establish iSCSI connections between the Windows application server and the storage system and between the Linux application server and the storage system by following the following configuration logic.



### NOTE

If switches are used, configure zones (for FC connections) or VLANs (for iSCSI connections) by referring to the official product documentation specific to the switch model and version.

The GUIs of DeviceManager vary slightly with different versions.

[Suggested Procedure]

For details, see **Configuring Connectivity > Establishing iSCSI Connections** in *OceanStor Dorado V6 Host Connectivity Guide for XXX*, where XXX indicates the OS, such as Windows, SUSE, Red Hat, CentOS, and EulerOS.

2 Scan for LUNs on the hosts.

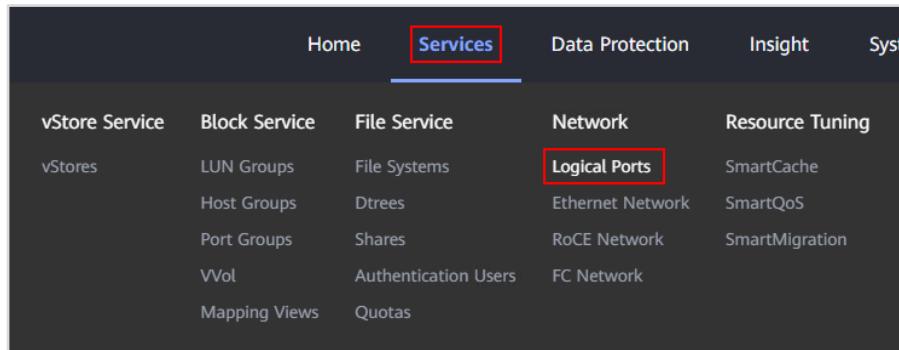
Scan for disks on the Windows and Linux servers respectively to detect LUNs mapped by the storage system.

[Suggested Procedure]

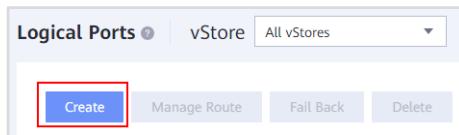
For details, see **Configuring Connectivity > Scanning LUNs on the Host** in *OceanStor Dorado V6 Host Connectivity Guide for XXX*, where XXX indicates the OS, such as Windows, SUSE, Red Hat, CentOS, and EulerOS.

- Adding logical ports to the Windows and Linux hosts on the storage system

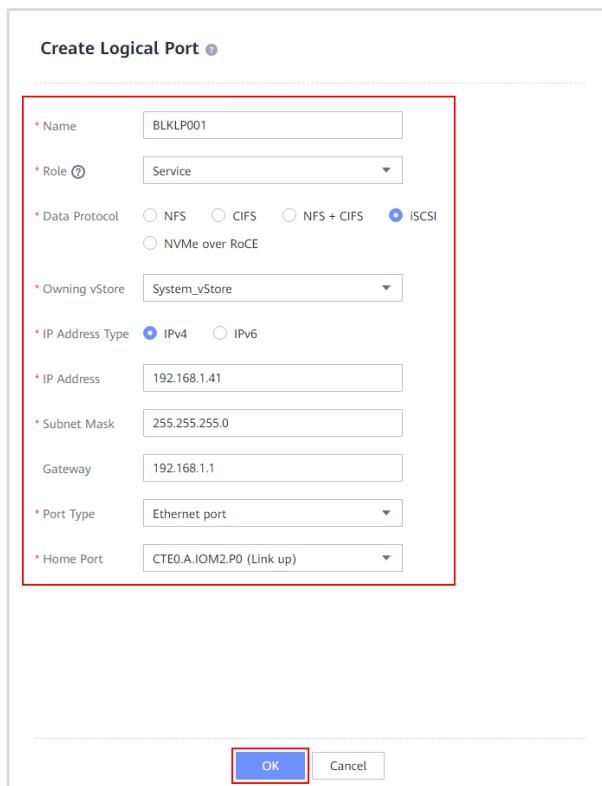
On DeviceManager, choose **Services > Network > Logical Ports**.



Click **Create**. The **Create Logical Port** page is displayed on the right.



Set the parameters of the logical port as planned. Click **OK**.



The screenshot shows the **Create Logical Port** dialog box. A red box highlights the parameter input area, which includes fields for Name (BLKLP001), Role (Service), Data Protocol (ISCSI), Owning vStore (System\_vStore), IP Address Type (IPv4), IP Address (192.168.1.41), Subnet Mask (255.255.255.0), Gateway (192.168.1.1), Port Type (Ethernet port), and Home Port (CTE0.A.IOM2.P0 (Link up)). At the bottom, there are OK and Cancel buttons.

Name	BLKLP001
Role	Service
Data Protocol	<input type="radio"/> NFS <input type="radio"/> CIFS <input type="radio"/> NFS + CIFS <input checked="" type="radio"/> ISCSI <input type="radio"/> NVMe over RoCE
Owning vStore	System_vStore
IP Address Type	<input checked="" type="radio"/> IPv4 <input type="radio"/> IPv6
IP Address	192.168.1.41
Subnet Mask	255.255.255.0
Gateway	192.168.1.1
Port Type	Ethernet port
Home Port	CTE0.A.IOM2.P0 (Link up)

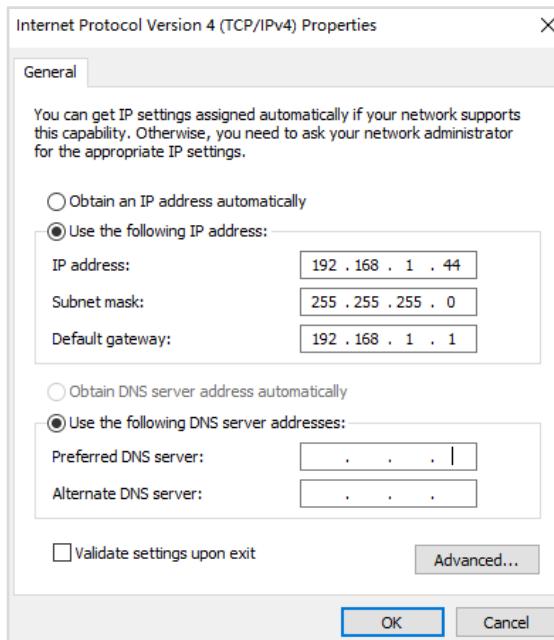
Repeat the preceding operations to create the other three logical ports. The following figure shows the result.

Logical Ports							
	Name	Owning vStore	Data Protocol	IP Address	Subnet Mask/Prefix	Gateway	Home Port/Current Port
<input type="checkbox"/>	BLKLP001	System_vStore	iSCSI	192.168.1.41	255.255.255.0	192.168.1.1	CTE0.A.IOM2.P0
<input type="checkbox"/>	BLKLP002	System_vStore	iSCSI	192.168.1.42	255.255.255.0	192.168.1.1	CTE0.B.IOM2.P0
<input type="checkbox"/>	BLKLP003	System_vStore	iSCSI	192.168.2.41	255.255.255.0	192.168.2.1	CTE0.A.IOM2.P1
<input type="checkbox"/>	BLKLP004	System_vStore	iSCSI	192.168.2.42	255.255.255.0	192.168.2.1	CTE0.B.IOM2.P1

- Establishing iSCSI connections on the Windows host and scanning for LUNs

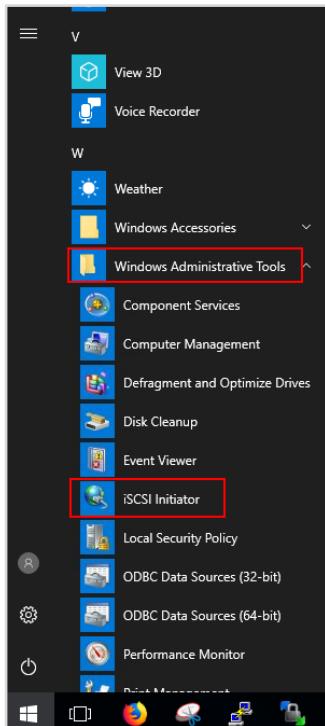
Configuring the host IP address:

On the Windows host, choose **Start > Settings > Network and Internet > Ethernet > Change adapter options**, right-click the specific network port, and choose **Properties** from the shortcut menu. Double-click **Internet Protocol Version 4 (TCP/IPv4)**. On the displayed page, set the IP address, subnet mask, and gateway.

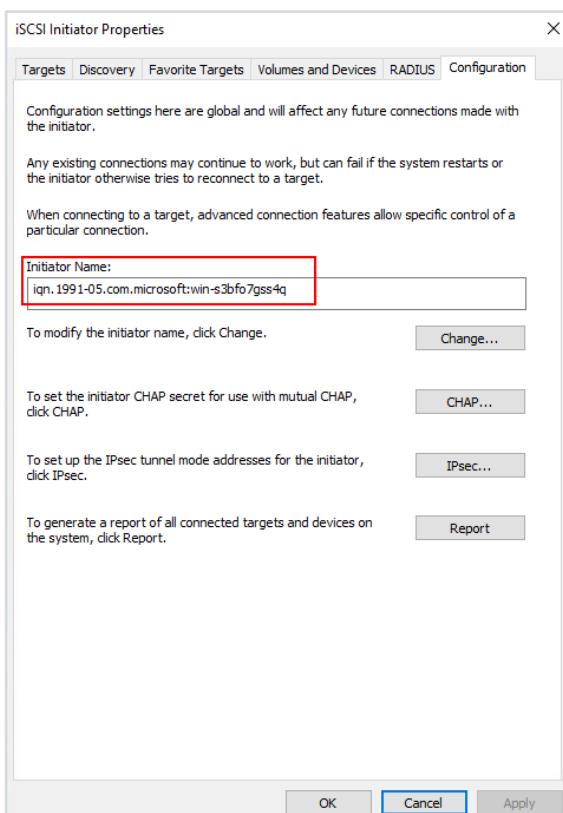


Configuring the iSCSI connections:

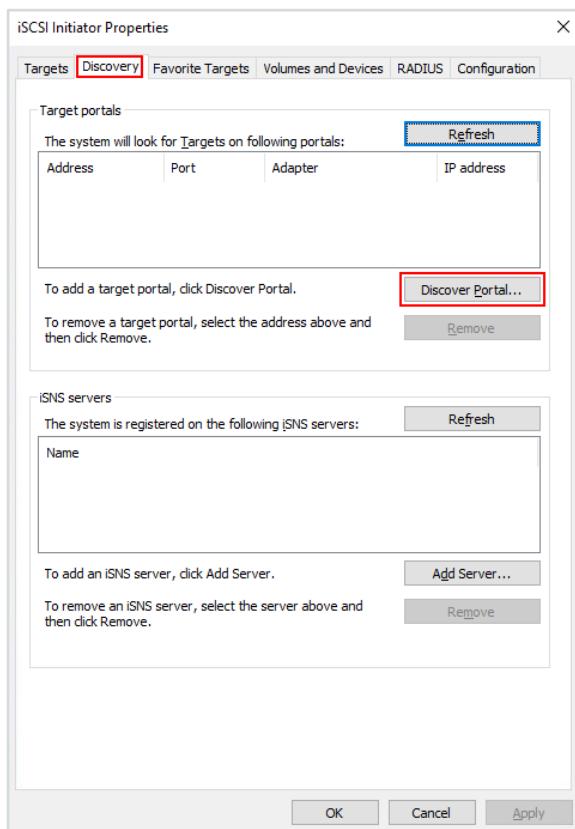
On the Windows host, choose **Start > Windows Administrative Tools > iSCSI Initiator**. The **iSCSI Initiator Properties** window is displayed.



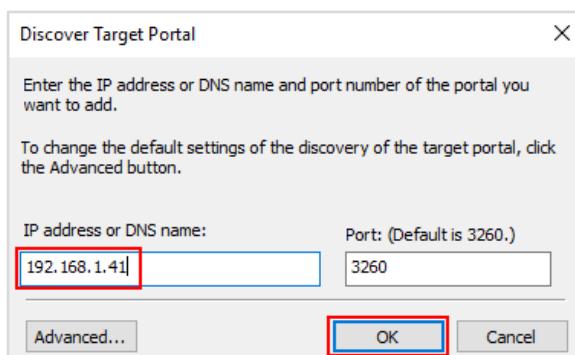
Click the **Configuration** tab to set the initiator name. Note the initiator name must be unique.



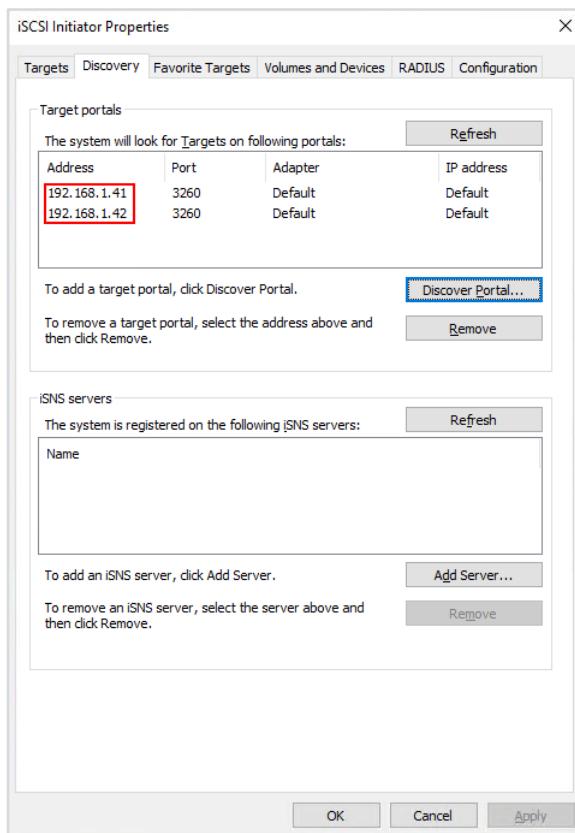
On the **Discovery** tab page, click **Discover Portal**.



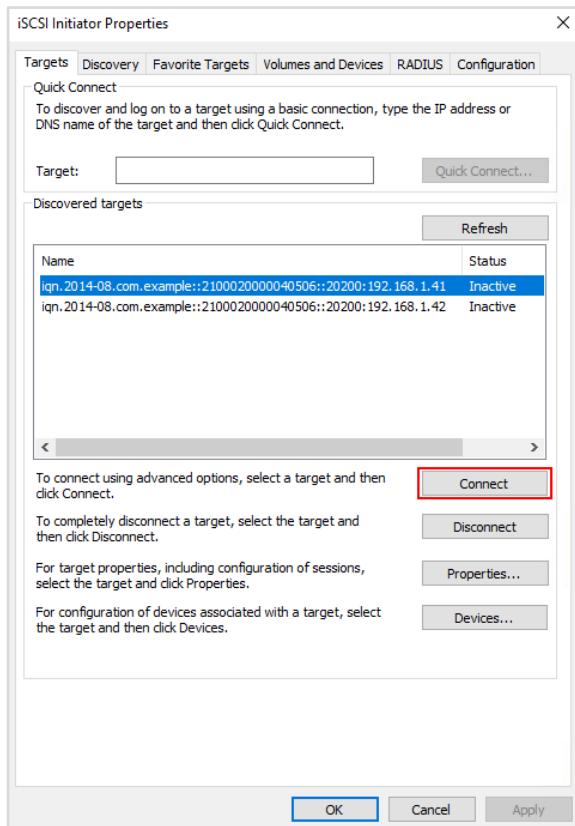
In the dialog box that is displayed, enter the IP address of a logical port on the storage system.



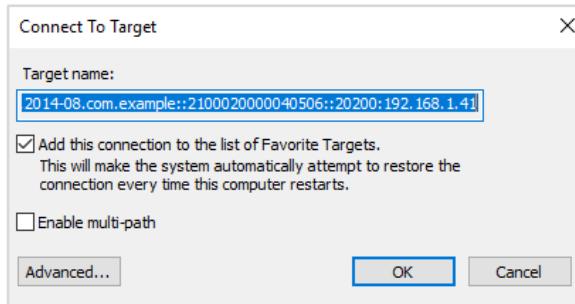
Repeat the preceding operations to enter another logical port IP address of the storage system. The following figure shows the result.



On the **Targets** tab page, you can view the discovered targets. Select the first target and click **Connect**.

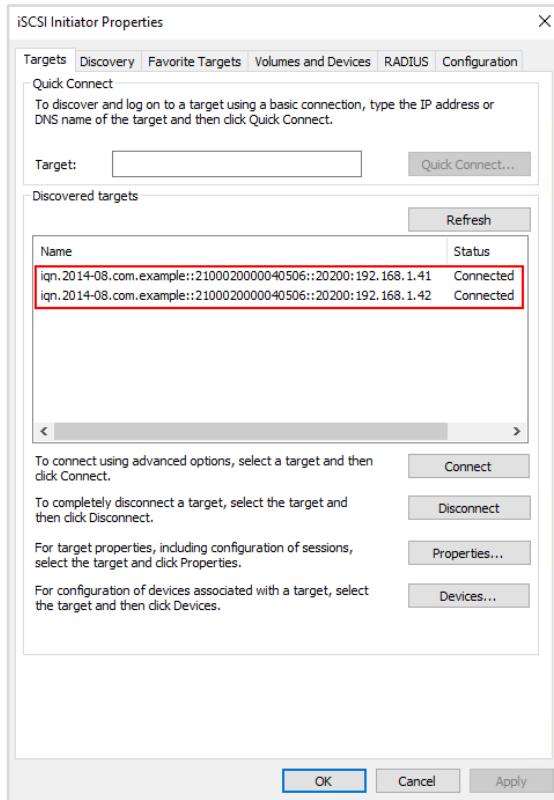


On the page that is displayed, click **OK**.



Check whether the connection status is **Connected**. If so, the connection between the host and the storage system is set up successfully.

Establish the connection between the host and the second target. The following figure shows the result after the connections are established.

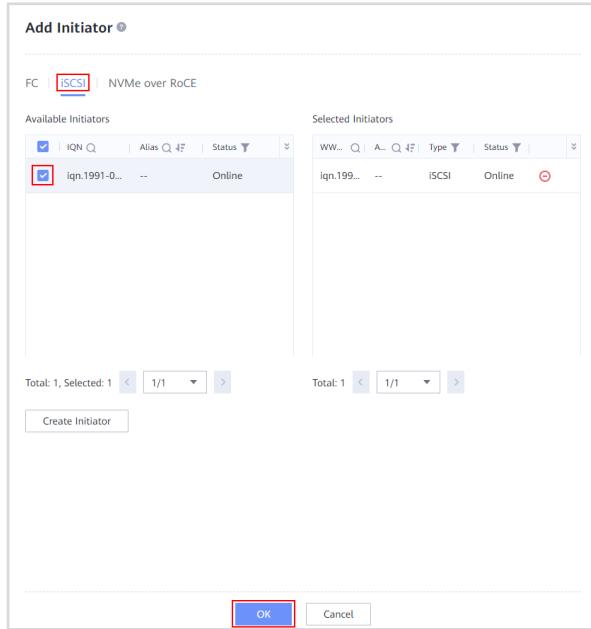


Adding an initiator to the Windows host:

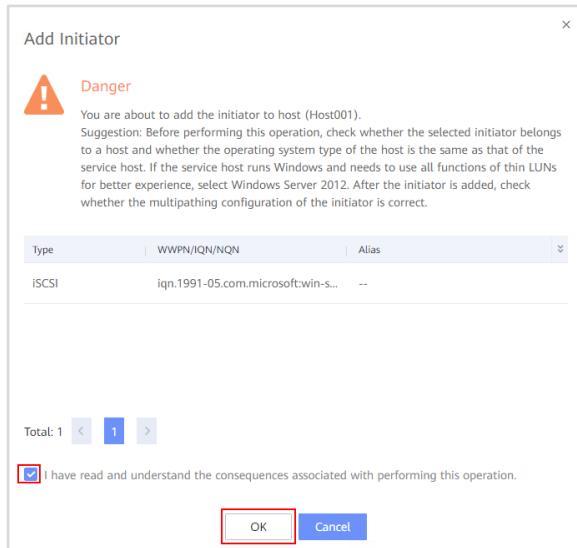
On DeviceManager, choose **Services > Block Service > Host Groups**.

On the **Hosts** tab page, select the host to which you want to add an initiator, click **More** on the right, and select **Add Initiator**.

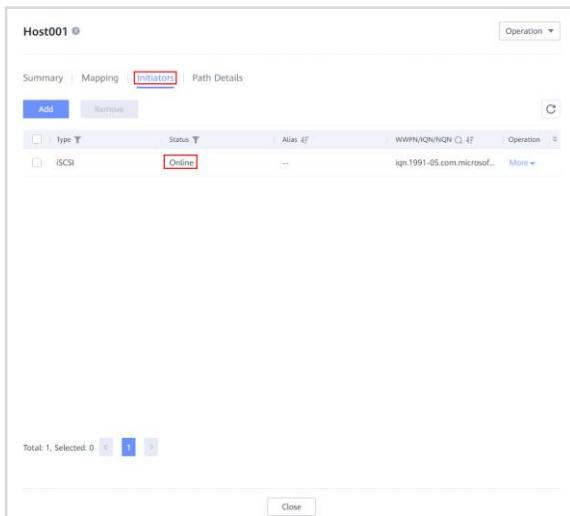
Click the **iSCSI** tab, select the desired initiator, and click **OK**.



Click **OK** to confirm the information and complete the configuration.

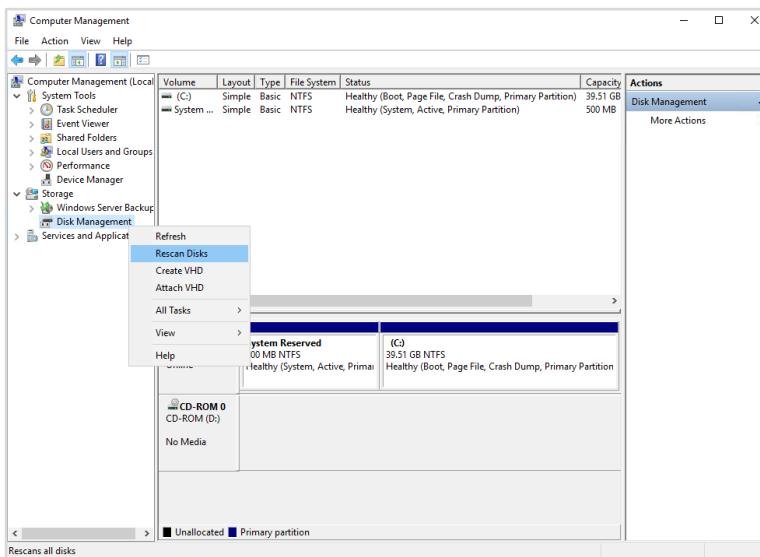


Click the host name. On the page that is displayed, click the **Initiators** tab. Ensure that the **Status** of the initiator is **Online**.

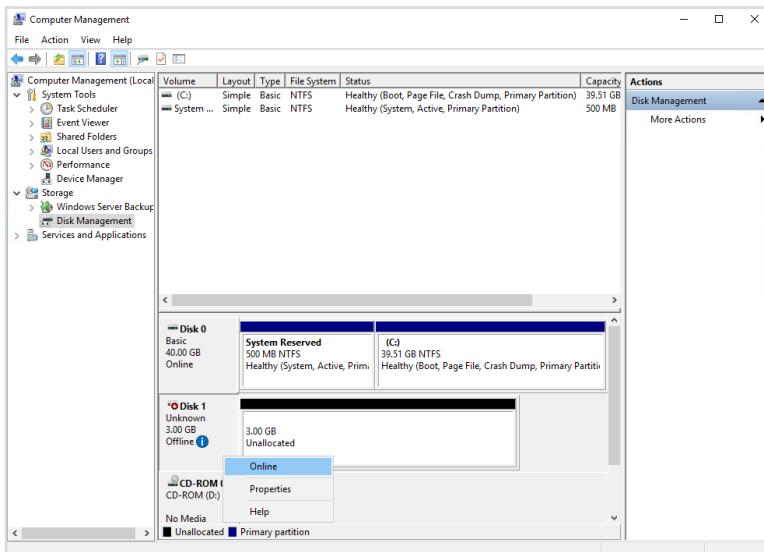


Scanning for LUNs on the Windows host:

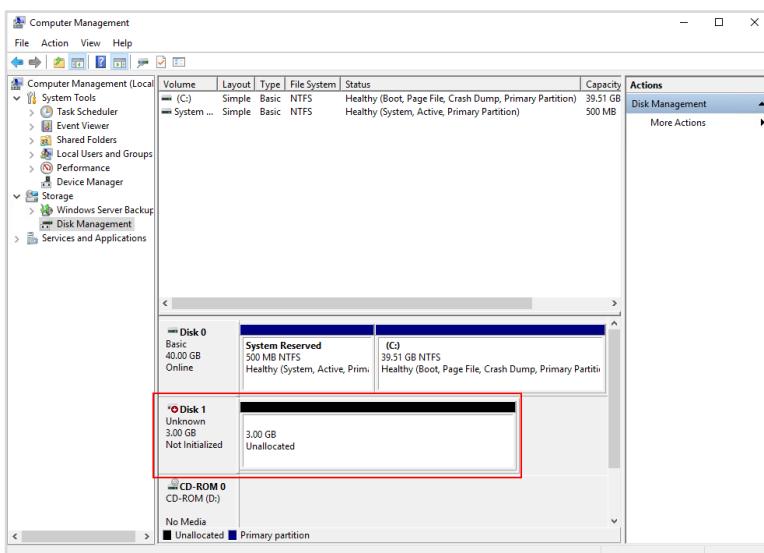
On the Windows host, choose **Start > Windows Administrative Tools > Computer Management > Storage**. Right-click **Disk Management** and select **Rescan Disks** from the shortcut menu.



A new LUN is detected, and its status is **Unknown** and **Offline**. Right-click the disk and choose **Online** from the shortcut menu.



The disk status changes to **Unknown** and **Not Initialized**, indicating that the disk is online. Initialization operations such as partitioning and formatting are required to use the disk space.



- Establishing iSCSI connections on the Linux host and scanning for LUNs

Configuring the host IP address:

Log in to the Linux host as the **root** user, and modify the parameters of network ports in their respective network configuration files. The following uses network port **eth1** as an example:

```
DEVICE=eth1
BOOTPROTO=None
ONBOOT=yes
TYPE=Ethernet
PERSISTENT_DHCLIENT="yes"
PROXY_METHOD=None
```

```
BROWSER_ONLY=no
IPADDR=192.168.2.45
PREFIX=24
GATEWAY=192.168.2.1
DEFROUTE=yes
IPV4_FAILURE_FATAL=no
RES_OPTIONS="timeout:1 single-request-reopen"
IPV6INIT=no
NAME="System eth1"
UUID=9c92fad9-6ecb-3e6c-eb4d-8a47c6f50c04
```

Restarting the network service:

```
[root@Host002 ~]# systemctl restart network.service
```

Checking the iSCSI software package:

```
[root@Host002 ~]# rpm -qa |grep iscsi
iscsi-initiator-utils-6.2.0.874-20.el7_9.x86_64
```

The preceding command output indicates that the iSCSI software has been installed.

#### NOTE

If the iSCSI software is not installed on the OS or the iSCSI software version is outdated, obtain and upload the iSCSI installation package to the host system, and install the iSCSI software.

Starting the iSCSI service:

```
[root@Host002 ~]# systemctl start iscsi.service
```

Querying the initiator name on the host:

```
[root@Host002 ~]# cat /etc/iscsi/initiatorname.iscsi
InitiatorName=iqn.1994-05.com.redhat:linux01
```

Searching for the targets based on the IP addresses of the logical ports configured on the storage system:

```
[root@Host002 ~]# iscsidadm -m discovery -t st -p 192.168.2.41
192.168.2.41:3260,514 iqn.2014-08.com.example::2100020000040506::20201:192.168.2.41
[root@Host002 ~]# iscsidadm -m discovery -t st -p 192.168.2.42
192.168.2.42:3260,514 iqn.2014-08.com.example::2100020000040506::20201:192.168.2.42
```

Logging in to the targets:

```
[root@Host002 ~]# iscsidadm -m node -p 192.168.2.41 -l
Logging in to [iface: default, target: iqn.2014-
08.com.example::2100020000040506::20201:192.168.2.41, portal: 192.168.2.41,3260] (multiple)
Login to [iface: default, target: iqn.2014-08.com.example::2100020000040506::20201:192.168.2.41,
portal: 192.168.2.41,3260] successful.
[root@Host002 ~]# iscsidadm -m node -p 192.168.2.42 -l
```

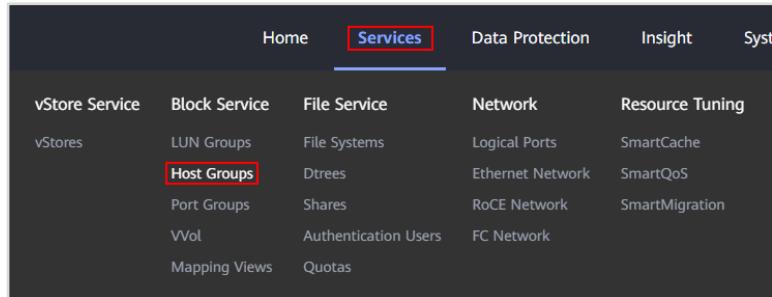
```
Logging in to [iface: default, target: iqn.2014-08.com.example::210002000040506::20201:192.168.2.42, portal: 192.168.2.42,3260] (multiple)
Login to [iface: default, target: iqn.2014-08.com.example::210002000040506::20201:192.168.2.42, portal: 192.168.2.42,3260] successful.
```

Configuring the iSCSI service to run upon system startup:

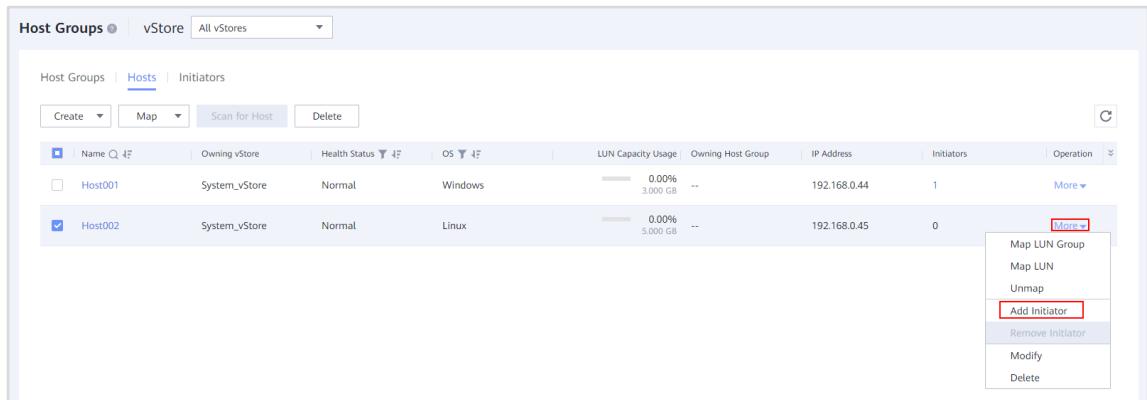
```
[root@Host002 ~]# systemctl enable iscsi.service
```

Adding an initiator to the Linux host:

On DeviceManager, choose **Services > Block Service > Host Groups**.

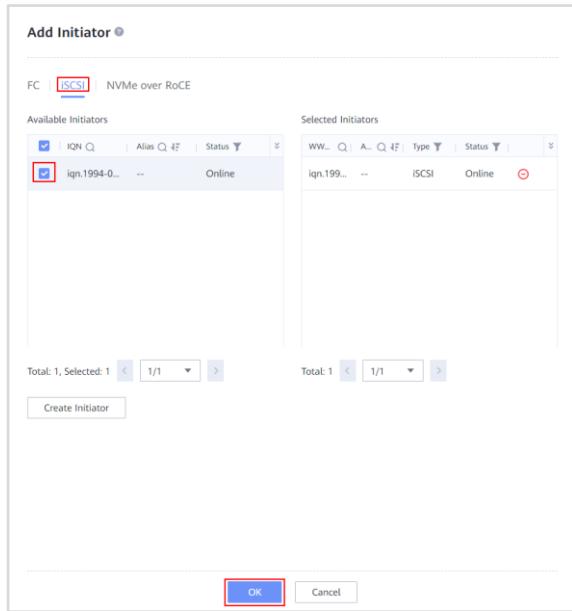


On the **Hosts** tab page, select the host to which you want to add an initiator, click **More** on the right, and select **Add Initiator**.

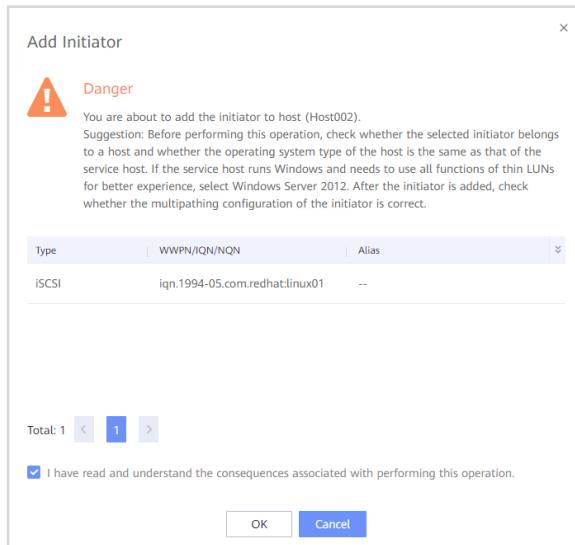


The screenshot shows the 'Host Groups > Hosts' interface. It displays two hosts: Host001 (Windows, 3.000 GB capacity) and Host002 (Linux, 5.000 GB capacity). A context menu is open over Host002, with the 'Add Initiator' option highlighted.

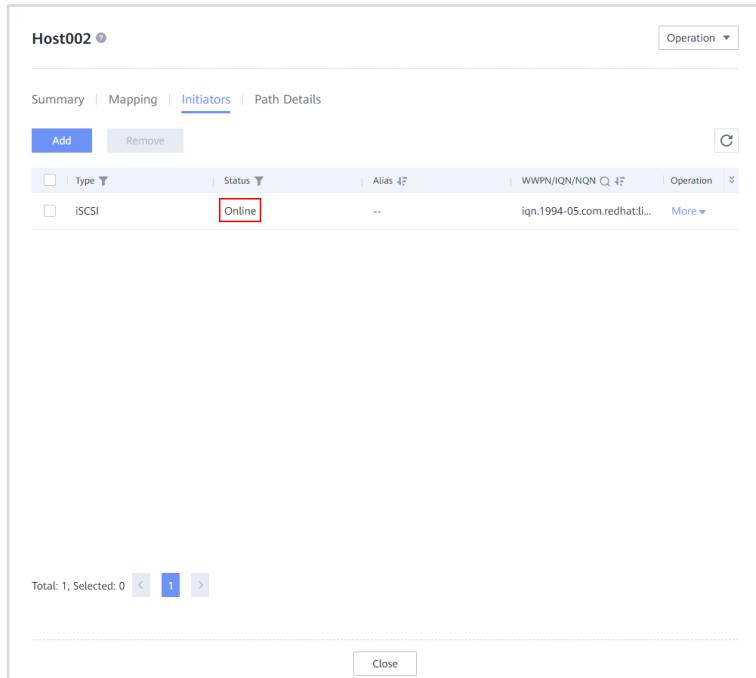
Click the **iSCSI** tab, select the desired initiator, and click **OK**.



Click **OK** to confirm the information and complete the configuration.



Click the host name. On the page that is displayed, click the **Initiators** tab. Ensure that the **Status** of the initiator is **Online**.



Host002

Operation ▾

Summary | Mapping | **Initiators** | Path Details

Add Remove

Type	Status	Alias	WWPN/IQN/NQN	Operation
iSCSI	Online	--	iqn.1994-05.com.redhat:li...	More ▾

Total: 1, Selected: 0 < 1 >

Close

Scanning for LUNs on the Linux host:

```
root@Host002 ~]# iscsiadm -m session --rescan
Rescanning session [sid: 1, target: iqn.2014-08.com.example::2100020000040506::20201:192.168.2.41,
portal: 192.168.2.41,3260]
Rescanning session [sid: 2, target: iqn.2014-08.com.example::2100020000040506::20201:192.168.2.42,
portal: 192.168.2.42,3260]
```

Run the **fdisk -l** command to check the disks. A 5 GB disk is found and is not partitioned.

```
[root@Host002 ~]# fdisk -l

Disk /dev/vda: 85.9 GB, 85899345920 bytes, 167772160 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0x000cd3a2

      Device Boot      Start         End      Blocks   Id  System
  /dev/vda1    *        2048    167772126    83885039+   83  Linux

Disk /dev/sda: 5368 MB, 5368709120 bytes, 10485760 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0xcd35d73f
```

## Step 7 The application servers use the storage space.

On the Windows and Linux servers, initialize, partition, and format the detected disks so that the application servers can use the storage space. Write test files to verify the result.

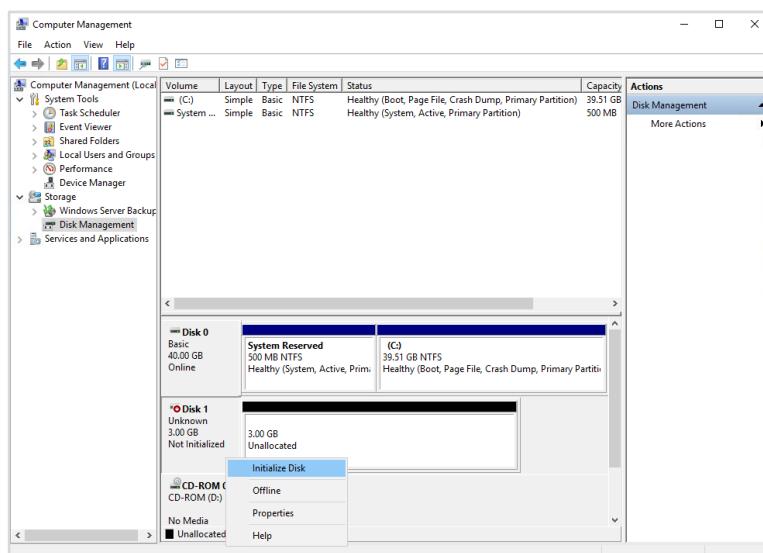


### [Suggested Procedure]

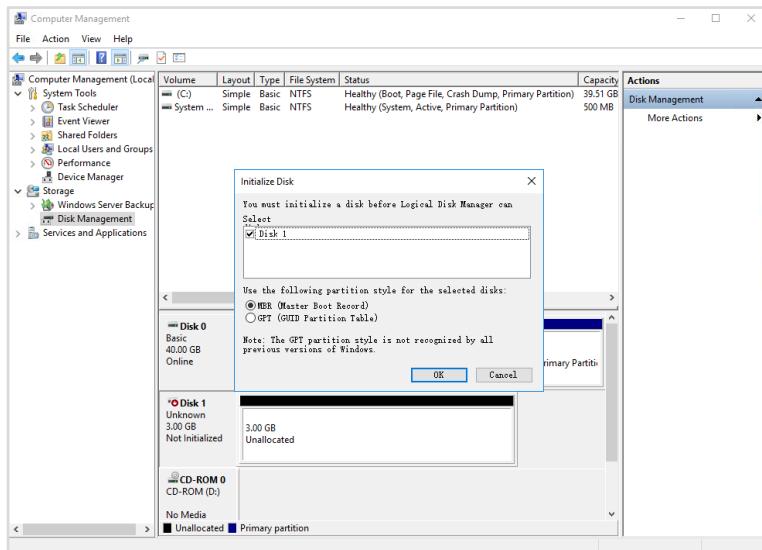
For details, see **Appendix A Volume Management** in *OceanStor Dorado V6 Host Connectivity Guide for XXX*, where *XXX* indicates the OS, such as Windows, SUSE, Red Hat, CentOS, and EulerOS.

- For the Windows host:

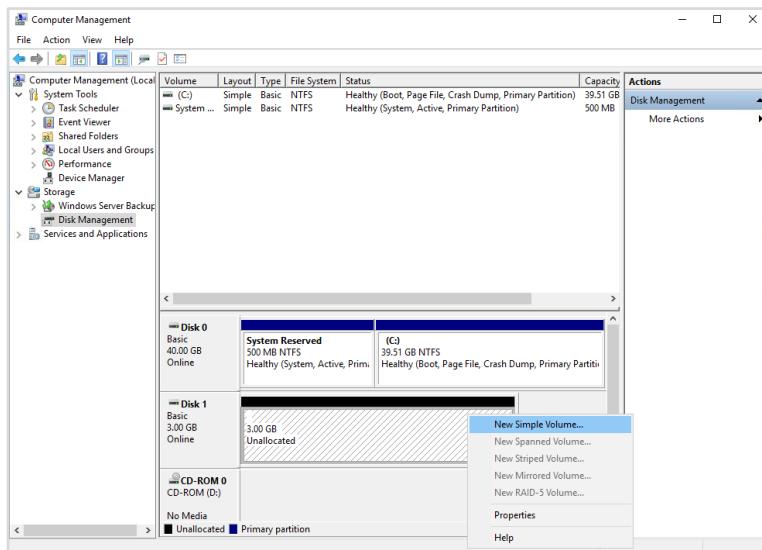
choose **Start > Windows Administrative Tools > Computer Management > Storage > Disk Management**. Right-click the disk that has been brought online just now, and choose **Initialize Disk** from the shortcut menu.



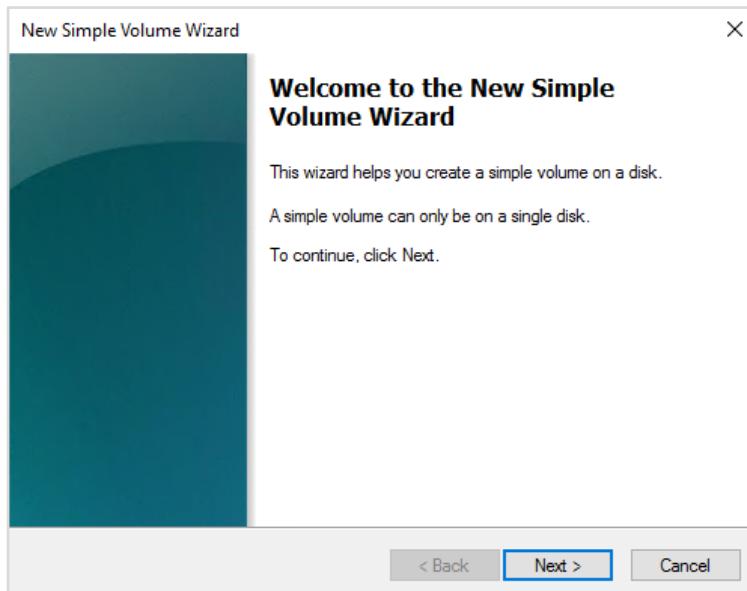
In the displayed **Initialize Disk** dialog box, select the disk to be initialized and specify the partition style. In this example, **MBR** is selected.



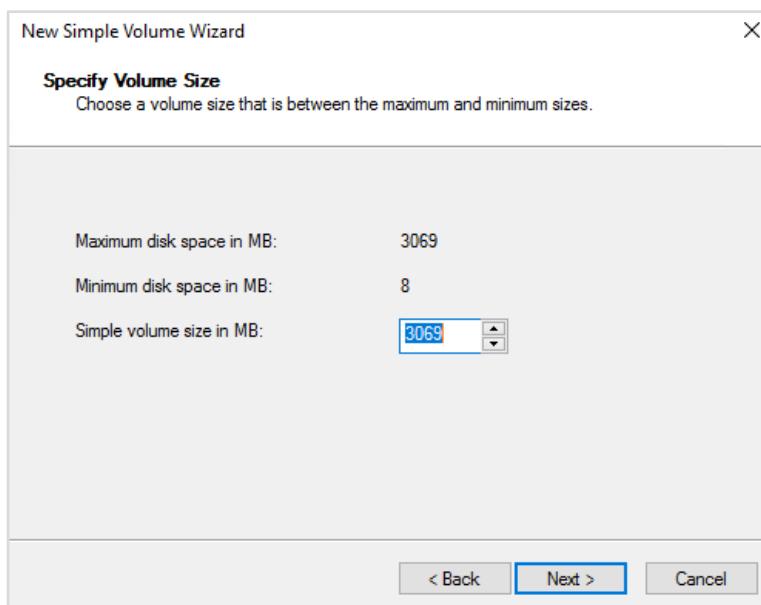
After the operation is performed, the disk status changes to **Online**. Right-click the disk and choose **New Simple Volume** from the shortcut menu.



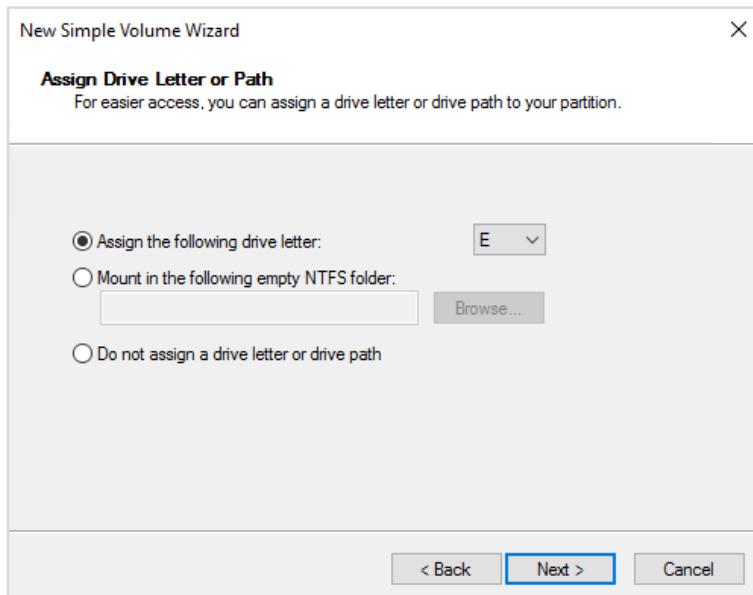
The **New Simple Volume Wizard** window is displayed. Click **Next**.



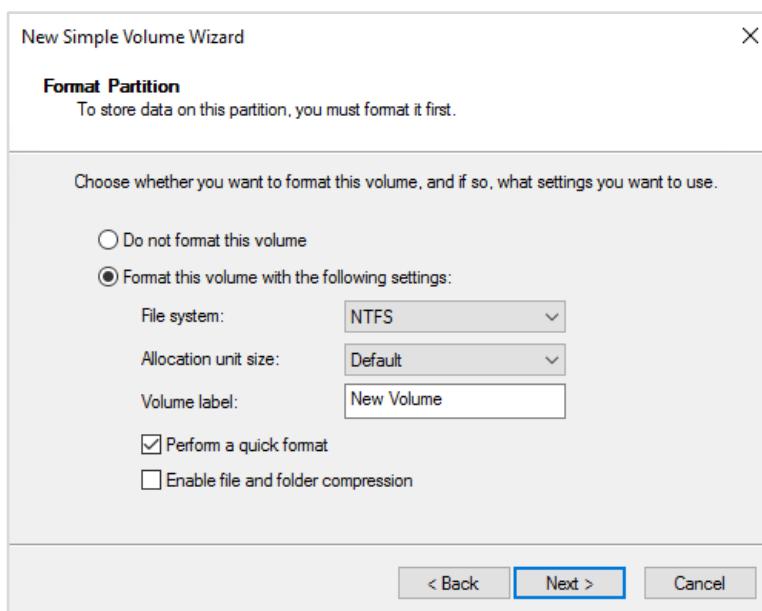
Specify the volume size. In this example, we select the full capacity and click **Next**.



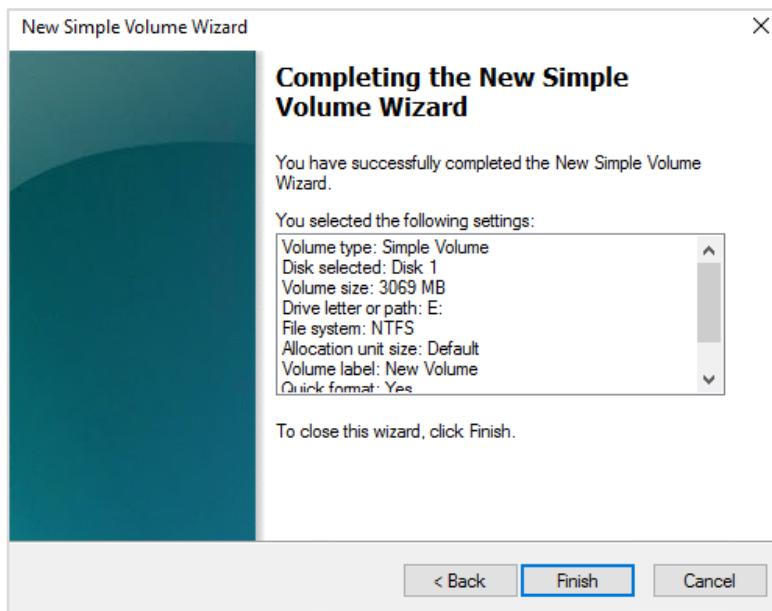
On the **Assign Drive Letter or Path** page, retain the default settings, and click **Next**.



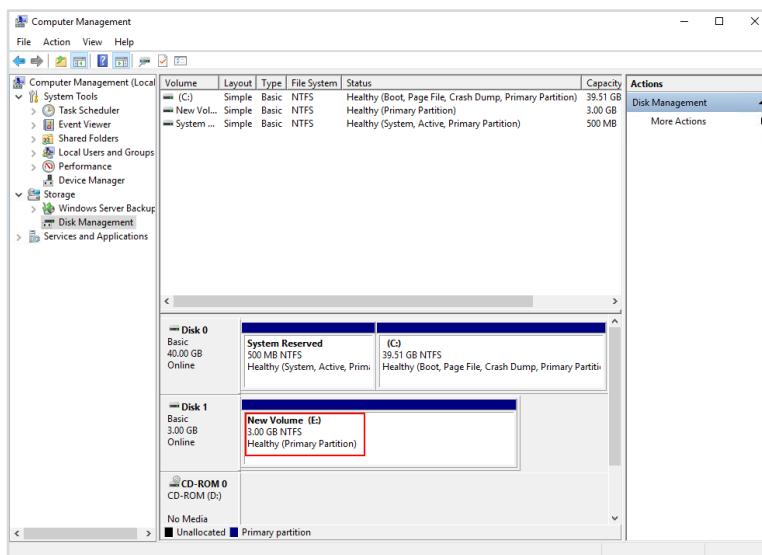
On the **Format Partition** page, retain the default value, and click **Next**.



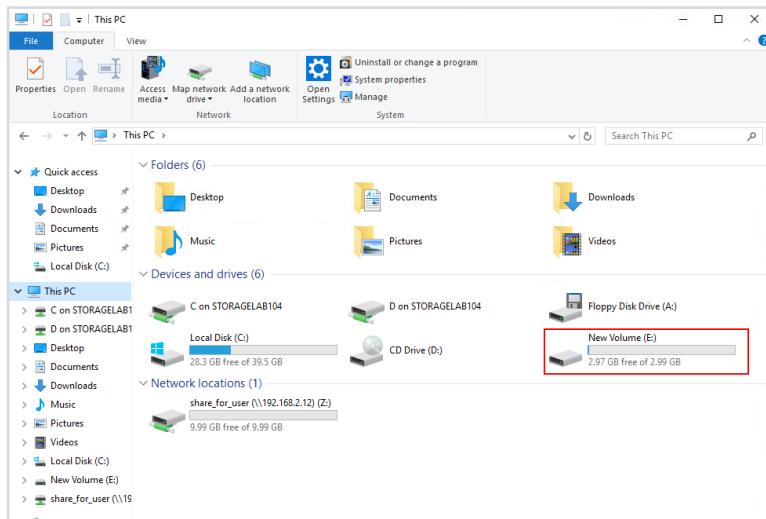
Click **Finish**.



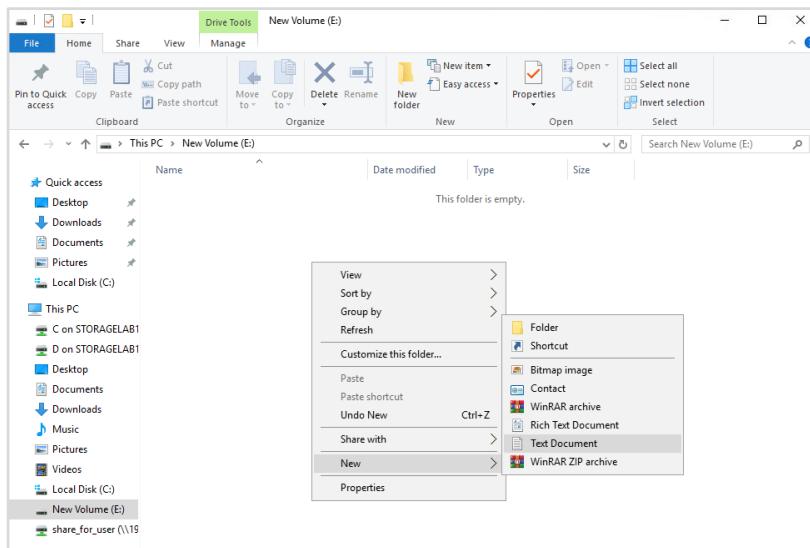
The **Disk Management** page displays information, such as the volume label, drive letter, capacity, file system, and status of the new volume.



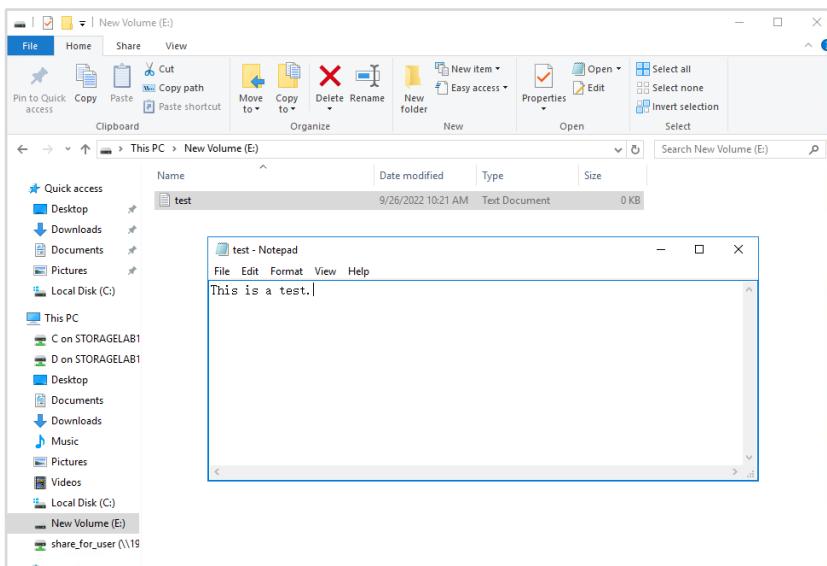
Click **This PC**. The new drive E is displayed.



Open drive E, right-click in the blank space and choose **New > Text Document** from the shortcut menu.



Edit and save the text. Data can be read and written normally.



- For the Linux host:

Run the **fdisk** command to partition the newly detected disk:

```
[root@Host002 ~]# fdisk /dev/sda
Welcome to fdisk (util-linux 2.23.2).
```

Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Command (m for help):

The **fdisk** command contains multiple built-in commands. You can run the **m** command to view the commands and their functions.

Command (m for help): m

Command action

- a toggle a bootable flag
- b edit bsd disklabel
- c toggle the dos compatibility flag
- d delete a partition
- g create a new empty GPT partition table
- G create an IRIX (SGI) partition table
- l list known partition types
- m print this menu
- n add a new partition
- o create a new empty DOS partition table
- p print the partition table
- q quit without saving changes
- s create a new empty Sun disklabel
- t change a partition's system id
- u change display/entry units
- v verify the partition table

w	write table to disk and exit
x	extra functionality (experts only)

Run the **p** command to view partitions:

```
Command (m for help): p

Disk /dev/sda: 5368 MB, 5368709120 bytes, 10485760 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0xcd35d73f

Device Boot      Start        End      Blocks   Id  System
```

The preceding output indicates that the disk is not partitioned.

Run the **n** command to create a partition. Use the total capacity of the disk to create a primary partition. Retain the default values for the parameters in this lab test.

```
Command (m for help): n
Partition type:
  p  primary (0 primary, 0 extended, 4 free)
  e  extended
Select (default p): p
Partition number (1-4, default 1): 1
First sector (2048-10485759, default 2048):
Using default value 2048
Last sector, +sectors or +size{K,M,G} (2048-10485759, default 10485759):
Using default value 10485759
Partition 1 of type Linux and of size 5 GiB is set
```

Run the **p** command to check the partition again. The new partition is displayed.

```
Command (m for help): p

Disk /dev/sda: 5368 MB, 5368709120 bytes, 10485760 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0xcd35d73f

Device Boot      Start        End      Blocks   Id  System
/dev/sda1          2048     10485759      5241856   83  Linux
```

Run the **w** command to write the partition table to the disk:

```
Command (m for help): w
The partition table has been altered!
```

 **NOTE**

If you do not run the **w** command, the partition table is recorded only in the memory, and the changes are not written to the disk.

Run the **mkfs** command to create a file system:

```
[root@Host002 ~]# mkfs /dev/sda1
mke2fs 1.42.9 (28-Dec-2013)
Discarding device blocks: done
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
327680 inodes, 1310464 blocks
65523 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=1342177280
40 block groups
32768 blocks per group, 32768 fragments per group
8192 inodes per group
Superblock backups stored on blocks:
    32768, 98304, 163840, 229376, 294912, 819200, 884736

Allocating group tables: done
Writing inode tables: done
Writing superblocks and filesystem accounting information: done
```

Mount the file system:

```
[root@Host002 ~]# cd /mnt
[root@Host002 mnt]# mkdir newdisk
[root@Host002 mnt]# mount /dev/sda1 /mnt/newdisk
```

View the file systems:

```
[root@Host002 mnt]# df
Filesystem      1K-blocks   Used Available Use% Mounted on
/devtmpfs        1924396     0  1924396  0% /dev
tmpfs           1939904     0  1939904  0% /dev/shm
tmpfs           1939904   9188  1930716  1% /run
tmpfs           1939904     0  1939904  0% /sys/fs/cgroup
/dev/vda1       82437508 16619292 62027092 22% /
tmpfs           387984     0   387984  0% /run/user/0
/dev/sda1       5159552   10232  4887228  1% /mnt/newdisk
```

Create a text file in the new mount directory, write content into the file, and open the file.

```
[root@Host002 mnt]# cd /mnt/newdisk
[root@Host002 newdisk]# touch test.txt
[root@Host002 newdisk]# echo "This is a test.">>test.txt
[root@Host002 newdisk]# cat test.txt
```

This is a test.

#### 2.4.3.6 Question

What are key steps of the service space reclamation process?

[Suggested Procedure]

For details, see **Configure > Basic Storage Service Configuration Guide > Managing Basic Storage Services** in the desired product documentation.

#### 2.4.3.7 Task 3: Reclaiming Service Space

Step 1    Disconnect the iSCSI connections.

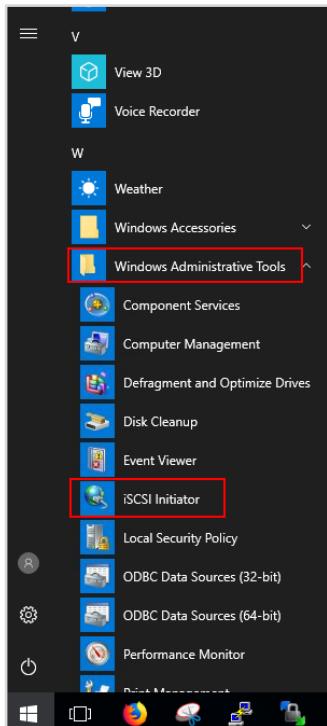
Disconnect the iSCSI connections from the service hosts.

[Suggested Procedure]

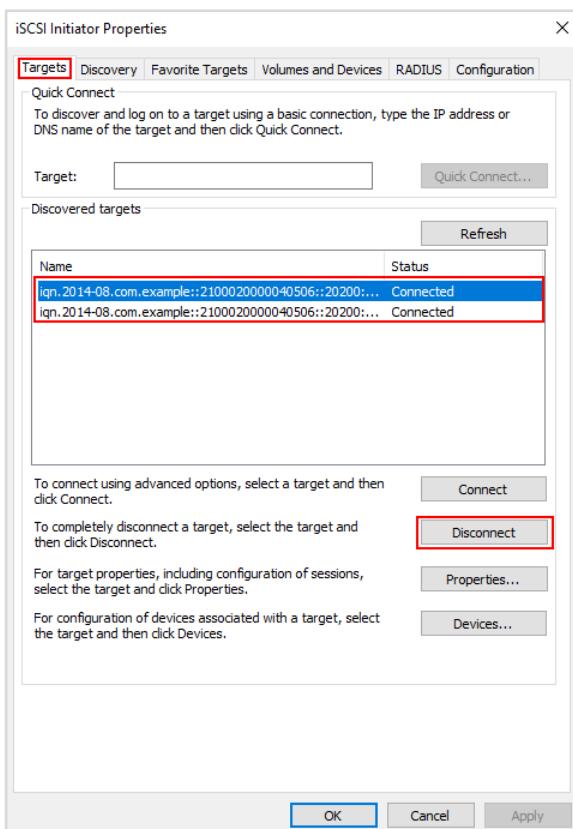
For details, see **Appendix A Volume Management** in *OceanStor Dorado V6 Host Connectivity Guide for XXX*, where XXX indicates the OS, such as Windows, SUSE, Red Hat, CentOS, and EulerOS.

- For the Windows host:

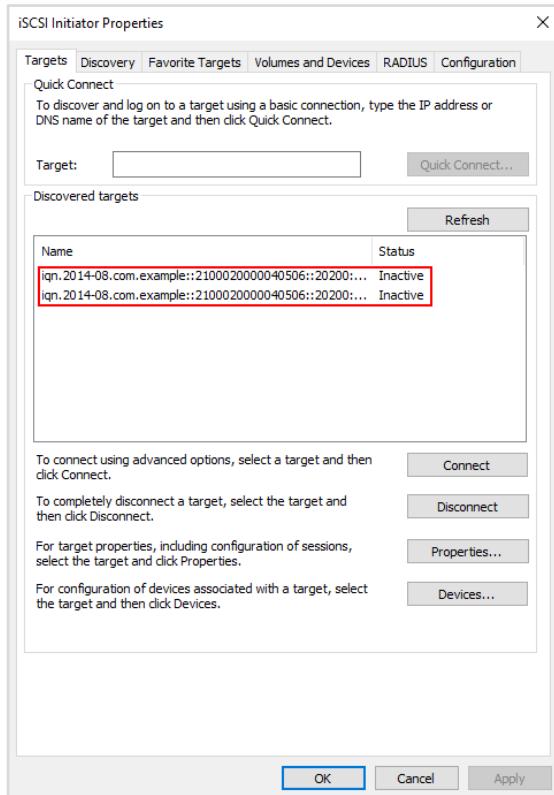
On the Windows host, click **Start > Windows Administrative Tools > iSCSI Initiator**.



On the **Targets** tab page, disconnect from the two targets.



The following figure shows the result.



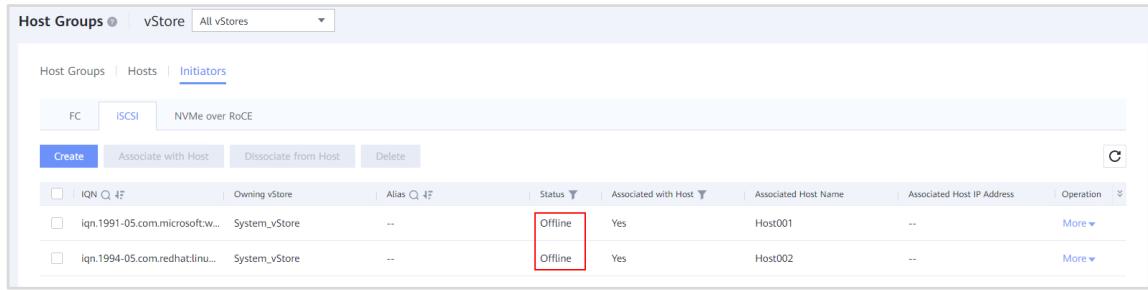
- For the Linux host:

Log out of the targets.

```
[root@Host002 newdisk]# iscsiadm -m node -p 192.168.2.41 -u
Logging out of session [sid: 1, target: iqn.2014-
08.com.example::2100020000040506::20201:192.168.2.41, portal: 192.168.2.41,3260]
Logout of [sid: 1, target: iqn.2014-08.com.example::2100020000040506::20201:192.168.2.41, portal:
192.168.2.41,3260] successful.
[root@Host002 newdisk]# iscsiadm -m node -p 192.168.2.42 -u
Logging out of session [sid: 2, target: iqn.2014-
08.com.example::2100020000040506::20201:192.168.2.42, portal: 192.168.2.42,3260]
Logout of [sid: 2, target: iqn.2014-08.com.example::2100020000040506::20201:192.168.2.42, portal:
192.168.2.42,3260] successful.
```

- Check the initiator status.

On DeviceManager, choose **Services > Block Service > Host Groups > Initiators > iSCSI**, you can see that the **Status** of initiators of the Windows and Linux hosts are **offline**.



Name	Owning vStore	Alias	Status	Associated with Host	Associated Host Name	Associated Host IP Address	Operation
IQN_4f7	System_vStore	--	Offline	Yes	Host001	--	More
iqn.1991-05.com.microsoft:tw...	System_vStore	--	Offline	Yes	Host002	--	More
iqn.1994-05.com.redhat.linux...	System_vStore	--	Offline	Yes	Host002	--	More

## Step 2 Delete mappings.

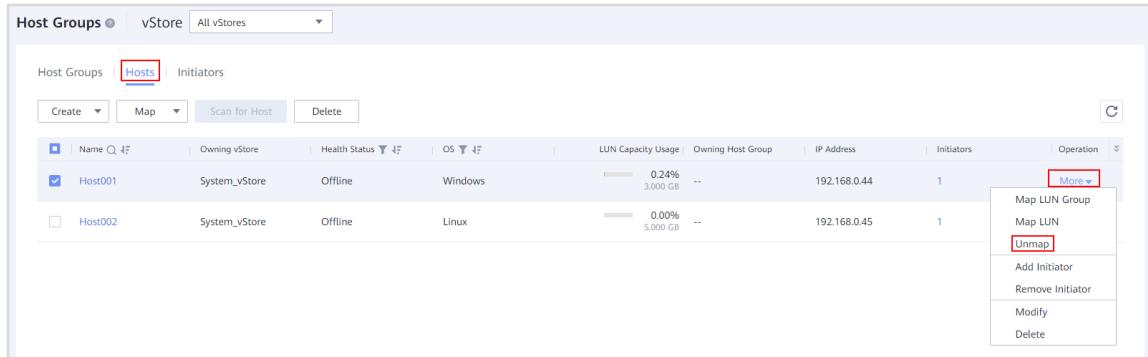
Log in to DeviceManager and cancel mappings between the hosts and LUNs.



### [Suggested Procedure]

For details, see **Configure > Basic Storage Service Configuration Guide > Managing Basic Storage Services > Managing Hosts** in the desired product documentation.

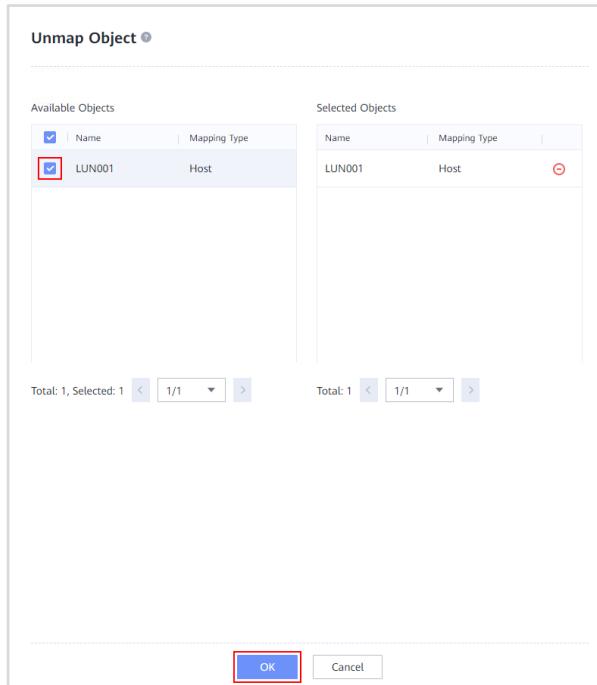
On DeviceManager, choose **Services > Block Service > Host Groups > Hosts**. Click **More** on the right of the desired host and select **Unmap**.



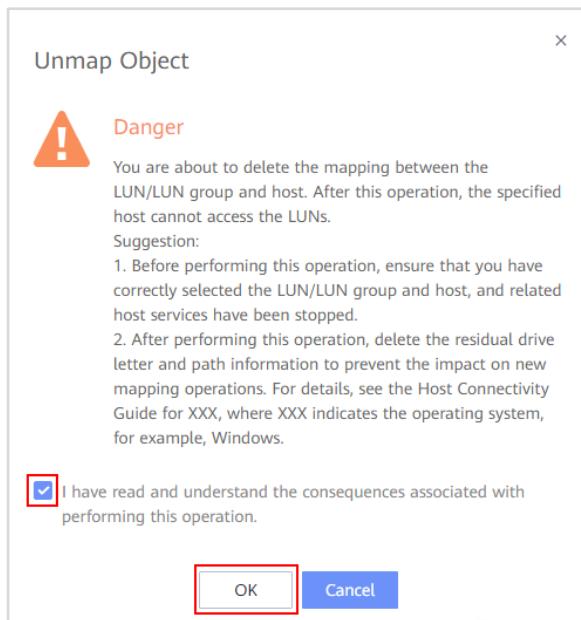
Name	Owning vStore	Health Status	OS	LUN Capacity Usage	Owning Host Group	IP Address	Initiators	Operation
Host001	System_vStore	Offline	Windows	0.24% 3.000 GB	--	192.168.0.44	1	More
Host002	System_vStore	Offline	Linux	0.00% 5.000 GB	--	192.168.0.45	1	

- Map LUN Group
- Map LUN
- Unmap**
- Add Initiator
- Remove Initiator
- Modify
- Delete

The **Unmap Object** page is displayed on the right. Select the object from **Available Objects**. Click **OK**.



Confirm your operation as prompted.



Perform the same operations on the second host to cancel the mapping between the host and the LUN.

### Step 3 Delete the hosts and initiators.

Log in to DeviceManager and delete the hosts, initiators, and service IP addresses.

### [Suggested Procedure]

For details, see **Configure > Basic Storage Service Configuration Guide > Managing Basic Storage Services** in the desired product documentation.

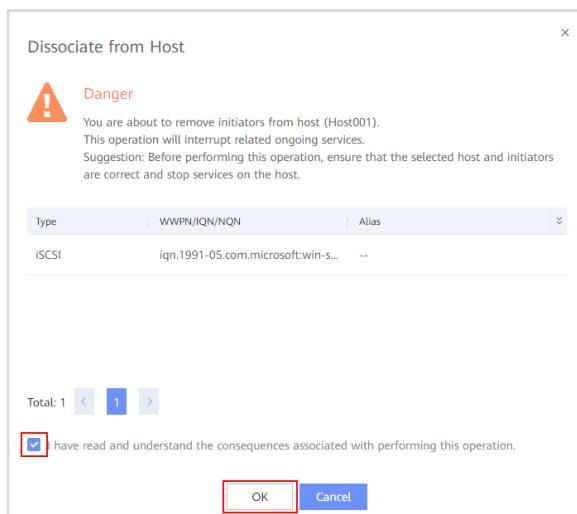
Dissociating the initiators from the hosts:

On DeviceManager, choose **Services > Block Service > Host Groups > Initiators > iSCSI**, select an initiator, and click **Dissociate from Host**.



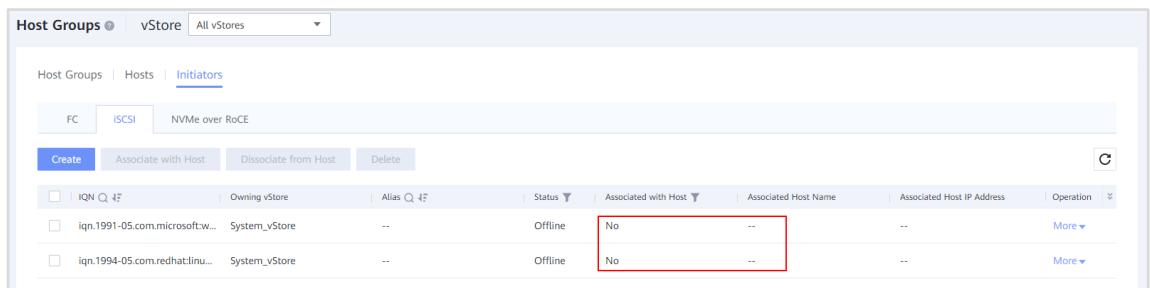
The screenshot shows the DeviceManager interface for managing host groups. The 'Host Groups' tab is selected. Under 'Host Groups', there are tabs for 'Hosts' and 'Initiators'. The 'Initiators' tab is active, indicated by a blue border. Below it, there are three tabs: 'FC', 'iSCSI' (which is selected and highlighted with a red border), and 'NVMe over RoCE'. In the center, there is a table of initiators. The first row has a checkbox column, followed by columns for IQN, Owning vStore, Alias, Status, Associated with Host, Associated Host Name, Associated Host IP Address, and Operation. The first row's checkbox is checked and highlighted with a red box. The second row's checkbox is unchecked. The third row's checkbox is also unchecked. At the bottom of the table, there are buttons for 'Create', 'Associate with Host', 'Dissociate from Host' (which is highlighted with a red box), and 'Delete'.

Confirm your operation as prompted.



The screenshot shows a confirmation dialog box titled 'Dissociate from Host'. It contains a warning icon and the text: 'Danger You are about to remove initiators from host (Host001). This operation will interrupt related ongoing services. Suggestion: Before performing this operation, ensure that the selected host and initiators are correct and stop services on the host.' Below this is a table with columns 'Type', 'WWPN/IQN/NQN', and 'Alias'. The first row shows 'iSCSI' and 'iqn.1991-05.com.microsoft:win-s...'. At the bottom, it says 'Total: 1' with page navigation buttons. There is a checkbox labeled 'I have read and understand the consequences associated with performing this operation.' which is checked and highlighted with a red box. At the bottom right are 'OK' and 'Cancel' buttons, with 'OK' highlighted with a red box.

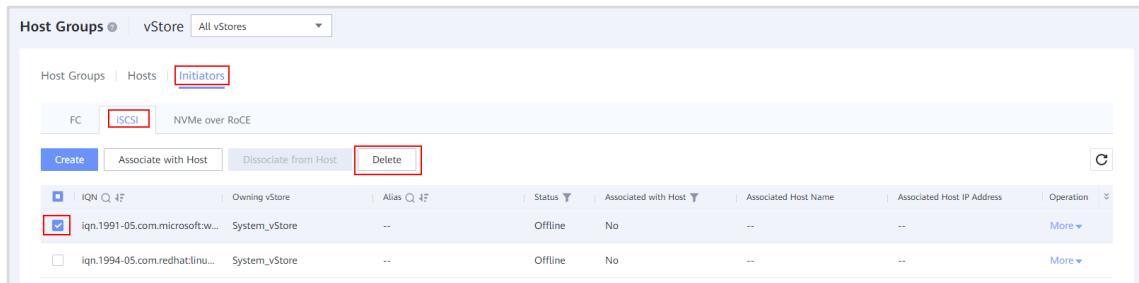
Perform the same operations for the other initiator. The following figure shows the result.



The screenshot shows the 'Host Groups > Initiators > iSCSI' interface again. The table now shows two rows where the 'Associated with Host' column contains 'No' and the 'Associated Host IP Address' column contains '--'. The first row's checkbox is unchecked, and the second row's checkbox is also unchecked. The 'Dissociate from Host' button is now grayed out.

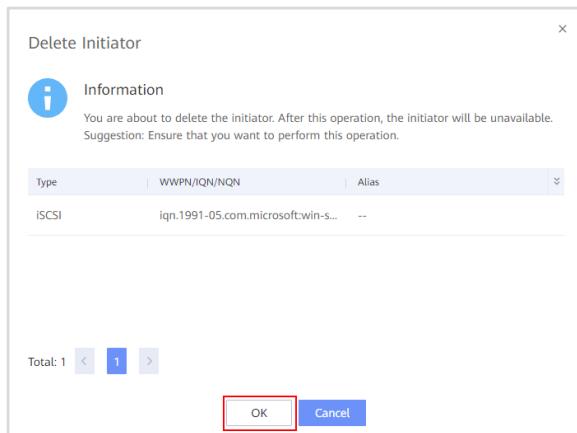
Deleting the initiators:

Choose **Services > Block Service > Host Groups > Initiators > iSCSI**, select an initiator, and click **Delete**.



The screenshot shows the 'Host Groups' interface with the 'vStore' selected. The 'Initiators' tab is active, and the 'iSCSI' sub-tab is selected. A checkbox is checked next to the first initiator entry, and the 'Delete' button is highlighted with a red box.

Confirm your operation as prompted.

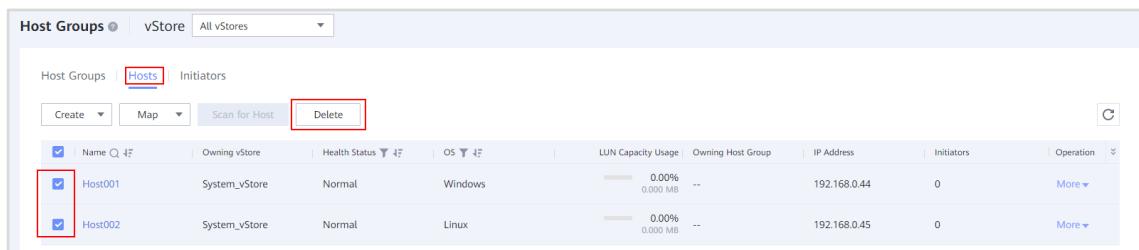


The screenshot shows a 'Delete Initiator' dialog box. It contains an information section with a blue info icon, stating: 'You are about to delete the initiator. After this operation, the initiator will be unavailable. Suggestion: Ensure that you want to perform this operation.' Below this is a table showing initiator details: Type (WWPN/IQN/NQN), Alias, and Value (iqn.1991-05.com.microsoft:win-s...). At the bottom, there is a pagination area showing 'Total: 1' with a page number '1' highlighted with a red box, and 'OK' and 'Cancel' buttons, where 'OK' is also highlighted with a red box.

Perform the same operations for the other initiator.

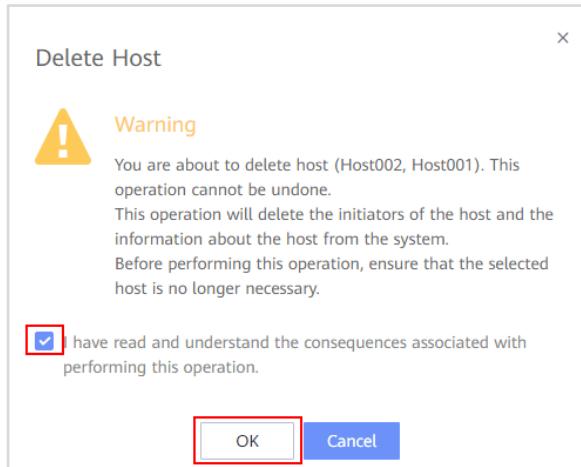
Deleting the hosts:

Choose **Services > Block Service > Host Groups > Hosts**, select the hosts to be deleted, and click **Delete**.



The screenshot shows the 'Host Groups' interface with the 'vStore' selected. The 'Hosts' tab is active. Two hosts, 'Host001' and 'Host002', are selected, indicated by checked checkboxes. The 'Delete' button is highlighted with a red box.

Confirm your operation as prompted.



Execution Result			
Total 2 Successful 2 Failed 0			
Operation	Status	Details	
Deleting host Host002	Successful	--	
Deleting host Host001	Successful	--	

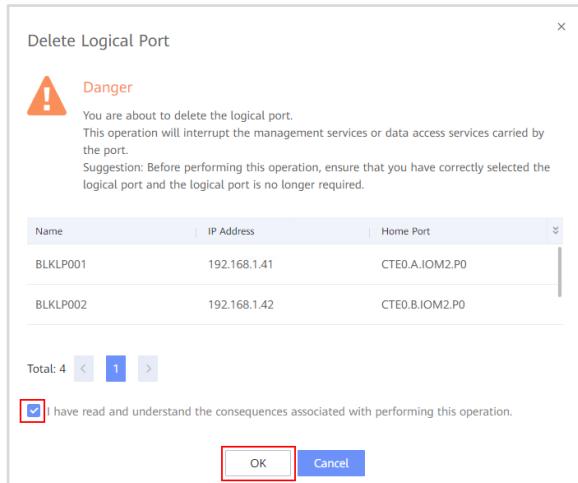
Total: 2 < 1/1 > Close

### Deleting the logical ports:

Choose **Services > Network > Logical Ports**, select the logical ports to be deleted, and click **Delete**.

Logical Ports							
Create		Manage Route		Fail Back		Delete	
	Name	Owning vStore	Data Protocol	IP Address	Subnet Mask/Prefix	Gateway	Home Port/Current Port
<input checked="" type="checkbox"/>	BLKLP001	System_vStore	iSCSI	192.168.1.41	255.255.255.0	192.168.1.1	CTE0.A.IOM2.P0
<input checked="" type="checkbox"/>	BLKLP002	System_vStore	iSCSI	192.168.1.42	255.255.255.0	192.168.1.1	CTE0.B.IOM2.P0
<input checked="" type="checkbox"/>	BLKLP003	System_vStore	iSCSI	192.168.2.41	255.255.255.0	192.168.2.1	CTE0.A.IOM2.P1
<input checked="" type="checkbox"/>	BLKLP004	System_vStore	iSCSI	192.168.2.42	255.255.255.0	192.168.2.1	CTE0.B.IOM2.P1
<input type="checkbox"/>	CTE0.A.MGMTV4	--	None	192.168.0.17	255.255.255.0	192.168.0.1	CTE0.A.MGMT
<input type="checkbox"/>	CTE0.B.MGMTV4	--	None	192.168.0.18	255.255.255.0	192.168.0.1	CTE0.B.MGMT

Confirm your operation as prompted.



Execution Result		
Total: 4	Successful: 4	Failed: 0
Operation	Status	Details
Deleting logical port BLKLP001	Successful	--
Deleting logical port BLKLP002	Successful	--
Deleting logical port BLKLP003	Successful	--
Deleting logical port BLKLP004	Successful	--

#### Step 4 Delete LUNs.

Log in to DeviceManager and delete the LUNs to release storage space.

##### [Suggested Procedure]

For details, see **Configure > Basic Storage Service Configuration Guide > Managing Basic Storage Services > Managing LUNs** in the desired product documentation.

On DeviceManager, choose **Services > Block Service > LUN Groups > LUNs**, select the LUNs you want to delete, and click **Delete**.

LUN Groups vStore All vStores

LUN Groups LUNs Recycle Bin

Create Map Protect Delete

Name	Owning vStore	Capacity	Health Status	Running Status	Created	Data Protection	Local WWN	Function	Mapping	Application Type	Operation
<input checked="" type="checkbox"/> LUN001	System_vStore	0.24% 3.000 GB	Normal	Online	2022-09-22 16:58:59		6020000100...	LUN	Unmapped	Default	<a href="#">More</a>
<input checked="" type="checkbox"/> LUN002	System_vStore	0.00% 5.000 GB	Normal	Online	2022-09-22 16:59:11		6020000100...	LUN	Unmapped	Default	<a href="#">More</a>

Confirm your operation as prompted.

Delete LUN

**Warning**

You are about to move the LUN to the recycle bin.  
After this operation, the LUN and data on the LUN will be deleted at the preset time point, and space occupied by the LUN will be reclaimed based on the reclamation policy.  
Suggestion: Before performing this operation, ensure that data on the LUN has been backed up or is no longer necessary.

Name	ID
LUN001	0
LUN002	1

Total: 2 < 1 >

I have read and understand the consequences associated with performing this operation.

OK Cancel

Execution Result

Total 2 Successful 2 Failed 0

Operation	Status	Details
Deleting LUN LUN001	Successful	--
Deleting LUN LUN002	Successful	--

Total: 2 < 1/1 >

Close

Choose **Services > Block Service > LUN Groups > Recycle Bin**, select the LUNs to be deleted, and click **Delete**.

LUN Groups vStore All vStores

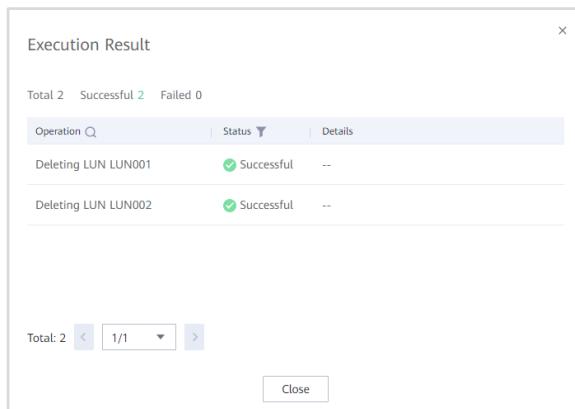
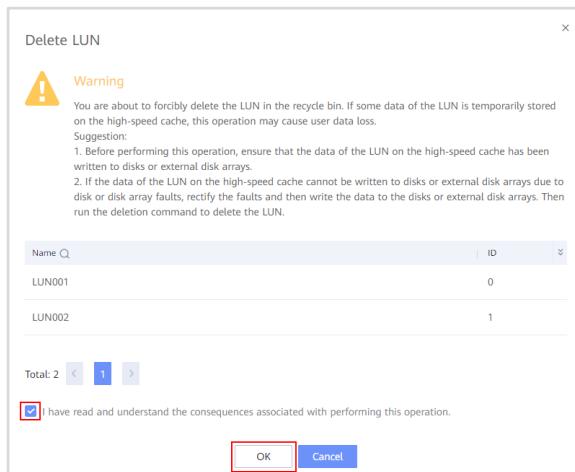
LUN Groups LUNs Recycle Bin

The recycle bin is enabled and the LUN retention period is 1 days. You can click Configure Recycle Bin to modify the settings. The recycle bin settings take effect for all vstores.

Restore Delete

Name	ID	Owning vStore	Total	Allocated	Local WWN	Deleted	Parent Object	Child Objects	Operation
<input checked="" type="checkbox"/> LUN001	0	System_vStore	3.000 GB	7.664 MB	6020000100040506...	2022-09-26 11:47:36	--	0	<a href="#">More</a>
<input checked="" type="checkbox"/> LUN002	1	System_vStore	5.000 GB	0.000 MB	6020000100040506...	2022-09-26 11:47:40	--	0	<a href="#">More</a>

Confirm your operation as prompted.



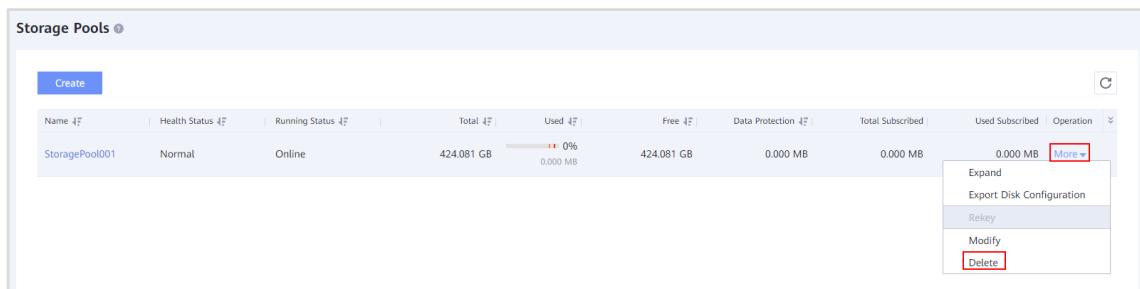
## Step 5 Delete the storage pool.

Log in to DeviceManager and delete the storage pool.

[Suggested Procedure]

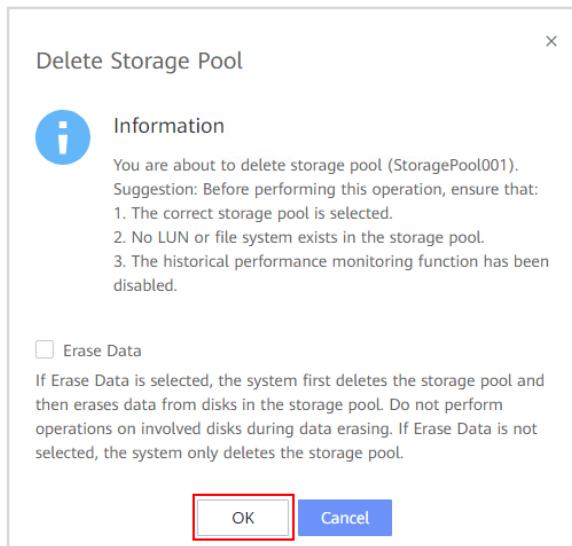
For details, see **Configure > Basic Storage Service Configuration Guide > Managing Basic Storage Services > Managing Storage Pools** in the desired product documentation.

On DeviceManager, choose **System > Storage Pools**. Click **More** on the right of the desired storage pool and select **Delete**.



The screenshot shows the 'Storage Pools' interface. A table lists a single storage pool: 'StoragePool001' (Normal, Online), with 424.081 GB total, 0.000 MB used, and 424.081 GB free. A context menu is open over the row, with the 'Delete' option highlighted.

In the displayed dialog box, click **OK**.



### NOTE

If you select **Erase Data**, the system deletes the storage pool and then erases data from all disks in the storage pool. Do not perform any operation on the disks during data erasure. If you do not select this option, the system only deletes the storage pool.

**Execution Result**

**Delete Storage Pool**

Progress  Successful

The task has completed. Please close the execution result page and refresh the list to update the data.

Name	Execution Times	Target	Status	Duration
Deleting the disk domain	1/1	StoragePool001	Successful	1 min 37s
Querying the disk domain	1/1	StoragePool001	Successful	2s
Deleting the storage pool	1/1	StoragePool001	Successful	55s
Querying the storage pool	1/1	StoragePool001	Successful	2s
Initializing the task	1/1	--	Successful	2s

Total: 5 < 1/1 >

**Close**

### Step 6 Verify the result.

Verify that the service space has been reclaimed successfully.

## 2.5 Practice Summary

My practice summary:

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Huawei Storage Certification Training

# HCIA-Storage

## Scenario-based Practice of Basic Storage Service Configurations (for File)

ISSUE: 5.0

(For Trainees)



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## **Huawei Technologies Co., Ltd.**

Address:      Huawei Industrial Base Bantian, Longgang Shenzhen 518129  
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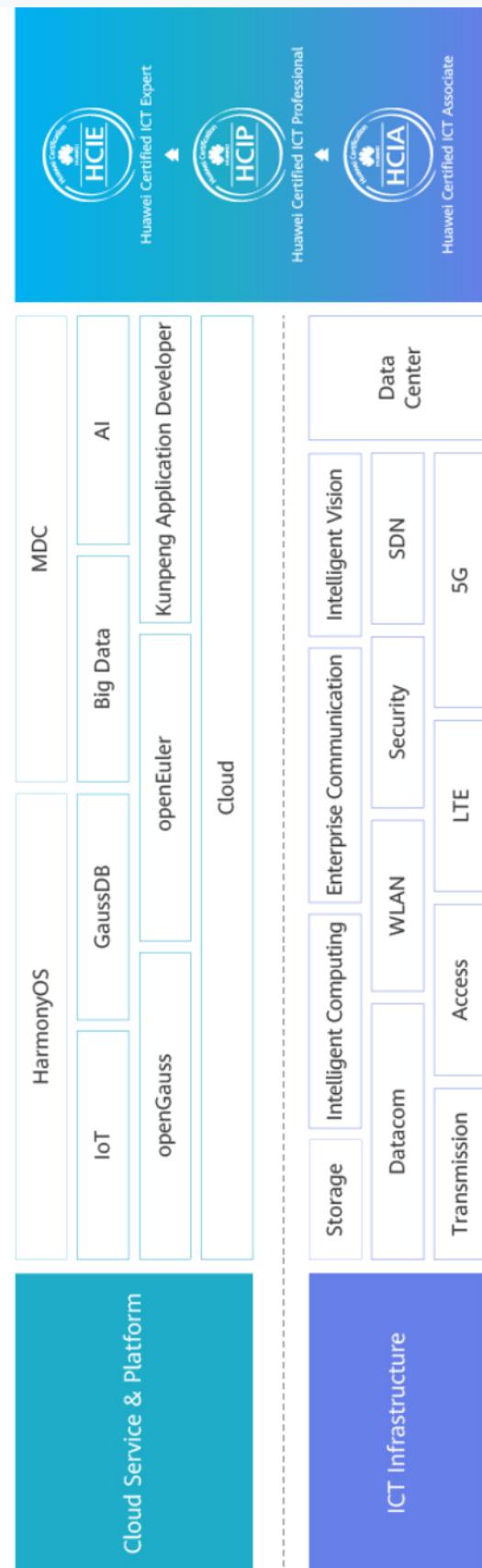
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## Huawei Certification



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# 1

# References and Tools

---

## 1.1 References

Commands and documents listed in this document are for reference only, and actual ones may vary with product versions.

1. Huawei OceanStor Dorado all-flash series product documentation

 **NOTE**

Features supported by Huawei OceanStor Dorado all-flash products vary between product models. For details, see the product documentation specific to the product model. Log in to the Huawei technical support website (<https://support.huawei.com/enterprise/>) and type the name of a documentation or tool in the search box to search for, browse, and download the desired documentation or tool.

## 1.2 Software Tools

PuTTY

 **NOTE**

You are advised to use open-source software PuTTY to log in to a terminal. You can use the common domain name ([putty.org](http://putty.org)) of PuTTY to browse or download the desired documentation or tool.

## 1.3 Version Description

Name	Version	Quantity	Remarks
Storage device	Huawei OceanStor Dorado V6	1	
Windows operating system (OS)	Windows Server 2012 and Windows Server 2016	--	Recommended version
Linux OS	SUSE, Red Hat, CentOS, and EulerOS	--	Recommended version
S5700 switch	--	1	

# 2

## Scenario-based Practice of Basic Storage Service Configurations

---

### 2.1 Course Overview

This course provides case studies and scenario-based practices to help trainees consolidate their knowledge on initial configuration and basic service deployment and implementation of Huawei OceanStor all-flash storage.

### 2.2 Objectives

- To understand common networking modes of storage services
- To plan and design networks
- To complete the initial configuration of the storage system
- To plan and configure file services

### 2.3 Case Background

#### NOTE

Cases in this document are examples only, and configurations may vary according to the actual environment. For details, see the product documentation specific to the product model and version.

Company W needs a high-performance storage system to support new services. To meet service development requirements, the company purchases a Huawei OceanStor all-flash storage system and deploys two test servers to ensure proper service running. Server A runs the Windows OS, server B runs the Linux OS, and storage devices provide file storage services for the two servers over an IP network.

As a storage engineer, you are responsible for network planning and design, initial configuration, and file service configuration of the storage system.

## 2.4 Tasks and Suggested Answers

### 2.4.1 Scenario-based Practice: Basic Service Planning and Configurations

#### 2.4.1.1 Background

Storage engineer A has created two 10 GB file systems named **FileSystem001** and **FileSystem002**, and a CIFS share and an NFS share for the corresponding client host.

#### 2.4.1.2 Question

Provide key steps of the file service configuration process.

#### 2.4.1.3 Task 1: Configuring the File System

Based on the case background and planning, configure the file service on the Windows and Linux servers. Then, use the storage space on the application servers, that is, write a test file, such as **test.txt**, to the servers, respectively.

##### Step 1 Create a storage pool.

To ensure that the application servers can use the storage space of the storage system, create a storage pool named **StoragePool001**.



##### NOTE

During configuration initialization, if you have specified that all disks are used to create a unique storage pool, skip this step.

If this step is performed, the capacity of the storage pool depends on the actual planning and experiment environment.

##### [Suggested Procedure]

For details, see **Configure > Basic Storage Service Configuration Guide for File > Configuring Basic Storage Services > Creating a Storage Pool** in the desired product documentation.

1. Choose **System > Storage Pools**.
2. Click **Create**.
3. Set the storage pool parameters.
4. Click **OK**.

**Create Storage Pool** 

Advanced

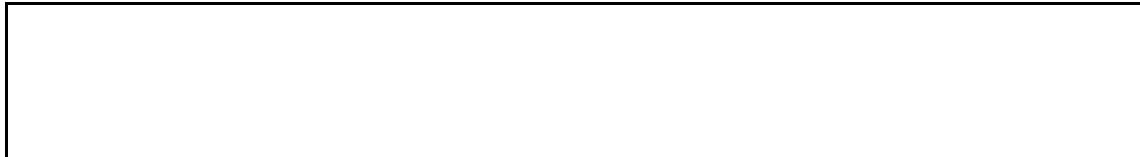
* Name	StoragePool001		
* Redundancy Policy	Disk redundancy		
* Controller Enclosure	<input checked="" type="checkbox"/> CTE0		
Storage Pool Capacity	424.081 GB		
 Select at least 8 disks.			
Capacity per Disk	Type	Available Disks	Selectable Disks per Controller Enclosure    Required Disks 
79.999 GB	SSD	10	10  x 1 = 10 <a href="#">Select</a>

Total: 1   

Retain historical monitoring data 

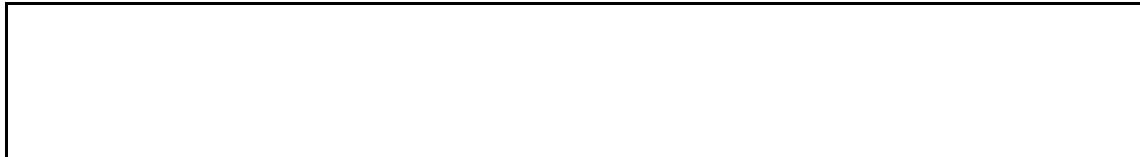
 A maximum of 200 GB historical monitoring data can be stored in the storage pool.

**OK** **Cancel**



## Step 2 Create a file system.

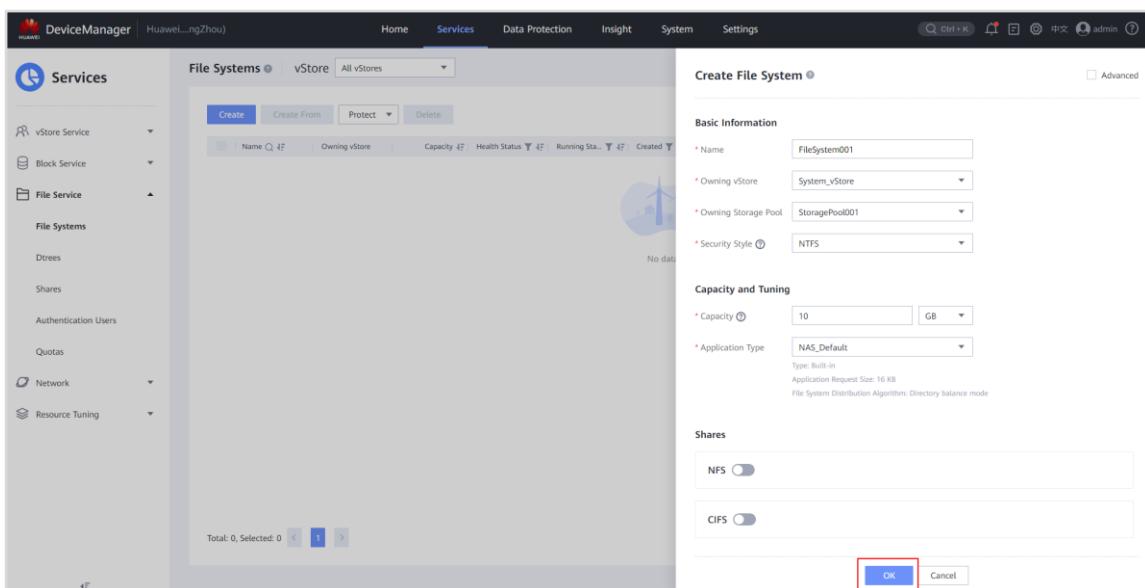
Create a 10 GB file system named **FileSystem001**.



[Suggested Procedure]

For details, see **Configure > Basic Storage Service Configuration Guide for File > Configuring Basic Storage Services > Creating a File System** in the desired product documentation.

1. Choose **Services > File Service > File Systems**.
2. Select the vStore for which you want to create a file system from the **vStore** drop-down list in the upper left corner.
3. Click **Create**.
4. Set the name of the file system to **FileSystem001** and the owning storage pool to **StoragePool001**.
5. Set the capacity of the file system to **10 GB** and the application type to **NAS\_Default**.
6. Click **OK**.



### Step 3 Create a dtree.

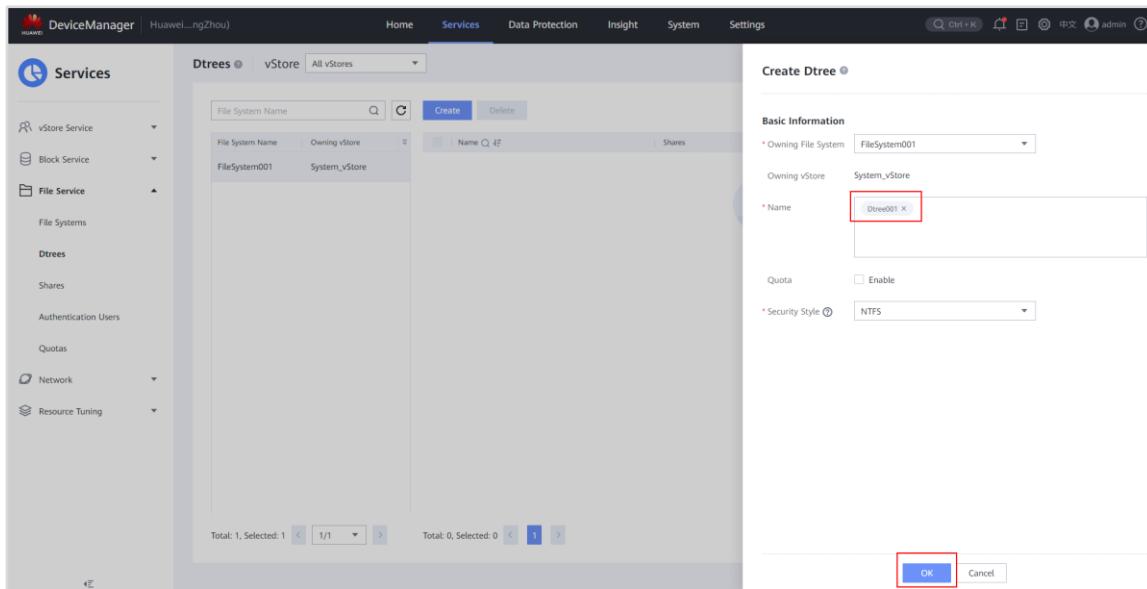
A dtree is created to manage the space used by all files in a directory and the access permission of the directory.

[Suggested Procedure]

For details, see **Configure > Basic Storage Service Configuration Guide for File > Configuring Basic Storage Services > (Optional) Creating a Dtree** in the desired product documentation.

1. Choose **Services > File Service > Dtrees**.
2. Select the vStore to which the desired file system belongs from the **vStore** drop-down list in the upper left corner.
3. Click **Create**.

4. Set the dtree name to **Dtree001**.
5. Click **OK**.



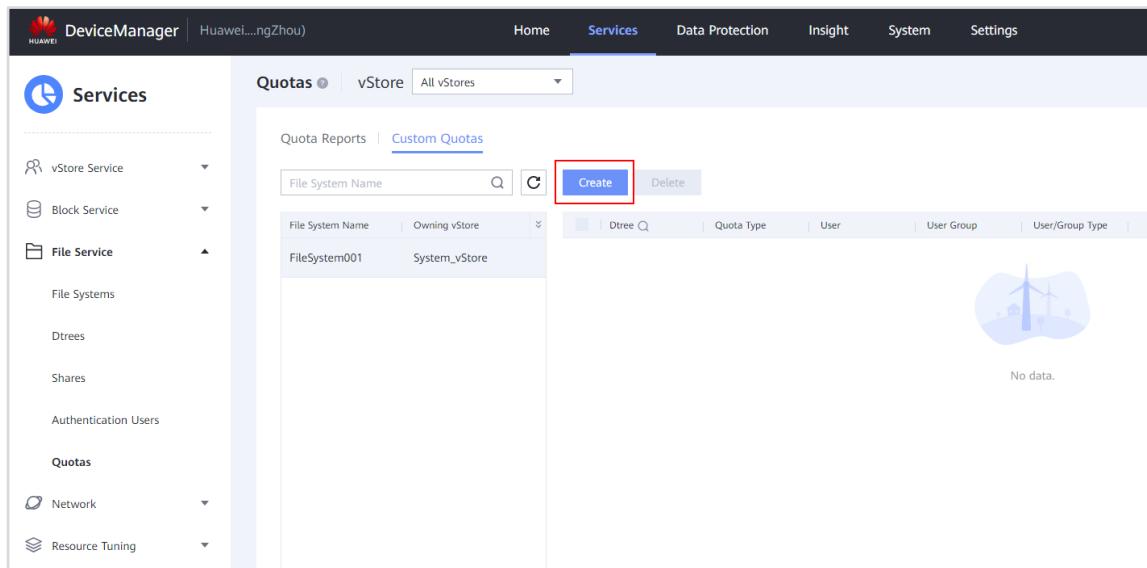
#### Step 4 Create a quota.

A quota is created to limit the space usage and file quantity used by a dtree.

[Suggested Procedure]

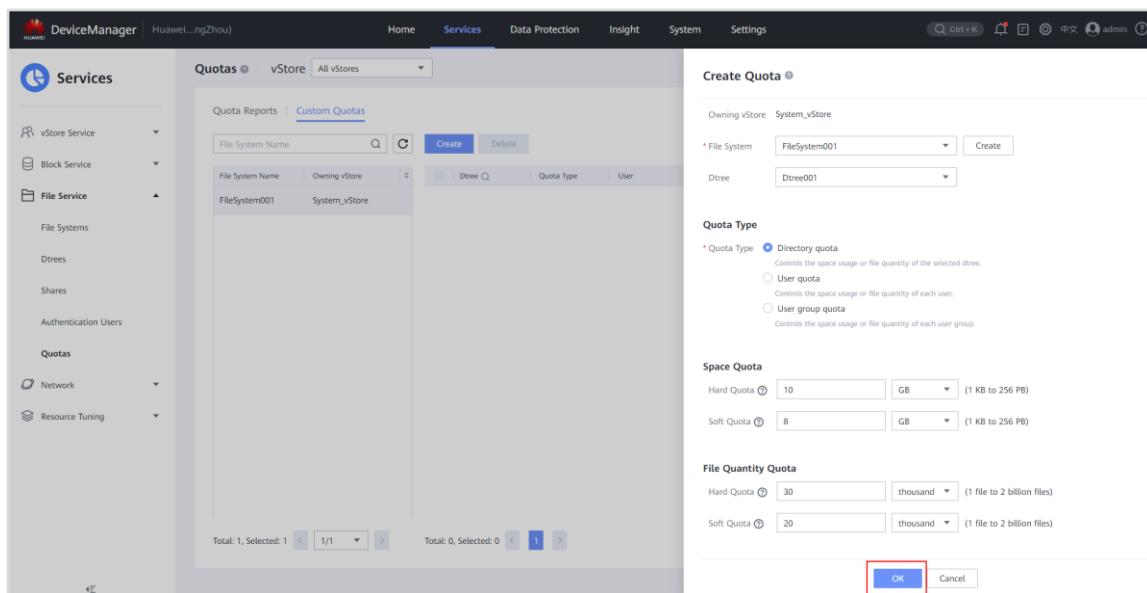
For details, see **Configure > Basic Storage Service Configuration Guide for File > Configuring Basic Storage Services > (Optional) Creating a Quota** in the desired product documentation.

1. Choose **Services > File Service > Quotas > Custom Quotas**.
2. Select the vStore to which the desired file system belongs from the **vStore** drop-down list in the upper left corner.
3. Click **Create**.



The screenshot shows the 'Services' tab selected in the DeviceManager interface. Under the 'File Service' category, the 'Quotas' option is chosen. The main area displays a table with one row: 'FileSystem001' under 'File System Name' and 'System\_vStore' under 'Owning vStore'. At the top right of the table, there is a 'Create' button highlighted with a red box.

4. Select file system **FileSystem001** and dtree **Dtree001** for which you want to create a quota.
5. Set **Quota Type** to **Directory quota**.
6. Set **Hard Quota** and **Soft Quota** of **Space Quota** to **10 GB** and **8 GB**, respectively.
7. Set the **Hard Quota** and **Soft Quota** of **File Quantity Quota** to **30 thousand** and **20 thousand**, respectively.
8. Click **OK**.



The screenshot shows the 'Create Quota' dialog box overlaid on the main 'Quotas' table. In the dialog, the 'Owning vStore' is set to 'System\_vStore', 'File System' is 'FileSystem001', and 'Dtree' is 'Dtree001'. Under 'Quota Type', 'Directory quota' is selected. In the 'Space Quota' section, 'Hard Quota' is set to 10 GB and 'Soft Quota' is set to 8 GB. In the 'File Quantity Quota' section, 'Hard Quota' is set to 30 thousand and 'Soft Quota' is set to 20 thousand. The 'OK' button at the bottom right of the dialog is highlighted with a red box.

#### 2.4.1.4 Question

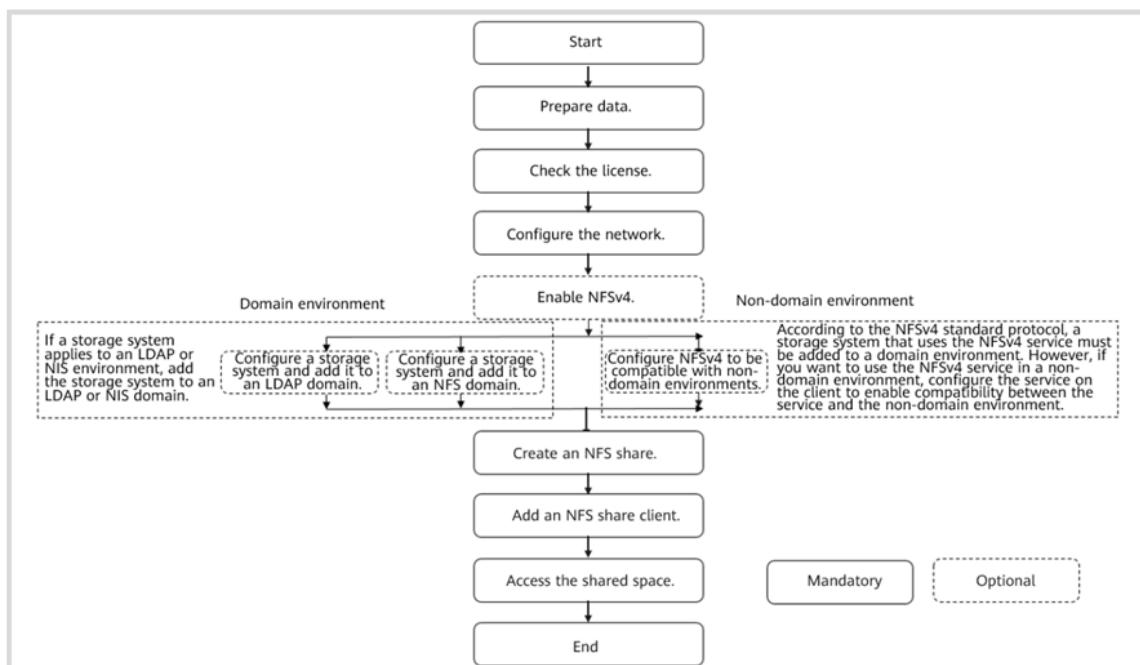
Which information needs to be planned before a file system is shared?

### 2.4.1.5 Task 2: Configuring an NFS Share

Step 1 Draw a flowchart for configuring an NFS share.

[Suggested Procedure]

For details, see **Configure > Basic Storage Service Configuration Guide for File > Configuring Basic Storage Services > Sharing File Systems > Configuring an NFS Share > Configuration Process** in the desired product documentation.



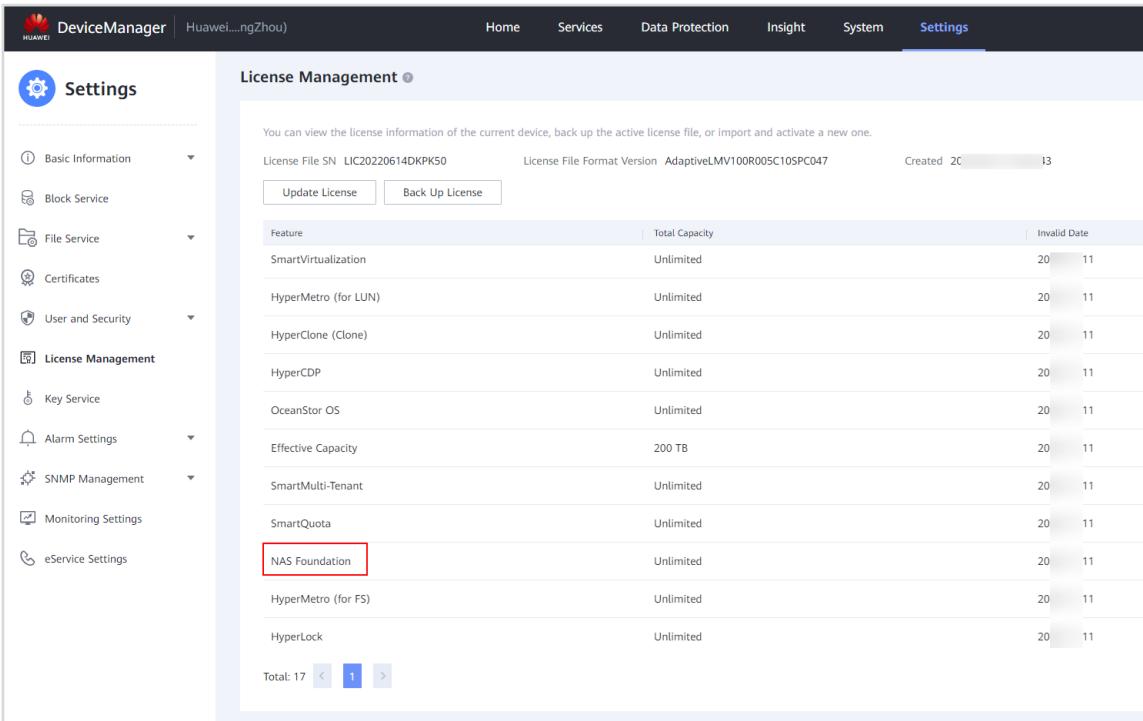
Step 2 Check the license.

[Suggested Procedure]

For details, see **Configure > Basic Storage Service Configuration Guide for File > Configuring Basic Storage Services > Sharing File Systems > Configuring an NFS Share > Checking the License** in the desired product documentation.

1. Choose **Settings > License Management**.

2. In the middle function pane, verify that **NAS Foundation** is displayed in the feature list.



The screenshot shows the DeviceManager interface with the 'Settings' tab selected. On the left, a sidebar lists various settings categories. Under 'License Management', the 'NAS Foundation' option is highlighted with a red box. The main content area is titled 'License Management' and displays a table of features and their details. The table includes columns for Feature, Total Capacity, and Invalid Date. The 'NAS Foundation' row is also highlighted with a red box. Other listed features include SmartVirtualization, HyperMetro (for LUN), HyperClone (Clone), HyperCDP, OceanStor OS, Effective Capacity, SmartMulti-Tenant, SmartQuota, HyperMetro (for FS), and HyperLock. All features have an 'Unlimited' capacity.

Feature	Total Capacity	Invalid Date
SmartVirtualization	Unlimited	20 11
HyperMetro (for LUN)	Unlimited	20 11
HyperClone (Clone)	Unlimited	20 11
HyperCDP	Unlimited	20 11
OceanStor OS	Unlimited	20 11
Effective Capacity	200 TB	20 11
SmartMulti-Tenant	Unlimited	20 11
SmartQuota	Unlimited	20 11
<b>NAS Foundation</b>	Unlimited	20 11
HyperMetro (for FS)	Unlimited	20 11
HyperLock	Unlimited	20 11

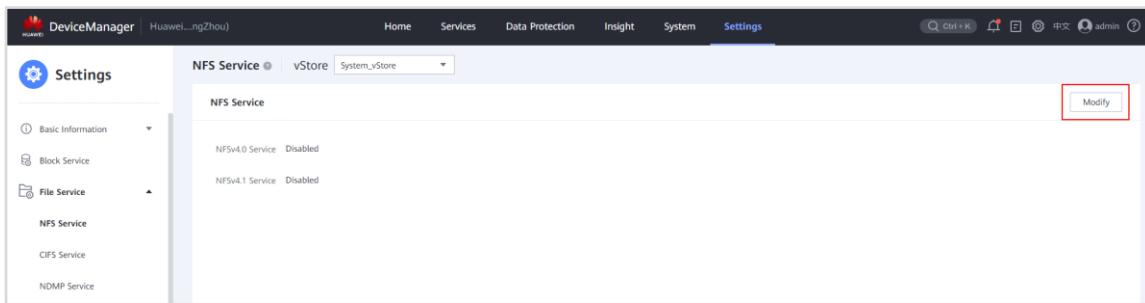
### Step 3    Enable the NFSv4 service.



#### [Suggested Procedure]

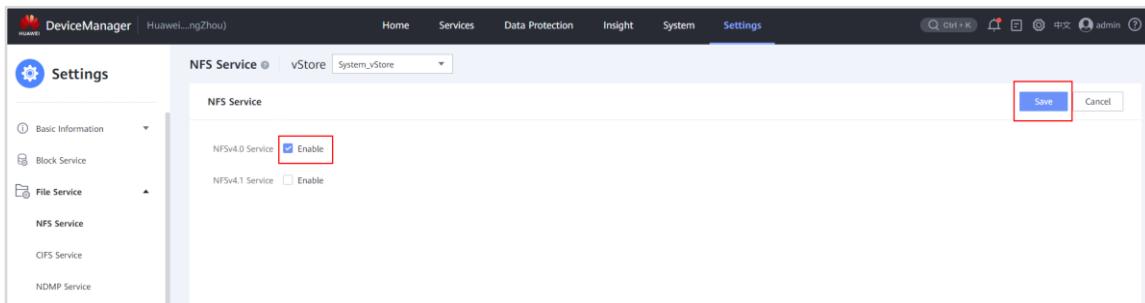
For details, see **Configure > Basic Storage Service Configuration Guide for File > Configuring Basic Storage Services > Sharing File Systems > Configuring an NFS Share > (Optional) Enabling the NFSv4 Service** in the desired product documentation.

1. Choose **Settings > File Service > NFS Service**.
2. Select the vStore for which you want to enable the NFSv4 service from the **vStore** drop-down list in the upper left.
3. Click **Modify** in the upper right.



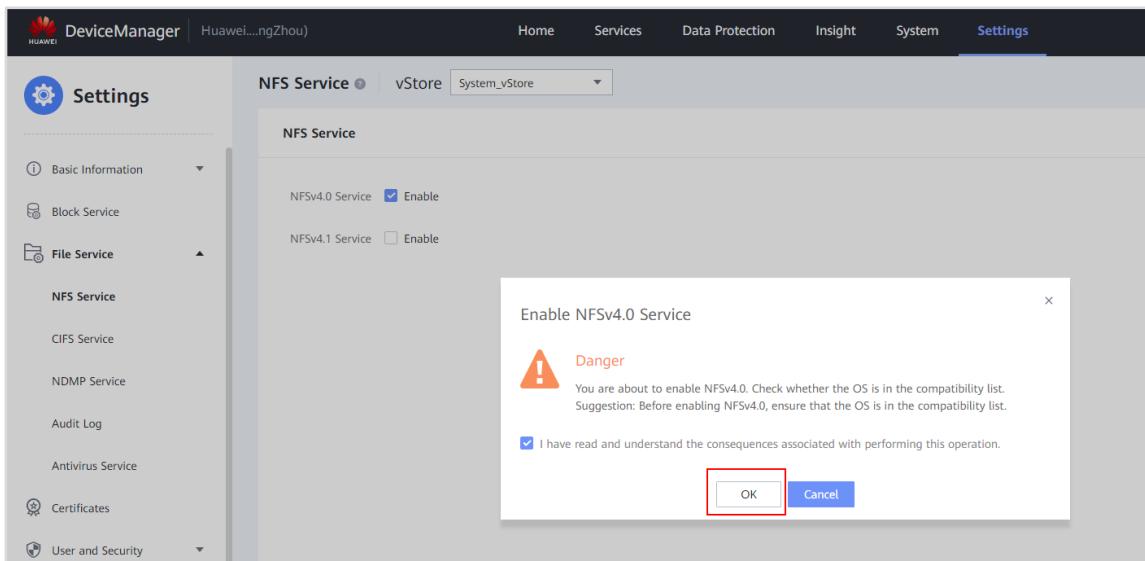
4. Select **NFSv4.0 Service** as required.

5. Click **Save**.



6. Confirm the information in the dialog box and select **I have read and understand the consequences associated with performing this operation**.

7. Click **OK**.

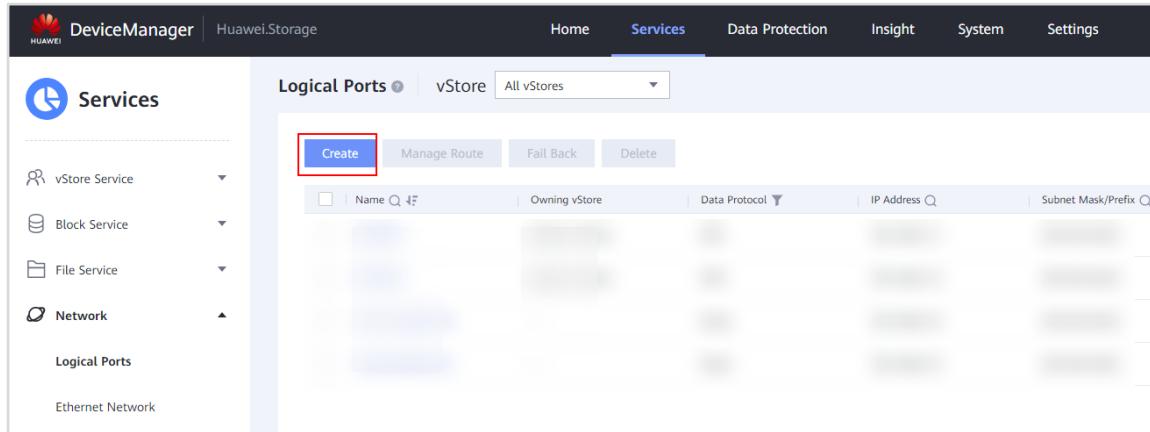


**Step 4 Configure the network and create a logical port.**

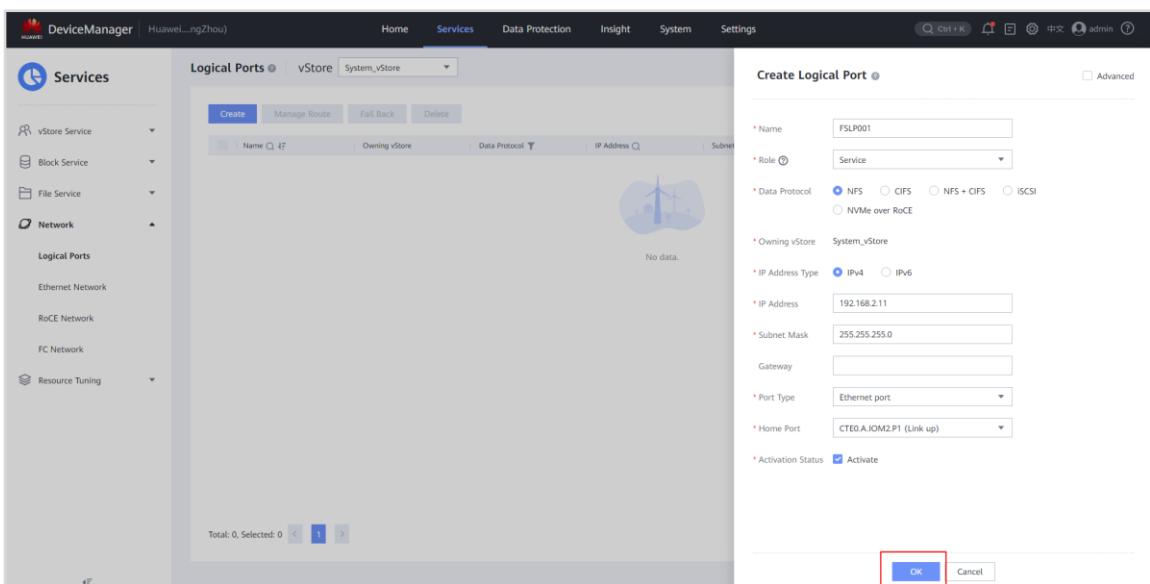
**[Suggested Procedure]**

For details, see **Configure > Basic Storage Service Configuration Guide for File > Configuring Basic Storage Services > Sharing File Systems > Configuring an NFS Share > Configuring the Network > Creating a Logical Port** in the desired product documentation.

1. Choose **Services > Network > Logical Ports**.
2. Click **Create**. The **Create Logical Port** page is displayed on the right.

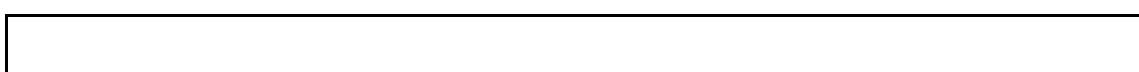


3. Configure logical port parameters. Set **Name** to **FSLP001**, **Role** to **Service**, **Data Protocol** to **NFS**, **IP Address** to **192.168.2.11**, and **Home Port** to **CTE0.A.IOM2.P1**.
4. Click **OK**.



The dialog box contains the following configuration fields:

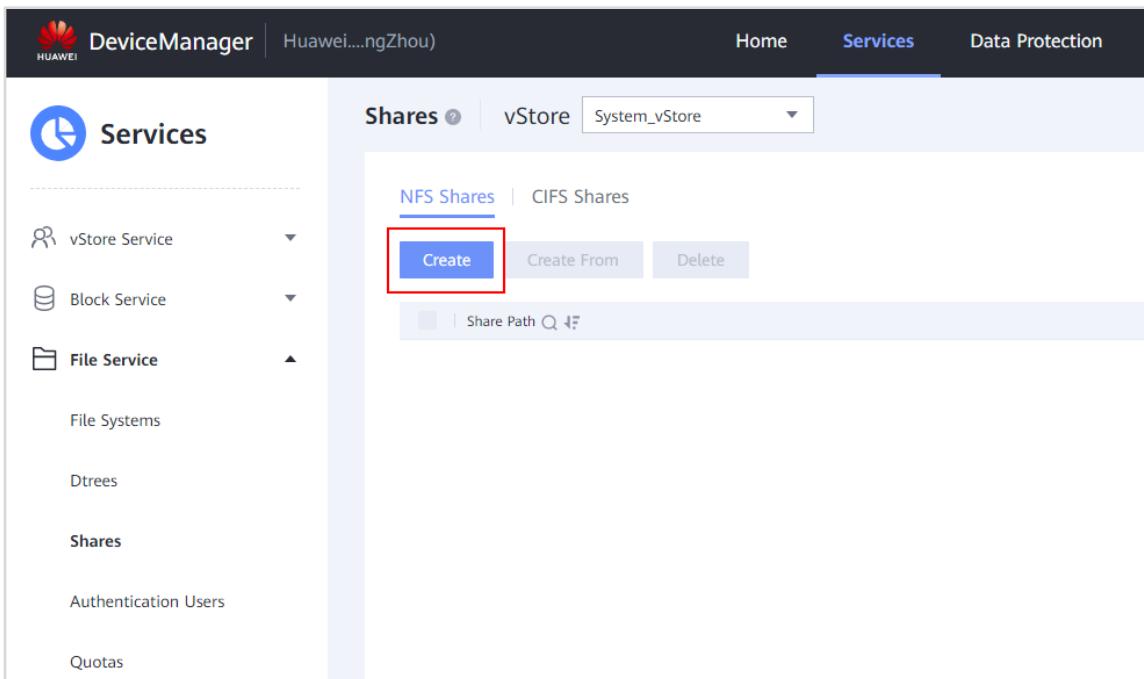
- Name:** FSLP001
- Role:** Service
- Data Protocol:** NFS (selected)
- Owning vStore:** System\_vStore
- IP Address Type:** IPv4 (selected)
- IP Address:** 192.168.2.11
- Subnet Mask:** 255.255.255.0
- Gateway:** (empty)
- Port Type:** Ethernet port
- Home Port:** CTE0.A.IOM2.P1 (Link up)
- Activation Status:**  Activate

**Step 5    Create an NFS share.**

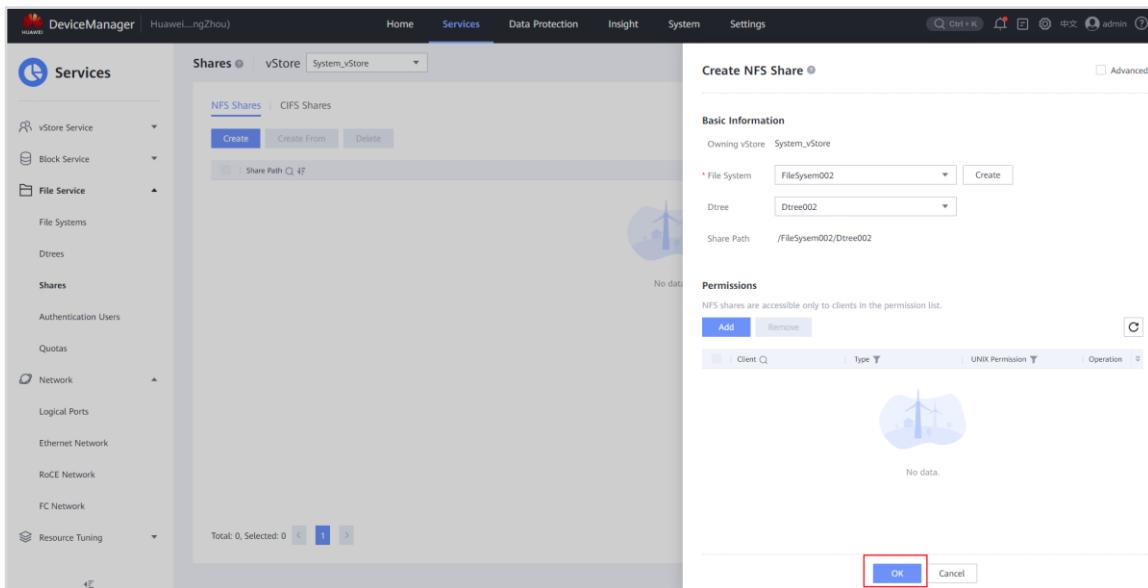
**[Suggested Procedure]**

For details, see **Configure > Basic Storage Service Configuration Guide for File > Configuring Basic Storage Services > Sharing File Systems > Configuring an NFS Share > Creating an NFS Share** in the desired product documentation.

1. Choose **Services > File Service > Shares > NFS Shares**.
2. Select the vStore to which the desired file system belongs from the **vStore** drop-down list in the upper left corner.
3. Click **Create**.



4. Set basic parameters as follows: **File System** to **FileSystem002** and **Dtree** to **Dtree002**.
5. Configure access permissions for the NFS share.
6. Click **OK**.



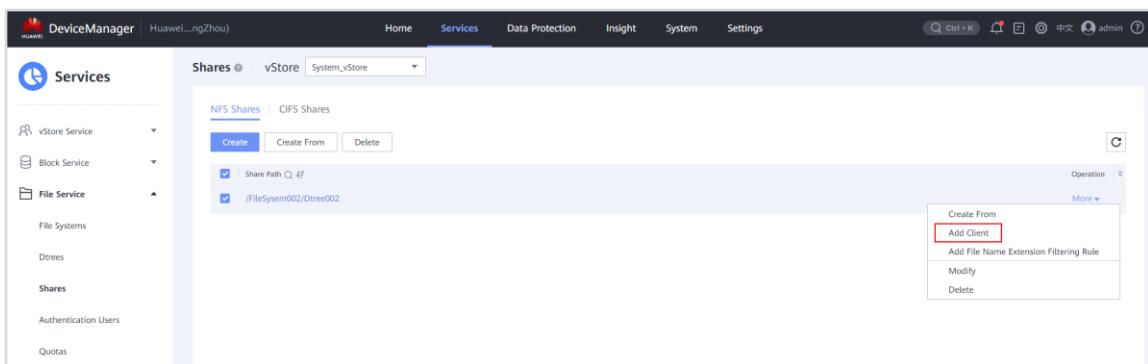
## Step 6 Add an NFS share client.



### [Suggested Procedure]

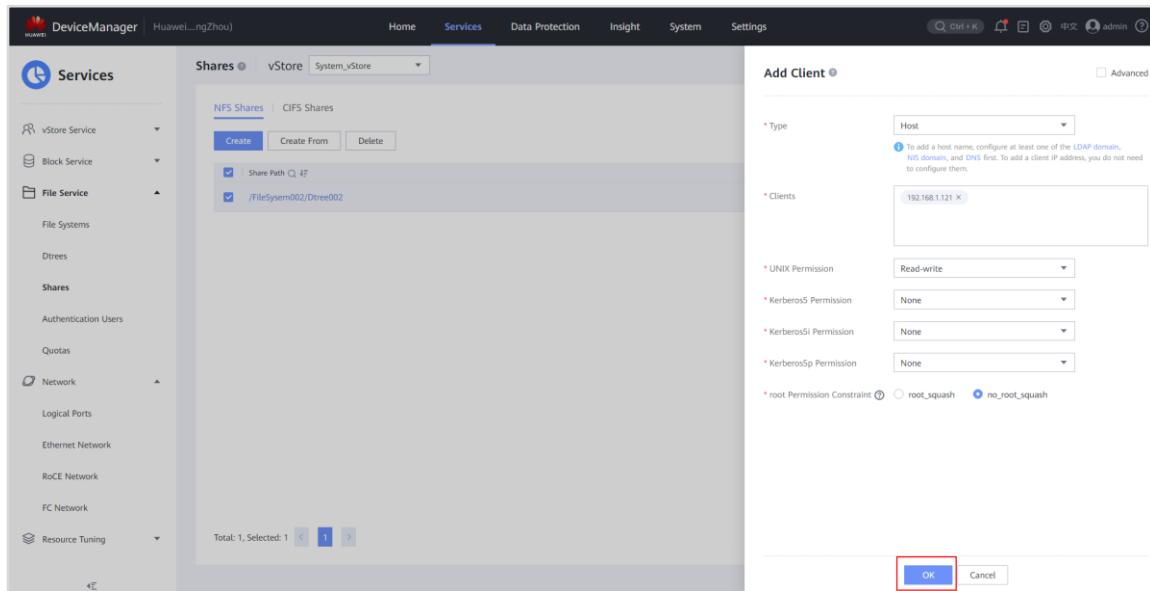
For details, see **Configure > Basic Storage Service Configuration Guide for File > Configuring Basic Storage Services > Sharing File Systems > Configuring an NFS Share > Adding an NFS Share Client** in the desired product documentation.

1. Choose **Services > File Service > Shares > NFS Shares**.
2. Select the vStore to which the desired NFS share belongs from the **vStore** drop-down list in the upper left corner.
3. Click **More** on the right of the desired NFS share and select **Add Client**.

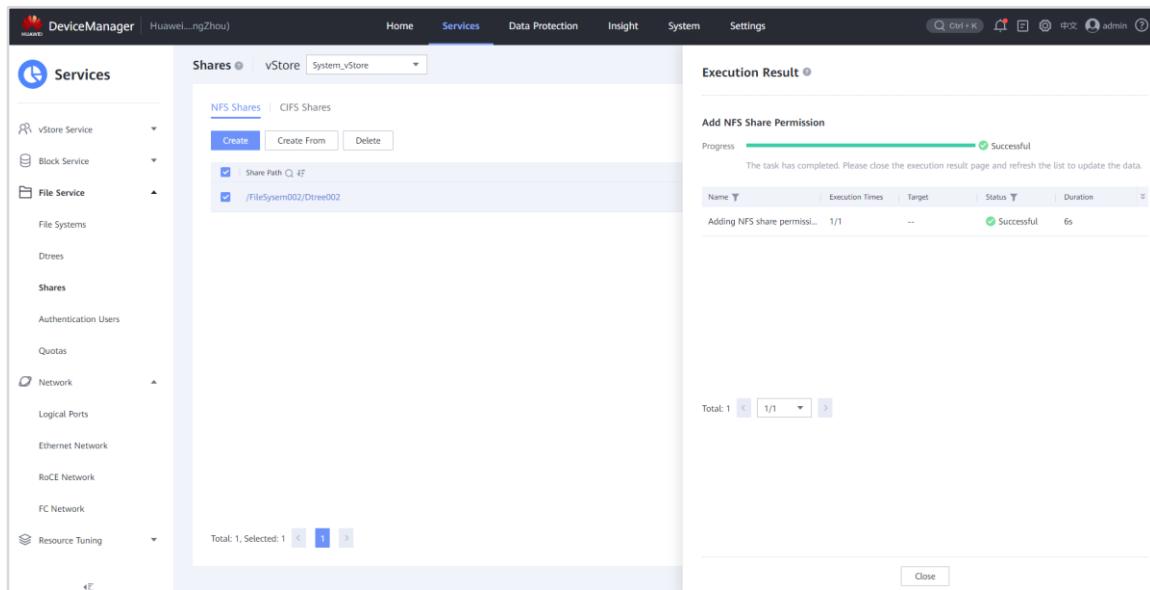


4. Set client attributes. Enter host IP address **192.168.1.121**, and set **UNIX Permission** to **Read-write** and **root Permission Constraint** to **no\_root\_squash**.

5. Click OK.



6. The execution results are as follows:



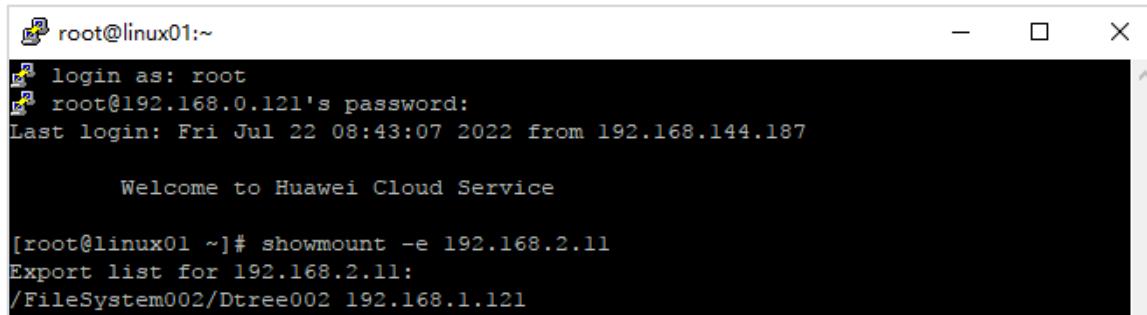
**Step 7 Access an NFS share.**



[Suggested Procedure]

For details, see **Configure > Basic Storage Service Configuration Guide for File > Configuring Basic Storage Services > Sharing File Systems > Configuring an NFS Share > Accessing an NFS Share** in the desired product documentation.

1. Log in to the client as user **root**.
2. Run the **showmount -e 192.168.2.11** command to view available NFS shares of the storage system.



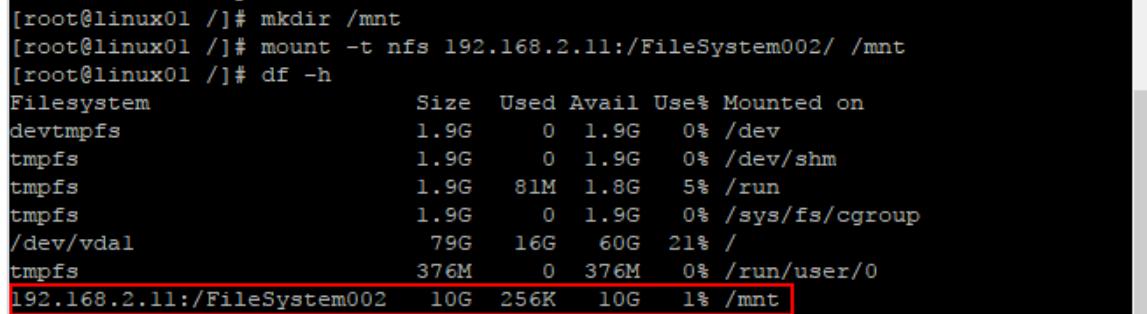
A terminal window titled "root@linux01:~". The session starts with a password prompt for root. It then displays a welcome message from Huawei Cloud Service. Finally, it shows the output of the "showmount -e 192.168.2.11" command, which lists the NFS export path "/FileSystem002/Dtree002" for the IP address "192.168.1.121".

```
root@linux01:~#
[ro login as: root
[ro root@192.168.0.121's password:
Last login: Fri Jul 22 08:43:07 2022 from 192.168.144.187

        Welcome to Huawei Cloud Service

[root@linux01 ~]# showmount -e 192.168.2.11
Export list for 192.168.2.11:
/FileSystem002/Dtree002 192.168.1.121
```

3. Run the **mkdir /mnt** command to create the **mnt** directory.
4. Run the **mount -t nfs 192.168.2.11:/FileSystem002/ /mnt** command to mount the NFS share.
5. Run the **df -h** command to check whether the mount is successful.



A terminal window showing the results of mounting an NFS share and checking disk usage. The user runs "mkdir /mnt", "mount -t nfs 192.168.2.11:/FileSystem002/ /mnt", and "df -h". The "df -h" command output shows the mounted NFS share at "/mnt" with a size of 10G, used space of 256K, available space of 10G, and a usage percentage of 1%.

```
[root@linux01 /]# mkdir /mnt
[root@linux01 /]# mount -t nfs 192.168.2.11:/FileSystem002/ /mnt
[root@linux01 /]# df -h
Filesystem      Size  Used Avail Use% Mounted on
devtmpfs        1.9G   0    1.9G  0% /dev
tmpfs          1.9G   0    1.9G  0% /dev/shm
tmpfs          1.9G  81M  1.8G  5% /run
tmpfs          1.9G   0    1.9G  0% /sys/fs/cgroup
/dev/vdal       79G  16G   60G  21% /
tmpfs         376M   0   376M  0% /run/user/0
192.168.2.11:/FileSystem002  10G  256K  10G  1% /mnt
```

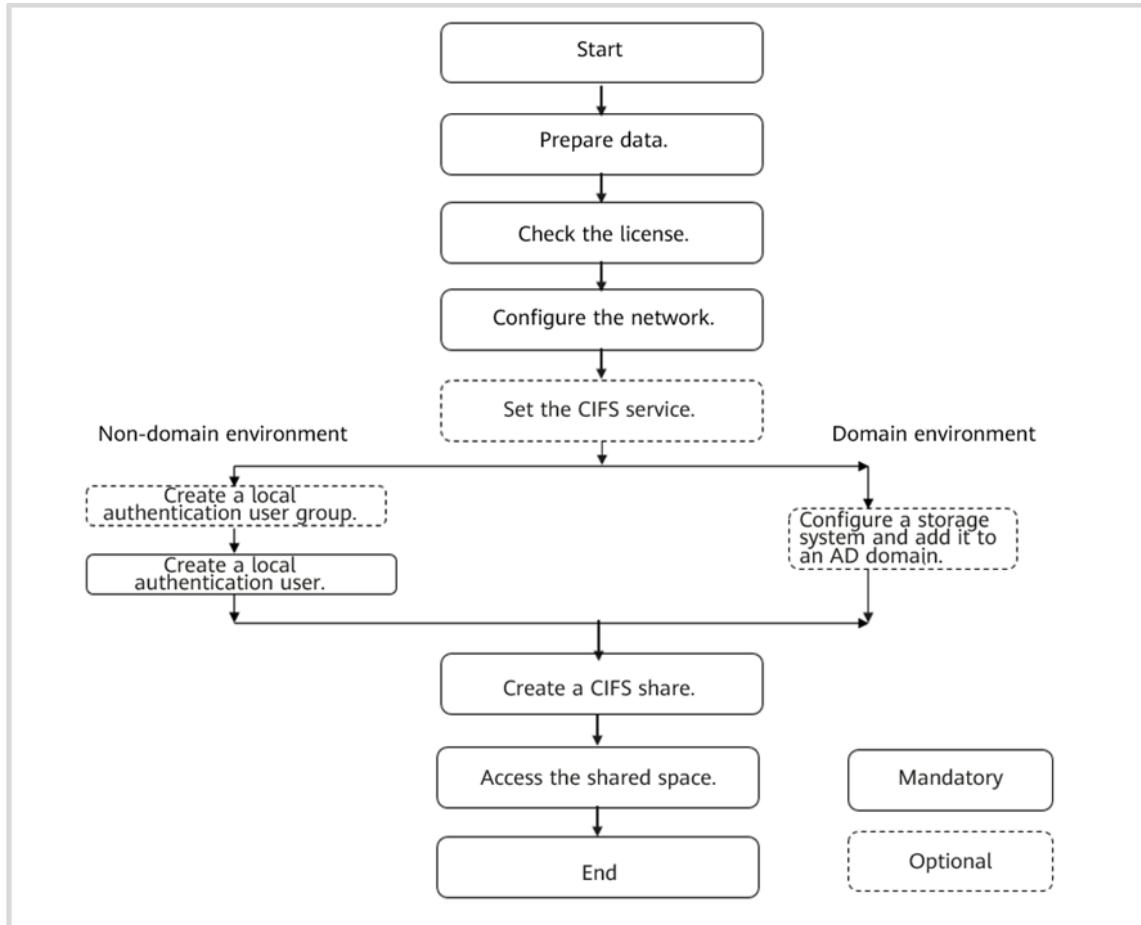
#### 2.4.1.6 Task 3: Configuring a CIFS Share

Step 1     Draw a flowchart for configuring a CIFS share.



[Suggested Procedure]

For details, see **Configure > Basic Storage Service Configuration Guide for File > Configuring Basic Storage Services > Sharing File Systems > Configuring a CIFS Share > Configuration Process** in the desired product documentation.

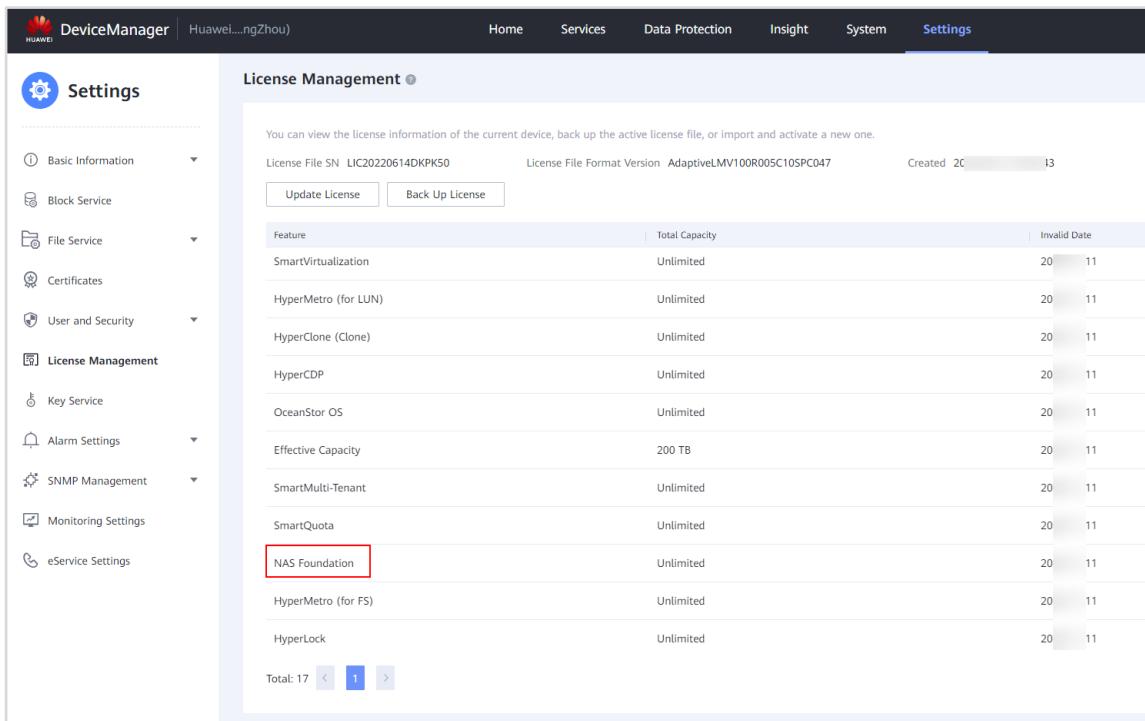


## Step 2 Check the license.

[Suggested Procedure]

For details, see **Configure > Basic Storage Service Configuration Guide for File > Configuring Basic Storage Services > Sharing File Systems > Configuring a CIFS Share > Checking the License** in the desired product documentation.

1. Choose **Settings > License Management**.
2. In the middle function pane, verify that **NAS Foundation** is displayed in the feature list.



The screenshot shows the 'License Management' section of the DeviceManager interface. The left sidebar has a 'Settings' icon and a 'License Management' section under it. The main area displays a table of licensed features:

Feature	Total Capacity	Valid Date	Invalid Date
SmartVirtualization	Unlimited	20.11	
HyperMetro (for LUN)	Unlimited	20.11	
HyperClone (Clone)	Unlimited	20.11	
HyperCDP	Unlimited	20.11	
OceanStor OS	Unlimited	20.11	
Effective Capacity	200 TB	20.11	
SmartMulti-Tenant	Unlimited	20.11	
SmartQuota	Unlimited	20.11	
<b>NAS Foundation</b>	Unlimited	20.11	
HyperMetro (for FS)	Unlimited	20.11	
HyperLock	Unlimited	20.11	

Total: 17

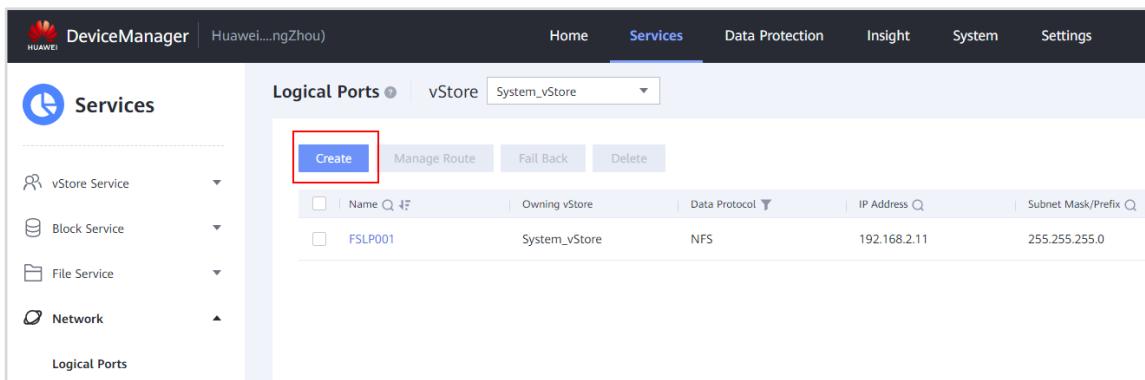
### Step 3 Configure the network and create a logical port.



#### [Suggested Procedure]

For details, see **Configure > Basic Storage Service Configuration Guide for File > Configuring Basic Storage Services > Sharing File Systems > Configuring a CIFS Share > Configuring the Network > Creating a Logical Port** in the desired product documentation.

1. Choose **Services > Network > Logical Ports**.
2. Click **Create**. The **Create Logical Port** page is displayed on the right.

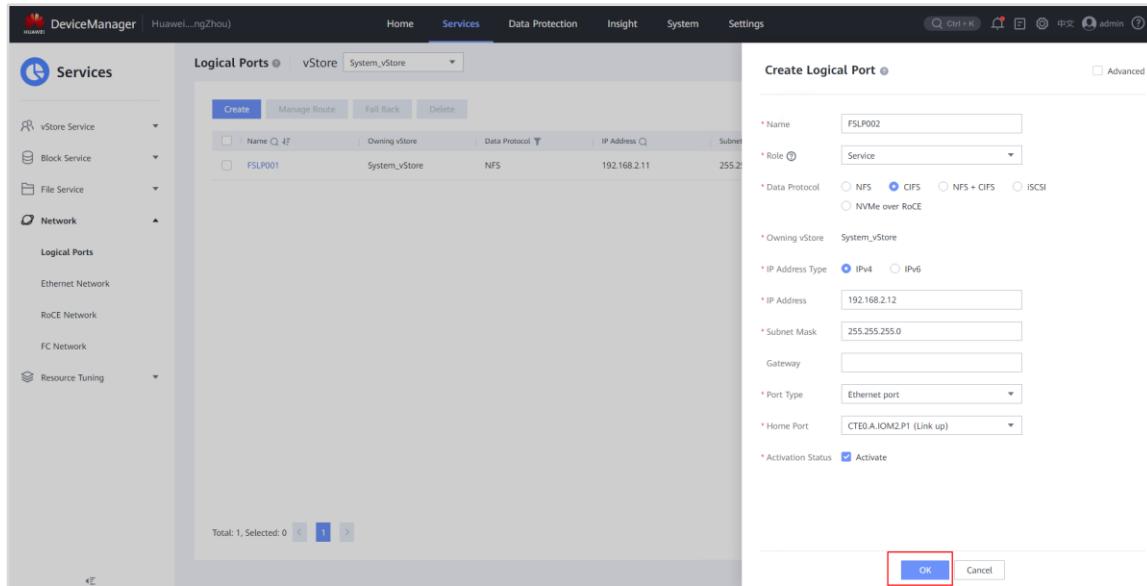


The screenshot shows the 'Logical Ports' section of the DeviceManager Services interface. The left sidebar has a 'Services' icon and a 'Logical Ports' section under it. The main area shows a table of logical ports:

Name	Owning vStore	Data Protocol	IP Address	Subnet Mask/Prefix
FSLP001	System_vStore	NFS	192.168.2.11	255.255.255.0

A blue box highlights the 'Create' button in the top toolbar.

3. Configure logical port parameters. Set **Role** to **Service**, **Data Protocol** to **CIFS**, **IP Address** to **192.168.2.12**, and **Home Port** to **CTE0.A.IOM2.P1**.
4. Click **OK**.

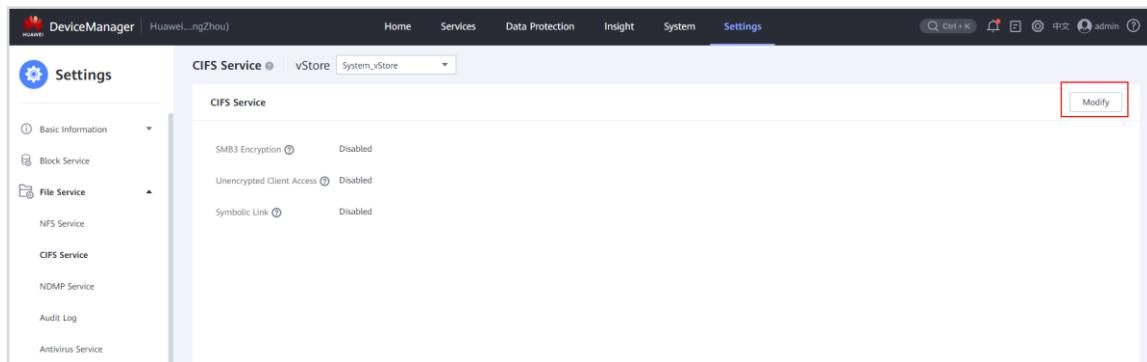


#### Step 4 Configure the CIFS service.

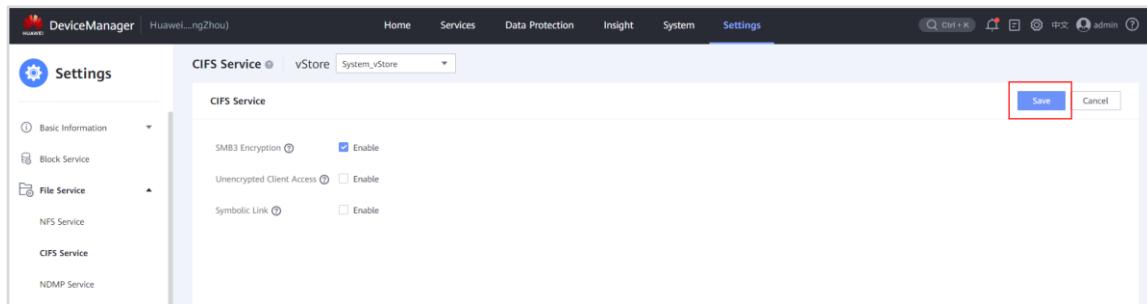
##### [Suggested Procedure]

For details, see **Configure > Basic Storage Service Configuration Guide for File > Configuring Basic Storage Services > Sharing File Systems > Configuring a CIFS Share > (Optional) Setting the CIFS Service** in the desired product documentation.

1. Choose **Settings > File Service > CIFS Service**.
2. Select the desired vStore from the **vStore** drop-down list in the upper left corner.
3. Click **Modify** in the upper right.



4. Set basic parameters and enable **SMB3 Encryption**.
5. Click **Save**.



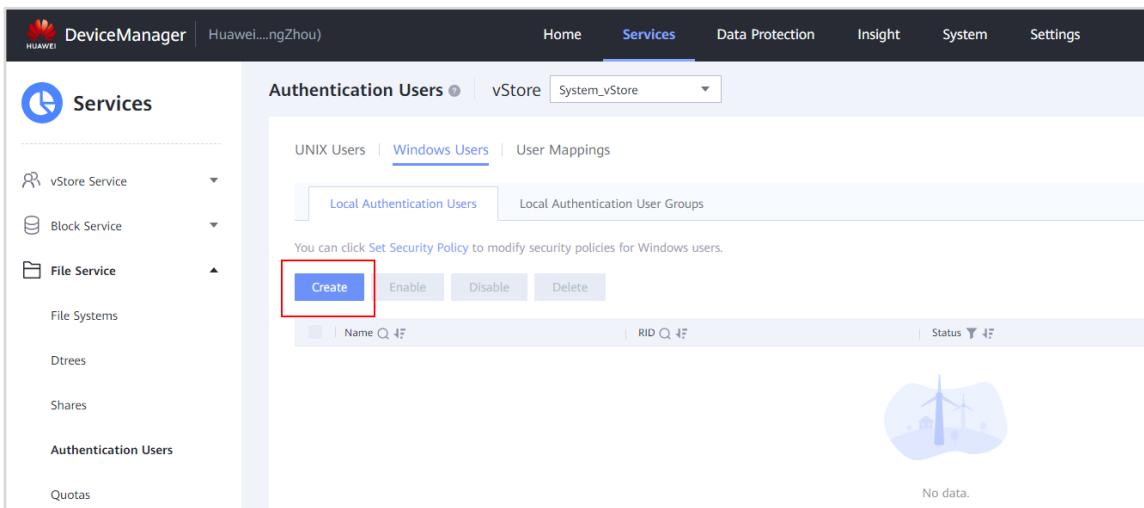
#### Step 5 Configure a local authentication user.



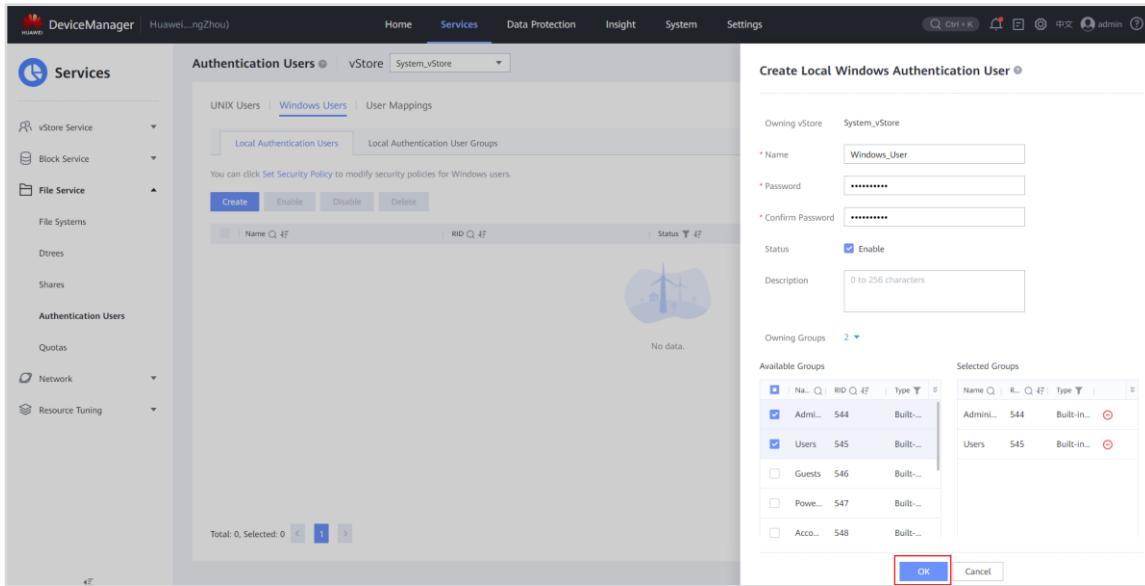
[Suggested Procedure]

For details, see **Configure > Basic Storage Service Configuration Guide for File > Configuring Basic Storage Services > Sharing File Systems > Configuring a CIFS Share > Configuring a Local Authentication User (Group) > Creating a Local Authentication User** in the desired product documentation.

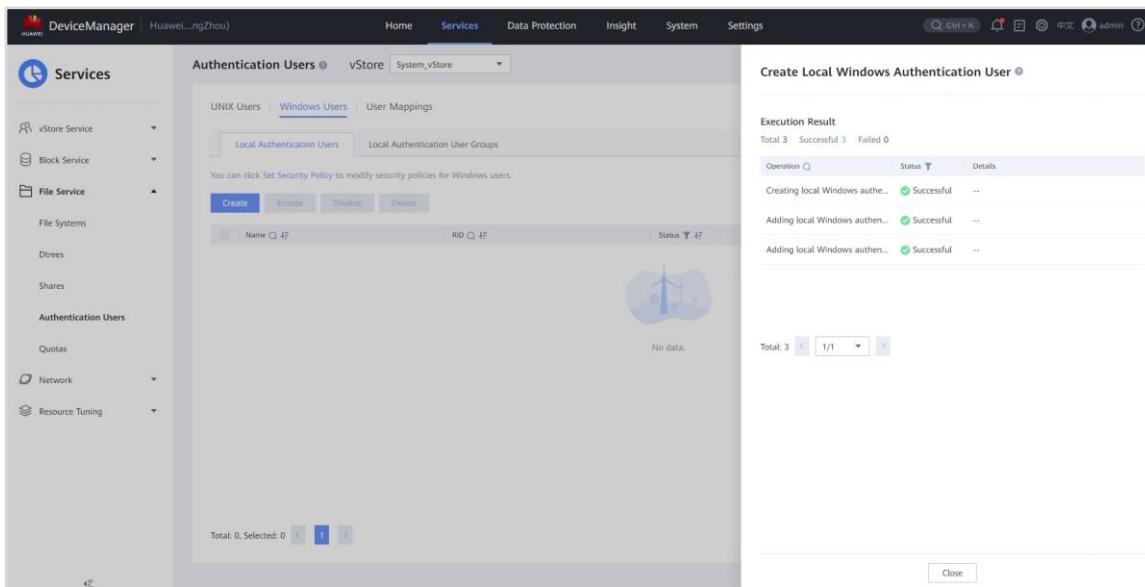
1. Choose **Services > File Service > Authentication Users > Windows Users > Local Authentication Users**.
2. Select the vStore for which you want to create a local authentication user from the **vStore** drop-down list in the upper left corner.
3. Click **Create**.



4. Set basic parameters as follows: **Name** to **Windows\_User**, and select **Administrators** and **Users** in the **Available Groups** list.
5. Click **OK**.



6. The execution results are as follows:

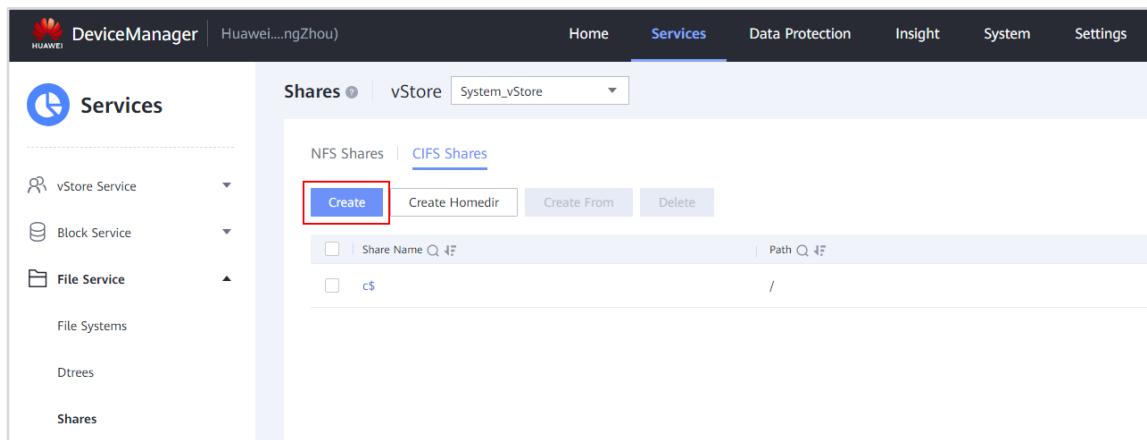


## Step 6 Create a CIFS share.

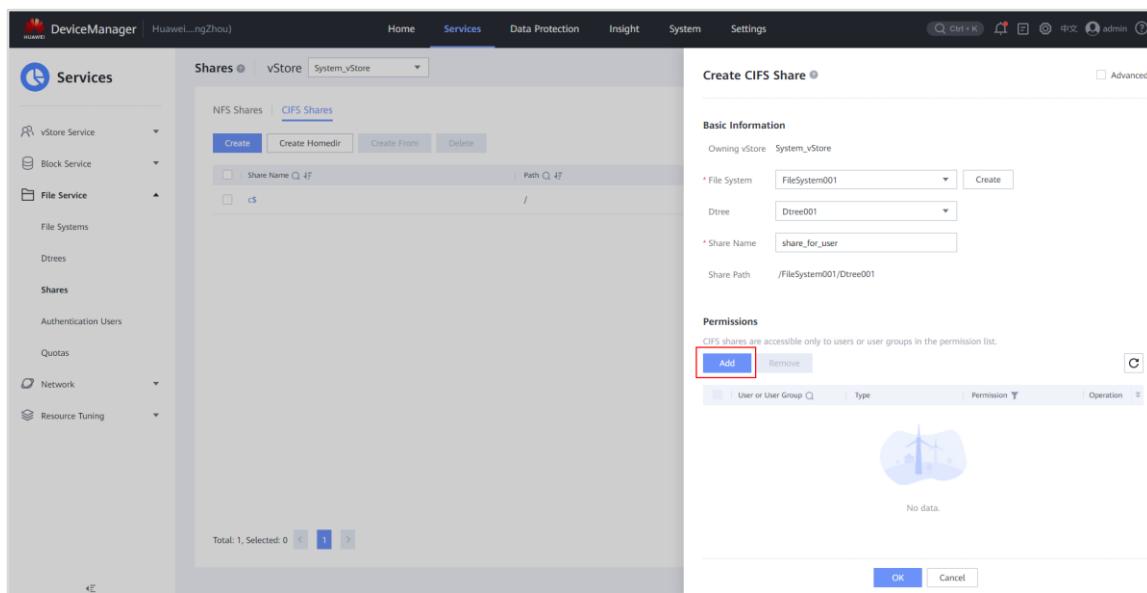
[Suggested Procedure]

For details, see **Configure > Basic Storage Service Configuration Guide for File > Configuring Basic Storage Services > Sharing File Systems > Configuring a CIFS Share > Creating a CIFS Share** in the desired product documentation.

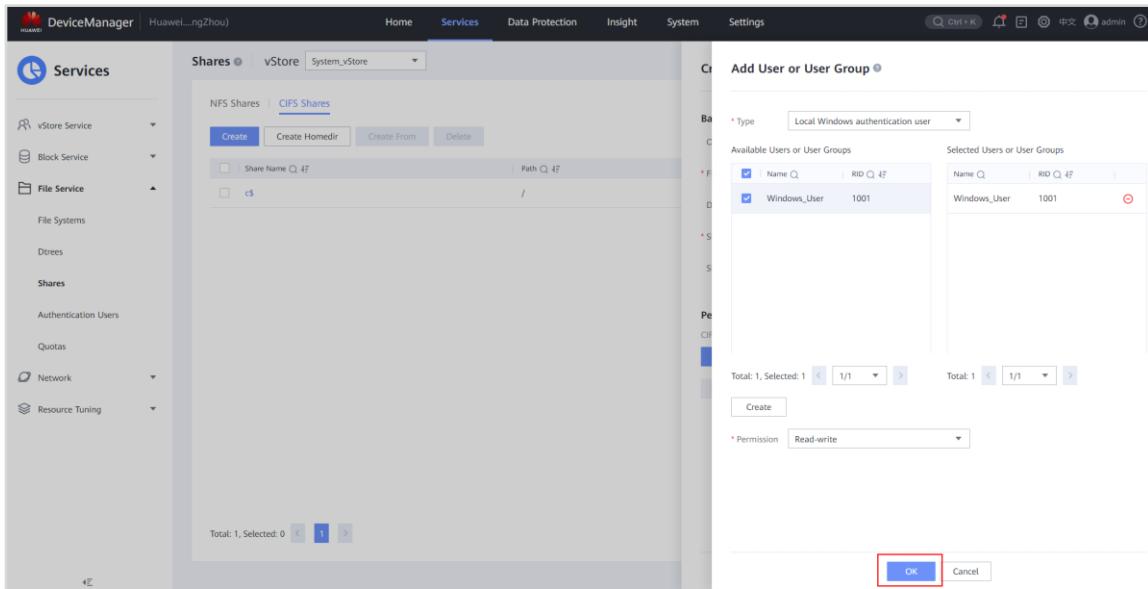
1. Choose **Services > File Service > Shares > CIFS Shares**.
2. Select the vStore to which the desired file system belongs from the **vStore** drop-down list in the upper left corner.
3. Click **Create**.



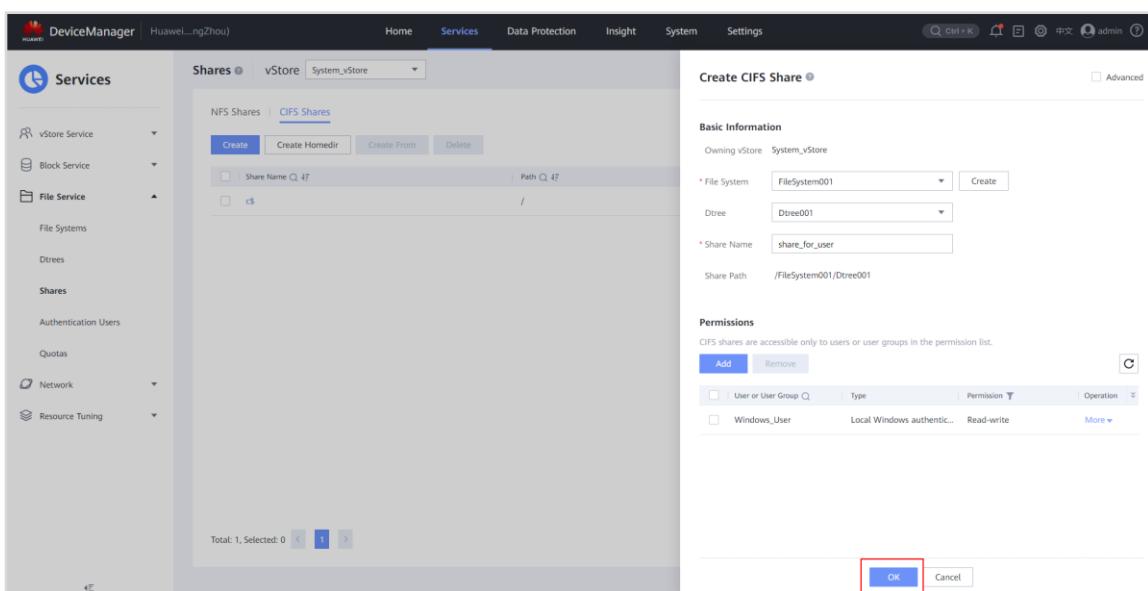
4. Set basic parameters as follows: **File System** to **FileSystem001**, **Dtree** to **Dtree001**, and **Share Name** to **share\_for\_user**.
5. Click **Add** to add user permissions.



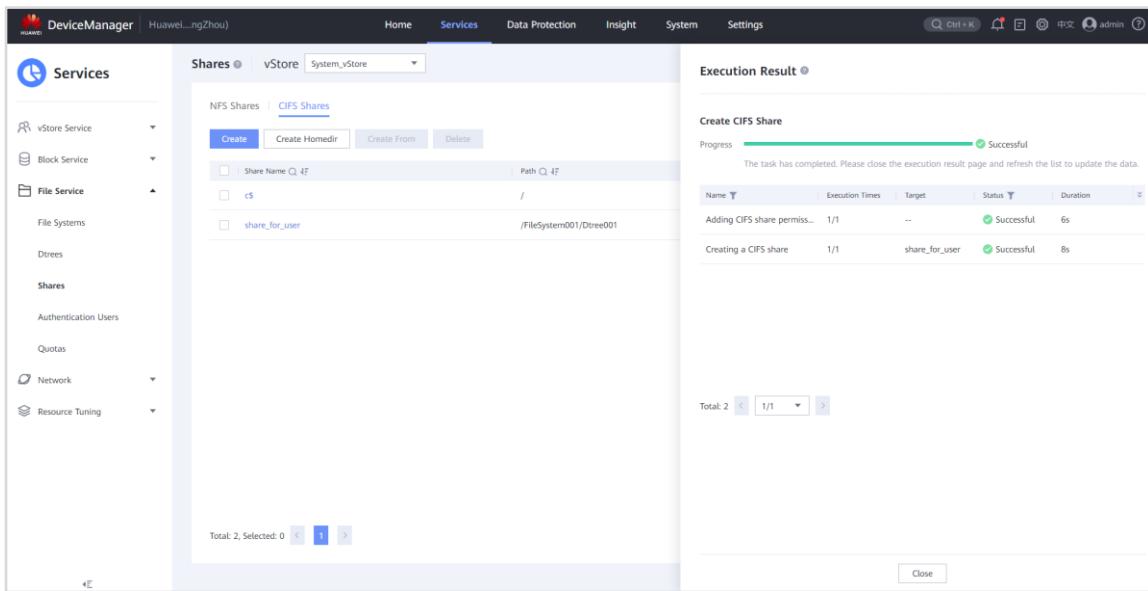
6. Set **Type** to **Local Windows authentication user**, select **Windows\_User** in the **Available Users or User Groups** list, set **Permission** to **Read-write**, and click **OK**.



## 7. Click OK.



## 8. The execution results are as follows:



The screenshot shows the 'Shares' section of the DeviceManager interface. On the left sidebar under 'File Service', 'Shares' is selected. In the main area, the 'CIFS Shares' tab is active. A 'Create' button is visible. Below it, there are two entries: 'Share Name: c\$' and 'share\_for\_user'. The 'share\_for\_user' entry has a path of '/FileSystem001/Dtree001'. To the right, the 'Execution Result' panel displays a table for 'Create CIFS Share' tasks. It shows one task completed successfully: 'Adding CIFS share permission...' with a duration of 6s. Another task is listed: 'Creating a CIFS share' for 'share\_for\_user' with a duration of 8s.

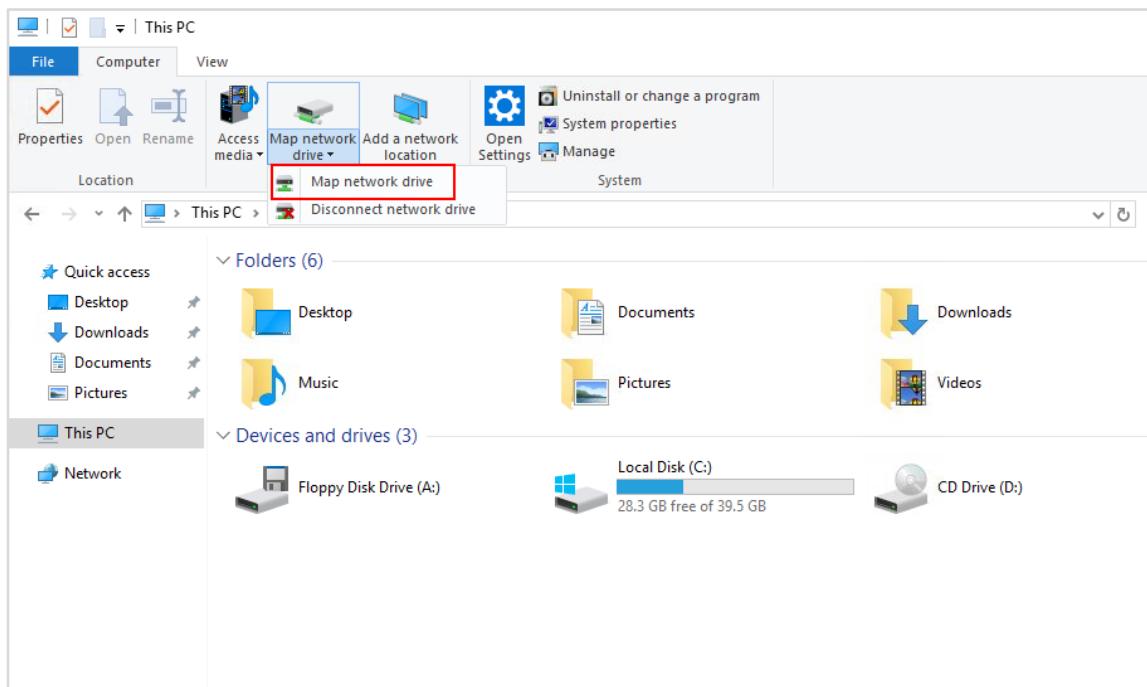
### Step 7 Access a CIFS share.



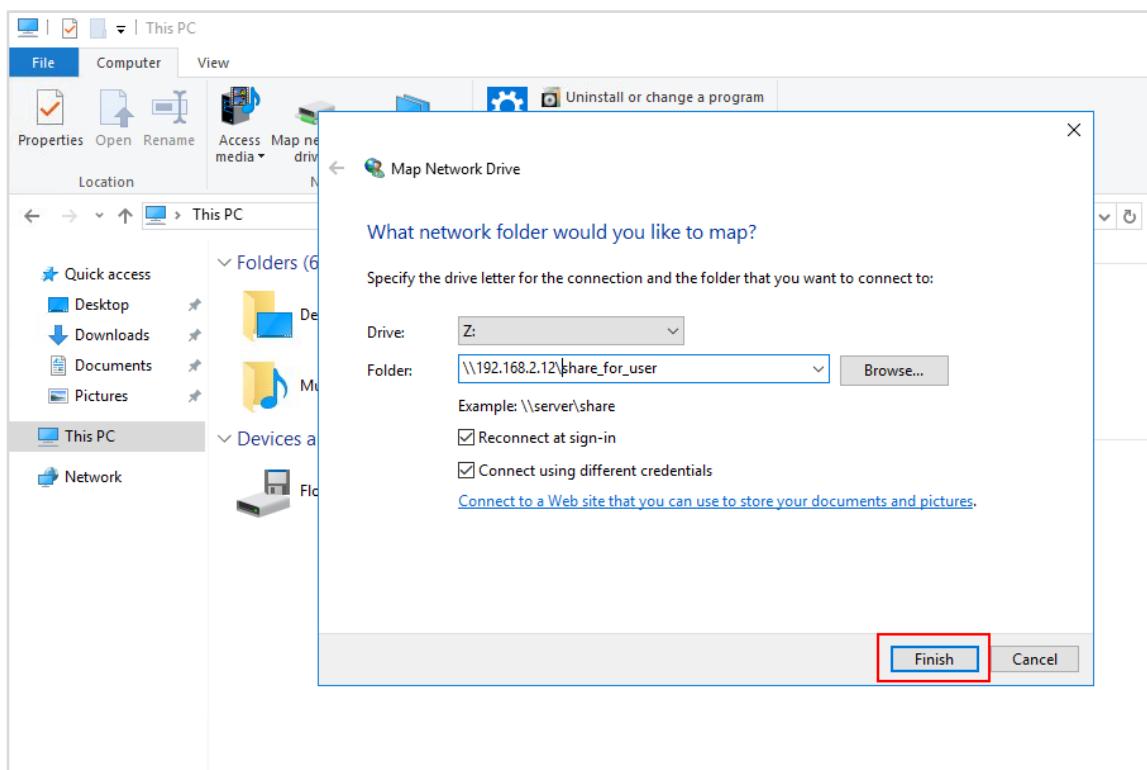
[Suggested Procedure]

For details, see **Configure > Basic Storage Service Configuration Guide for File > Configuring Basic Storage Services > Sharing File Systems > Configuring a CIFS Share > Accessing a CIFS Share** in the desired product documentation.

1. Choose **Map network drive** on a Windows client.

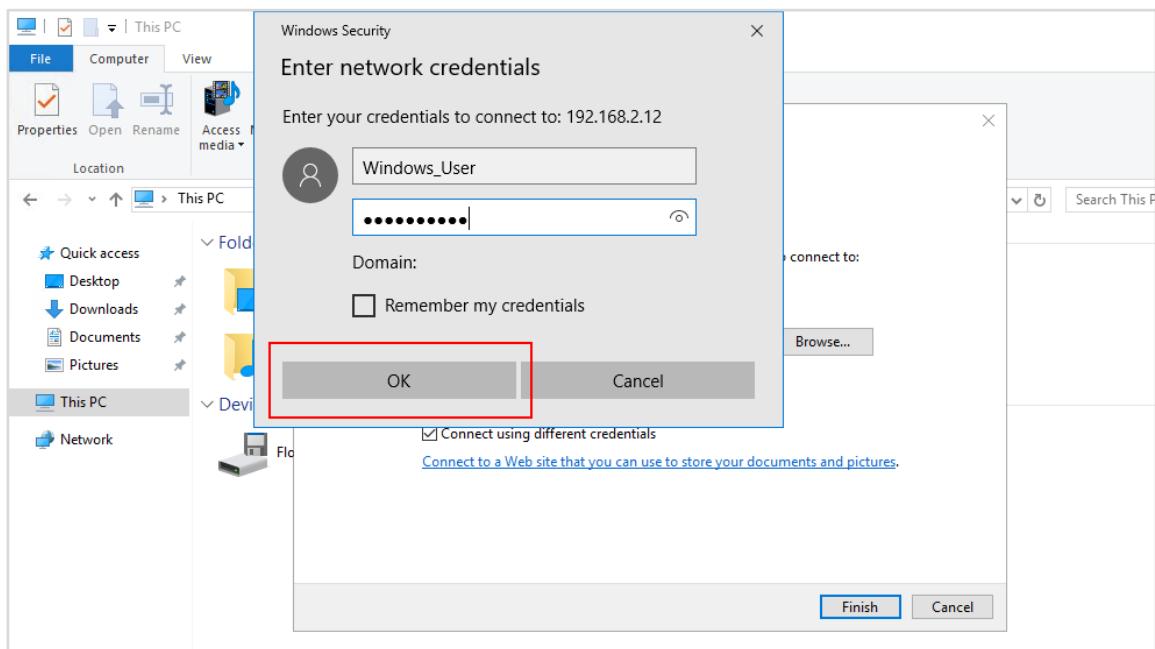


2. In the displayed **Map Network Drive** dialog box, enter `\\"192.168.2.12\share_for_user` in the **Folder** text box to configure the network folder you want to map, and click **Finish**.

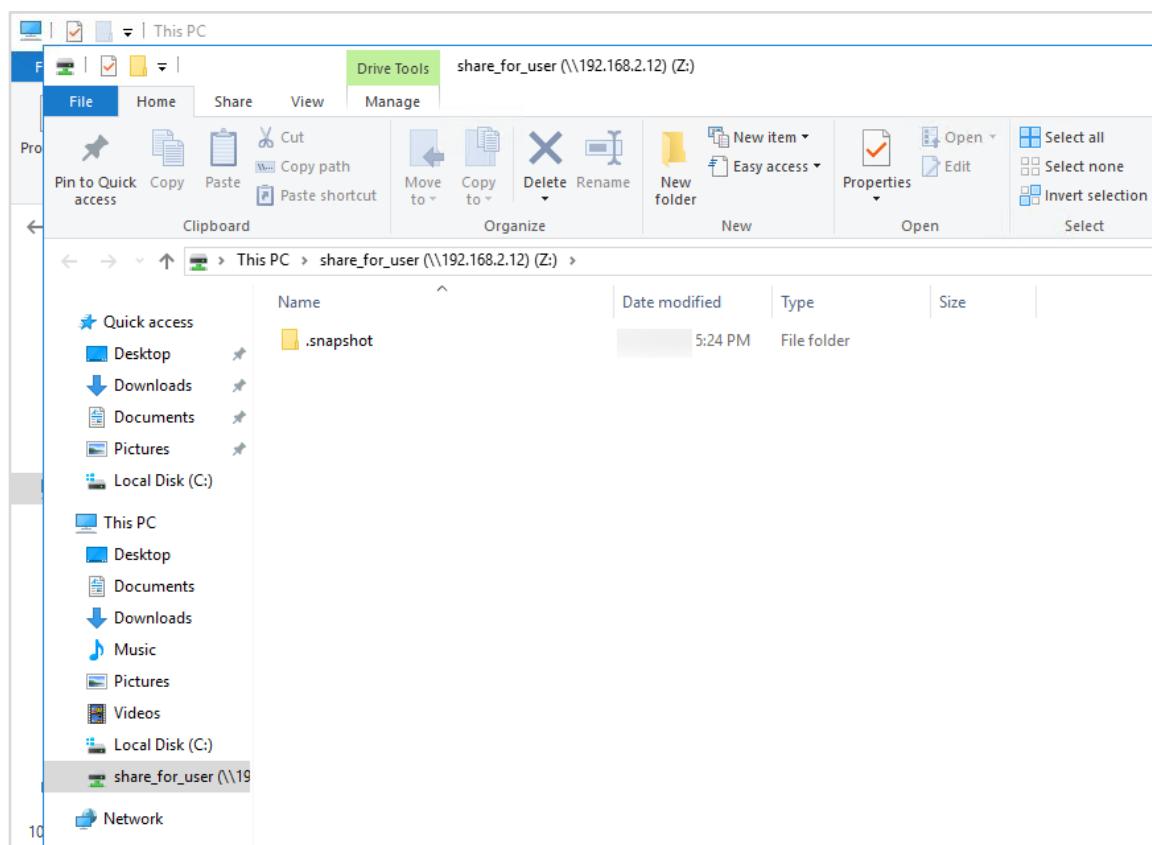


3. In the displayed **Windows Security** dialog box, enter the user name **Windows\_User** and password for accessing the CIFS share.

## 4. Click OK.



## 5. The execution results are as follows:



### 2.4.1.7 Question

Provide key steps of the service space reclamation process.

## 2.5 Summary and Conclusion

My Opinion:

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Huawei Storage Certification Training

# HCIA-Storage

## Scenario-based Practice of HyperClone

ISSUE: 5.0

(For Trainees)



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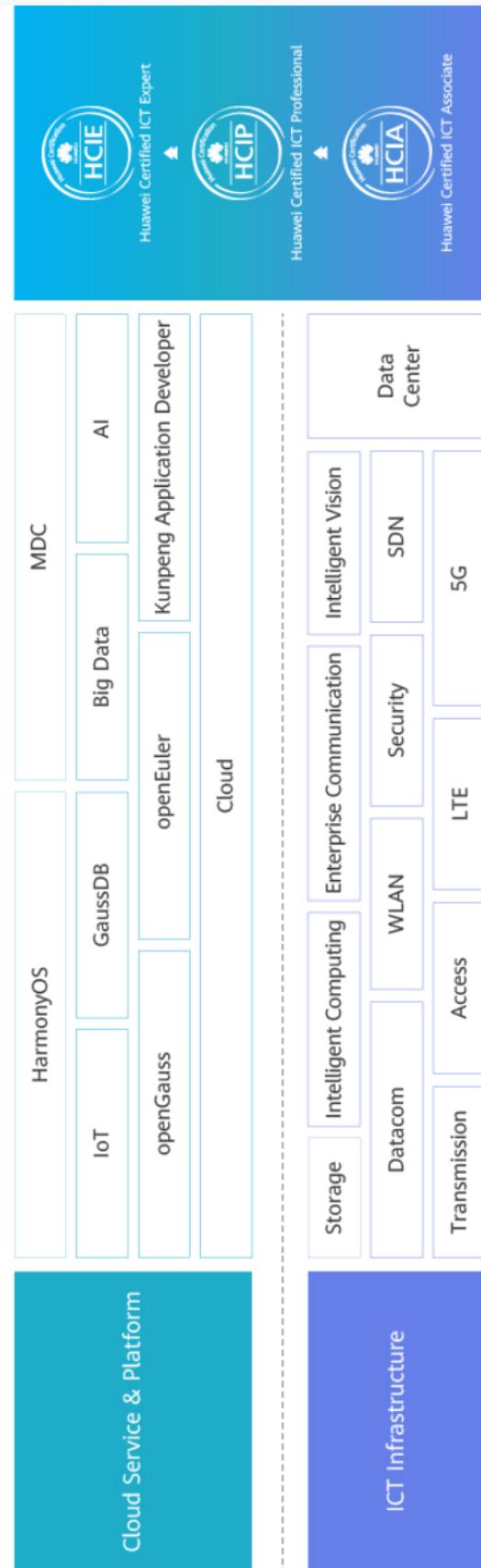
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# 1

# References and Tools

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Commands and documents listed in this document are for reference only. The actual commands and documents may vary with product versions.

## 1.1 References

Huawei OceanStor Dorado all-flash series product documentation



Log in to the Huawei technical support website (<https://support.huawei.com/enterprise/en/index.html>) and type the name of a documentation or tool in the search box to search for, browse and download the desired documentation or tool.

## 1.2 Software Tools

PuTTY



You are advised to use the open-source software PuTTY to log in to a terminal. You can use the common domain name (putty.org) of PuTTY to browse or download the desired document or tool.

## 1.3 Version Description

The recommended platforms and software versions in the practice tasks are as follows.

Name	Version	Quantity	Remarks
OceanStor Dorado V6	6.1.3	1	Recommended version
Windows OS	Windows Server 2012 or Windows Server 2016	--	Recommended version

Name	Version	Quantity	Remarks
Linux OS	SUSE, Red Hat, CentOS, or EulerOS	--	Recommended version

# 2

# Scenario-based Practice of HyperClone

---

## 2.1 Course Overview

This course provides case study and scenario-based practices to help trainees consolidate their knowledge on the use of HyperClone. HyperClone is a common advanced storage technology. Before using HyperClone, you are advised to learn how to configure basic storage services.

## 2.2 Objectives

- To be able to configure HyperClone
- To understand how to manage HyperClone

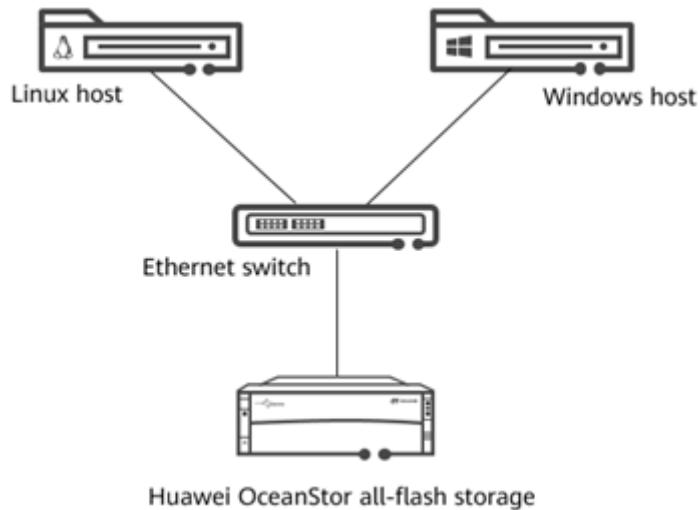
## 2.3 Case Background

 **NOTE:**

Cases in this document are examples only. The actual configuration may vary according to actual environments. For details, see the corresponding product documentation. The names of storage pools and LUNs involved in this document can be customized (for example, LUN \_XXX) for different trainees if they use the same device.

An enterprise has a Huawei OceanStor all-flash storage device and has purchased the HyperClone license. Help storage engineers get familiar with operations related to this feature.

The following figure shows the live network topology of the enterprise.

**Figure 2-1 Network topology**

## 2.4 Tasks and Suggested Answers

### 2.4.1 Scenario-based Practice 1: HyperClone Hands-on Practice (Block Services)

#### 2.4.1.1 Background

A 5 GB LUN named **LUN\_SOUR** has been created and mapped to a host. A file system has been created for **LUN\_SOUR** on the host and has been mounted. A text file **A.txt** containing characters has been written to **LUN\_SOUR**.

#### 2.4.1.2 Question

What is the difference between HyperClone and HyperSnap?

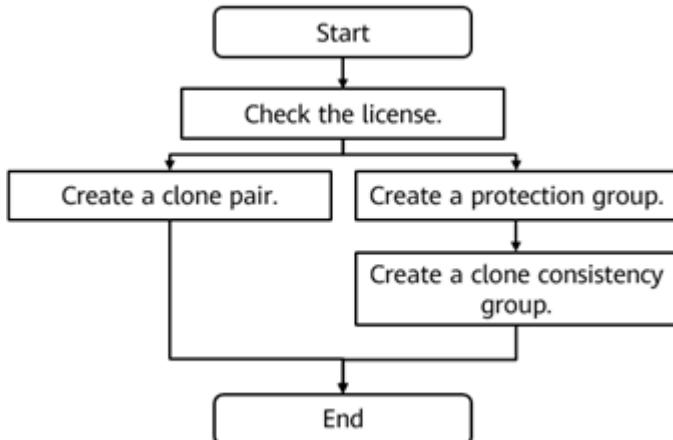
#### 2.4.1.3 Task 1: Configuring HyperClone

Step 1     Draw a flowchart for configuring HyperClone.

Demonstrate how to configure HyperClone.

**[Suggested Procedure]**

For details about how to draw a flowchart, see **Configure > HyperClone Feature Guide for Block > Configuring and Managing HyperClone (System User) > Configuring HyperClone > Configuration Process** in the product documentation.

**[Suggested Answer]****Step 2 View HyperClone license information.**

Before configuring HyperClone, ensure that the permission for using HyperClone has been granted. Help the engineer check HyperClone license information.

**[Suggested Procedure]**

For details about operations on DeviceManager, see **Configure > HyperClone Feature Guide for Block > Configuring and Managing HyperClone (System User) > Configuring HyperClone > Checking the License** in the product documentation.

1. Choose **Settings > License Management**.
2. In the middle information pane, view the information of the active license file.

Feature	Total Capacity
SmartVirtualization	Unlimited
HyperMetro (for LUN)	Unlimited
HyperClone (Clone)	Unlimited
HyperCDP	Unlimited
OceanStor OS	Unlimited

[Suggested Answer]

Query result on DeviceManager: In the license list, the total capacity of HyperClone is unlimited and is still within the validity period.

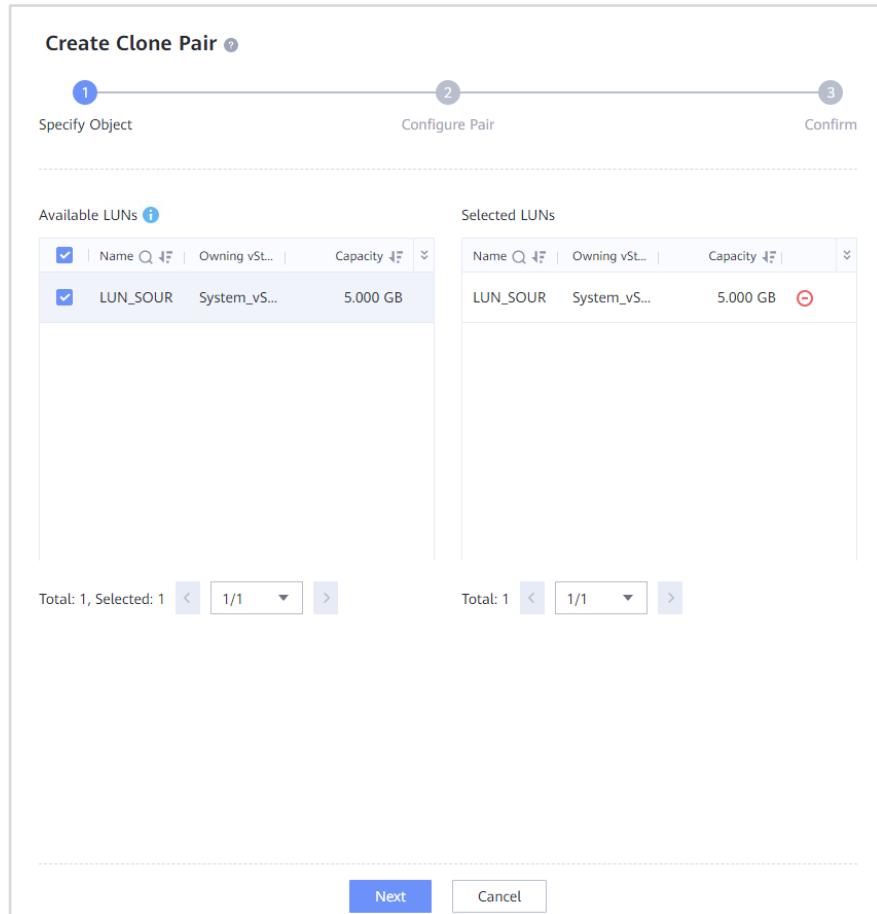
Step 3 Create a clone pair.

Help the engineer create a clone pair for **LUN\_SOUR**. Set the target LUN name to **LUN\_DEST**.

[Suggested Procedure]

For details about operations on DeviceManager, see **Configure > HyperClone Feature Guide for Block > Configuring and Managing HyperClone (System User) > Configuring HyperClone > Creating a Clone Pair** in the product documentation.

1. Choose **Data Protection > Protection Entities > LUNs > Clone Pairs**.
2. Select the desired **System\_vStore** from the **vStore** drop-down list in the upper left corner.
3. Click **Create**. The **Create Clone Pair** page is displayed.
4. Select the desired LUN from **Available LUNs** to add it to **Selected LUNs**.
5. Click **Next**.



6. Set properties for the clone pair. Set the target LUN name to **LUN\_DEST** and the copy speed to **Medium**.
7. Click **Next**.

**Create Clone Pair**

1 Specify Object      2 Configure Pair      3 Confirm

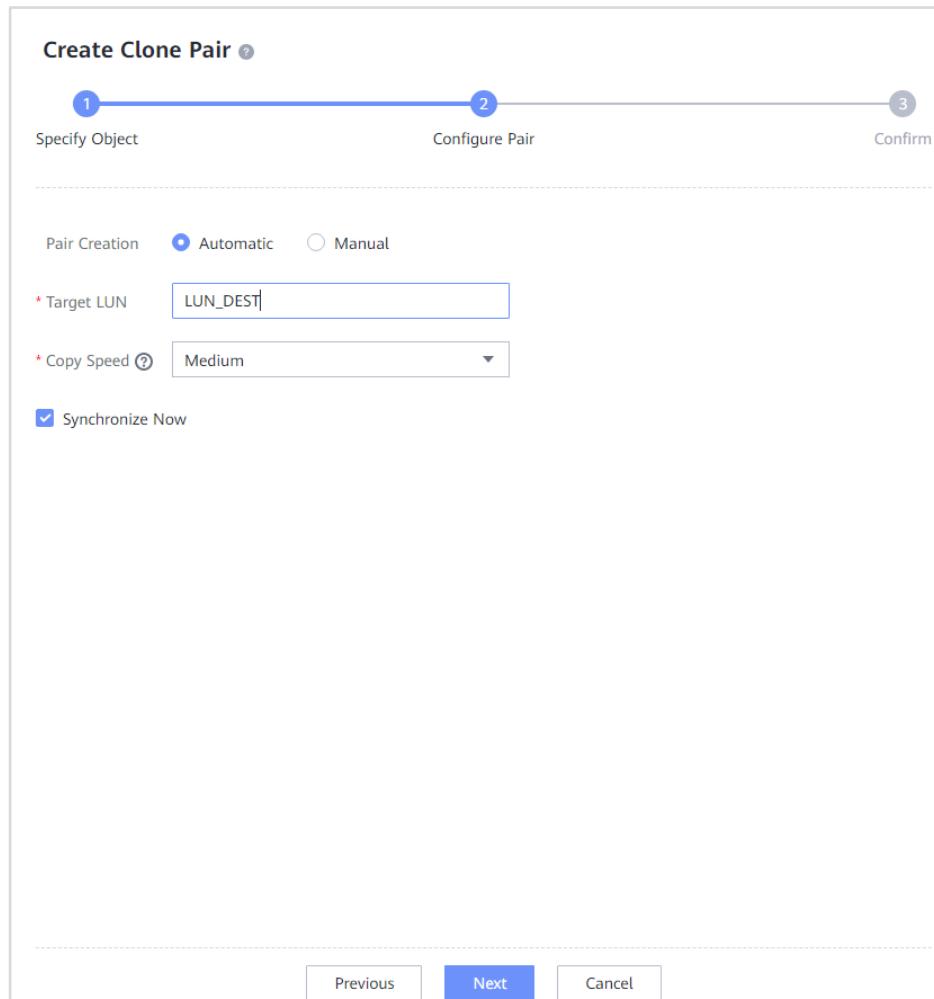
Pair Creation     Automatic     Manual

\* Target LUN   

\* Copy Speed   

Synchronize Now

Previous    Next    Cancel



8. A summary page is displayed.
9. Confirm information of the clone pair and click **OK**.

**Create Clone Pair**

1 Specify Object      2 Configure Pair      3 Confirm

Pair Creation Automatic

Clone Pairs

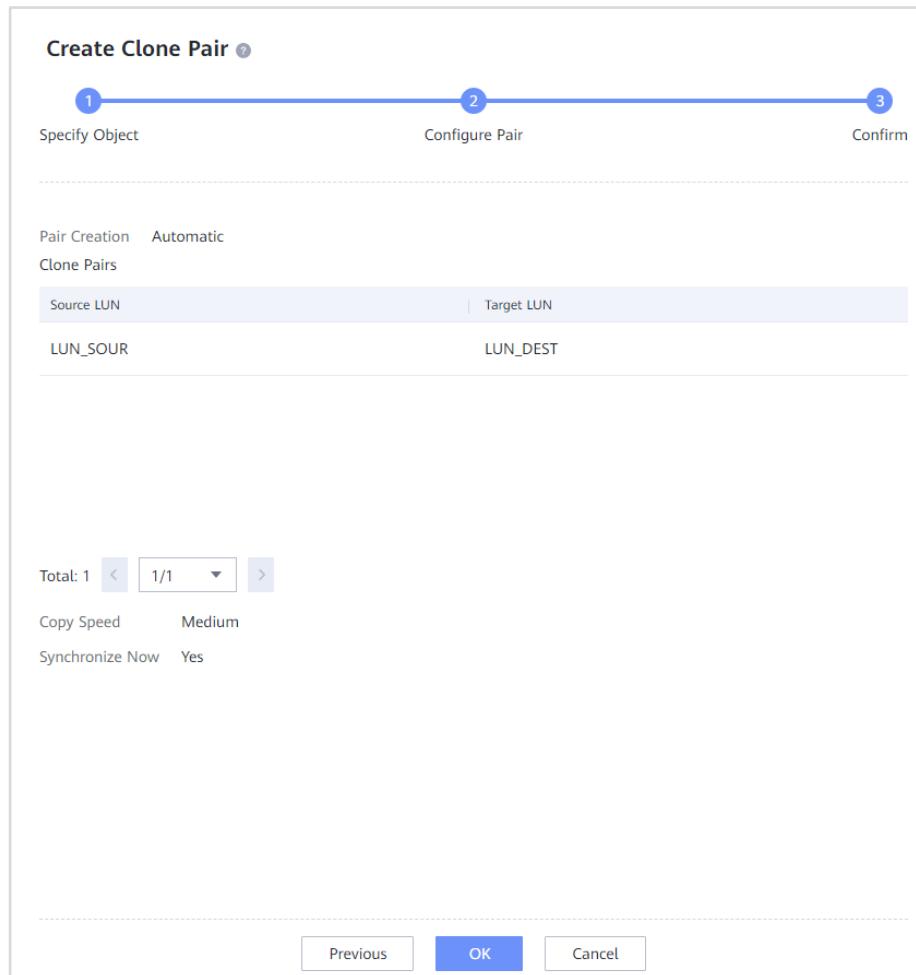
Source LUN	Target LUN
LUN_SOUR	LUN_DEST

Total: 1 < 1/1 >

Copy Speed Medium

Synchronize Now Yes

Previous OK Cancel



10. Confirm your operation as prompted.

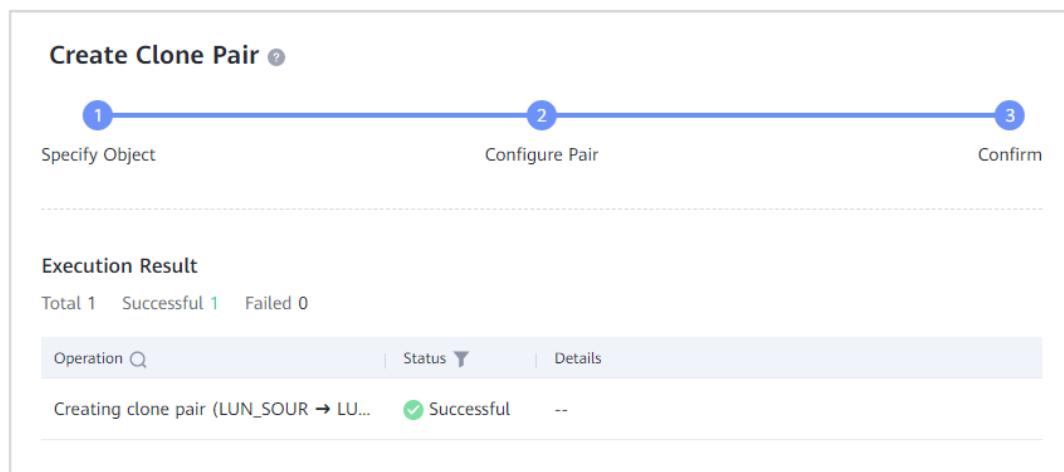
**Create Clone Pair**

1 Specify Object      2 Configure Pair      3 Confirm

Execution Result

Total 1 Successful 1 Failed 0

Operation	Status	Details
Creating clone pair (LUN_SOUR → LU...	Successful	--



[Suggested Answer]

Map **LUN\_DEST** to the host and check whether the data in **LUN\_DEST** is consistent with that in the source LUN. If **LUN\_DEST** is available and its data is the same as that in the source LUN, the practice is successful.

#### 2.4.1.4 Question

In Huawei OceanStor all-flash storage systems, what will happen if the capacity of the source LUN is inconsistent with that of the target LUN in a clone pair?

#### 2.4.1.5 Task 2: Managing HyperClone

In practice, unexpected situations may occur during the use of HyperClone, for example, the service load increases sharply during clone synchronization. In such cases, the engineer should pause the synchronization and resume it when the service load is light. Help the engineer understand how to pause and resume clone synchronization.

Step 1     Modify attributes of a clone pair.

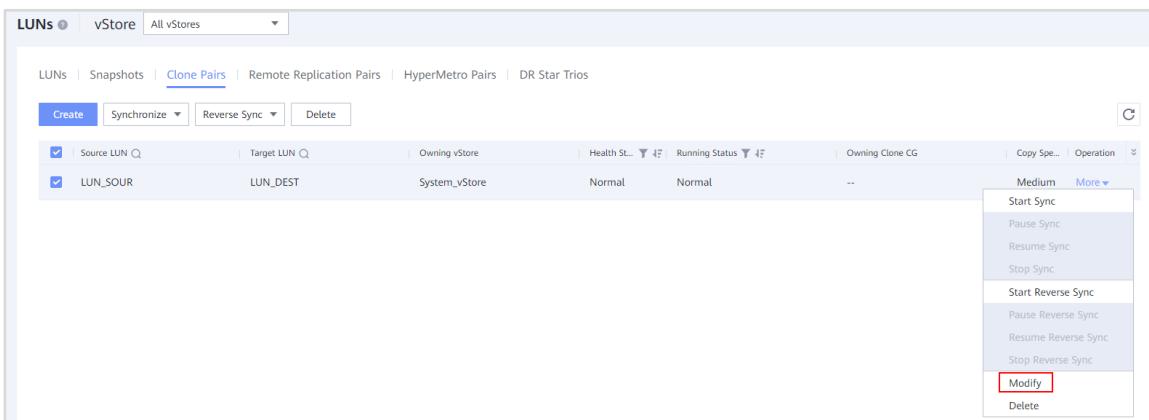
After creating a clone pair, help the engineer pause clone synchronization.



[Suggested Procedure]

For details about operations on DeviceManager, see **Configure > HyperClone Feature Guide for Block > Configuring and Managing HyperClone (System User) > Managing Clone Pairs > Modifying Attributes of a Clone Pair** in the product documentation.

1. Choose **Data Protection > Protection Entities > LUNs > Clone Pairs**.
2. Select the desired **System\_vStore** from the **vStore** drop-down list in the upper left corner.
3. Click **More** on the right of the desired clone pair and select **Modify**. The **Modify Clone Pair** page is displayed on the right.



The screenshot shows the DeviceManager interface for managing clone pairs. The 'Clone Pairs' tab is selected. A context menu is open over a specific clone pair (LUN\_SOURCE to LUN\_DEST). The menu options include: Start Sync, Pause Sync, Resume Sync, Stop Sync, Start Reverse Sync, Pause Reverse Sync, Resume Reverse Sync, Stop Reverse Sync, Modify (which is highlighted with a red box), and Delete.

4. Set the copy speed of the clone pair to **High**.

Modify Clone Pair ?

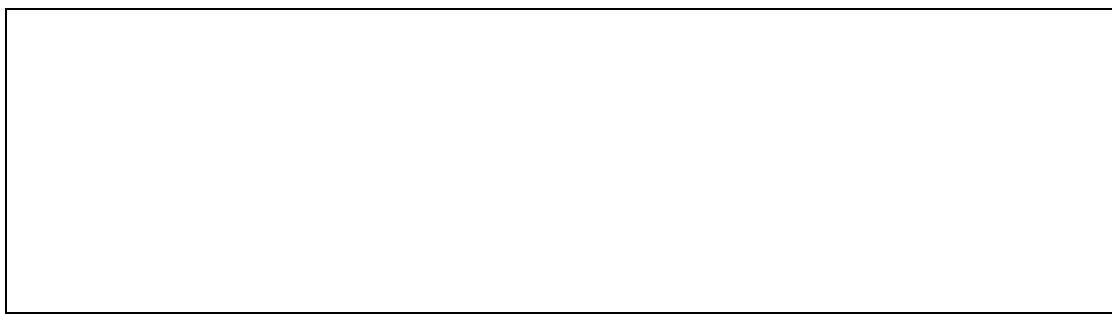
\* Copy Speed ? **High**

Description  
0 to 255 characters



### Step 2 Start synchronization or reverse synchronization.

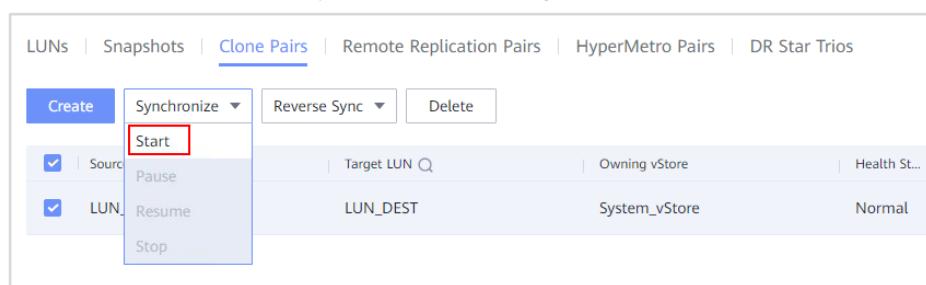
After creating a clone pair, help the engineer synchronize data from **LUN\_SOUR** to **LUN\_DEST** and then delete data from **LUN\_SOUR** to simulate data loss.



#### [Suggested Procedure]

For details about operations on DeviceManager, see **Configure > HyperClone Feature Guide for Block > Configuring and Managing HyperClone (System User) > Managing Clone Pairs > Starting Synchronizing or Reversely Synchronizing a Clone Pair** in the product documentation.

1. Choose **Data Protection > Protection Entities > LUNs > Clone Pairs**.
2. Select the desired **System\_vStore** from the **vStore** drop-down list in the upper left corner.
3. Select the desired clone pair and choose **Synchronize > Start**.



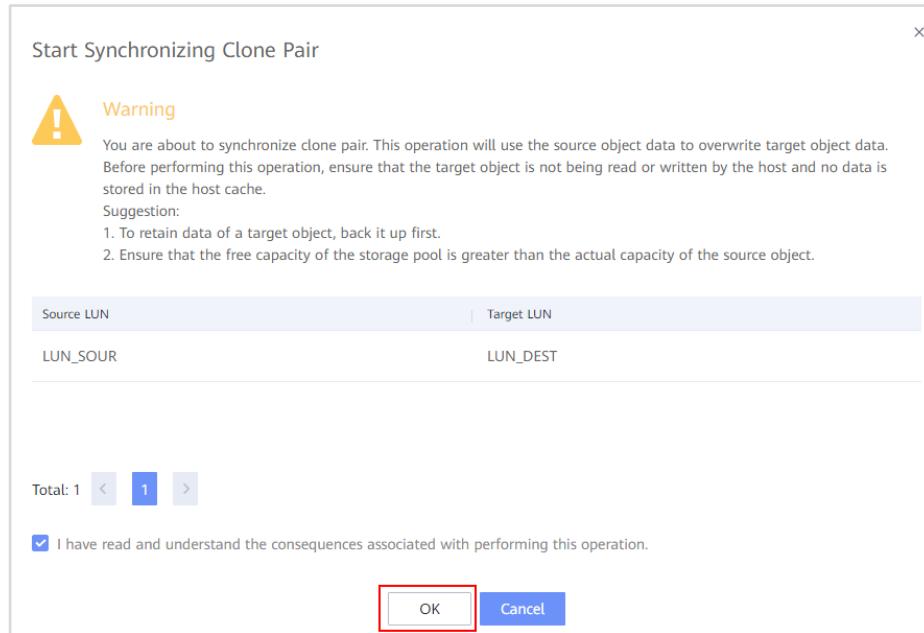
LUNs | Snapshots | **Clone Pairs** | Remote Replication Pairs | HyperMetro Pairs | DR Star Trios

Create   Synchronize ▾   Reverse Sync ▾   Delete

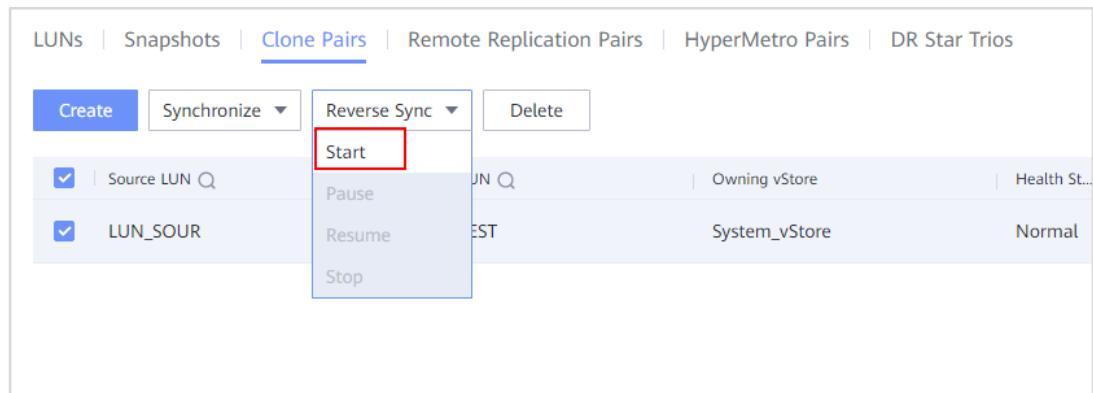
Start

	Target LUN	Owning vStore	Health St...
Source	LUN_DEST	System_vStore	Normal
LUN_			

4. Click **OK** to complete the synchronization.



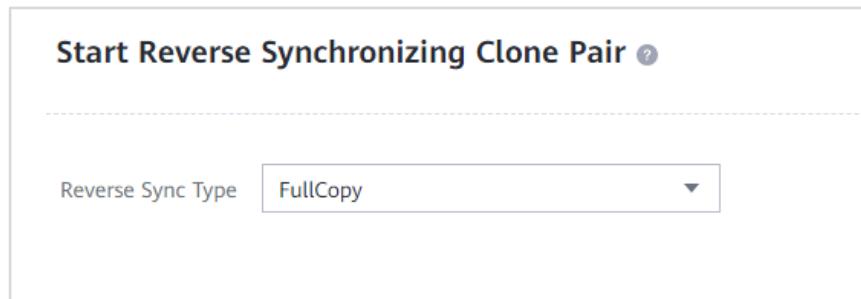
5. After deleting data from **LUN\_SOUR**, select the desired clone pair and choose **Reverse Sync > Start**.



The screenshot shows the "Clone Pairs" tab in a management interface. At the top, there are buttons for "Create", "Synchronize", "Reverse Sync" (with a dropdown menu showing "Start", "Pause", "Resume", and "Stop", where "Start" is highlighted with a red box), and "Delete". Below these are two entries in a table:

Source LUN	Target LUN	Owning vStore	Health St...
LUN_SOUR	LUN_DEST	System_vStore	Normal

6. Set **Reverse Sync Type** to **FullCopy**.



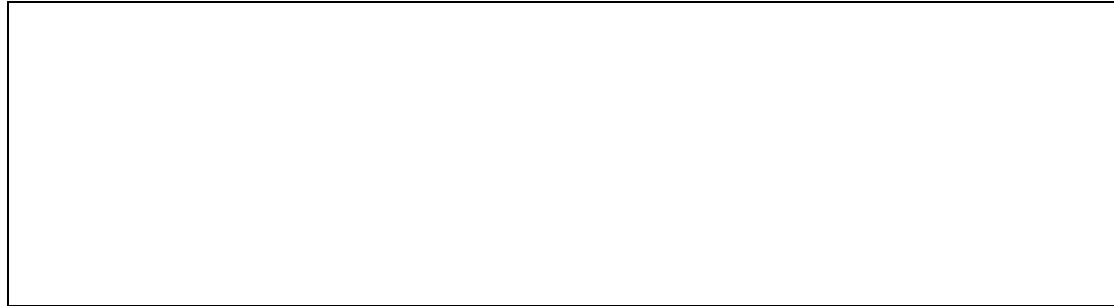
7. Click **OK** to complete the reverse synchronization.



#### 8. Check the data in **LUN\_SOURCE**.

##### Step 3 Delete a clone pair.

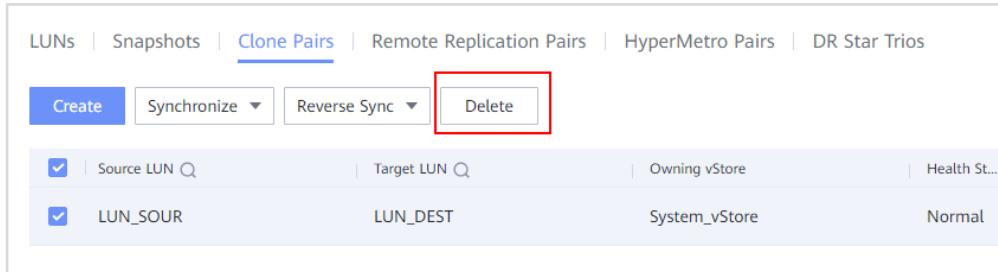
After completing the preceding operations, help the engineer delete the clone pair.



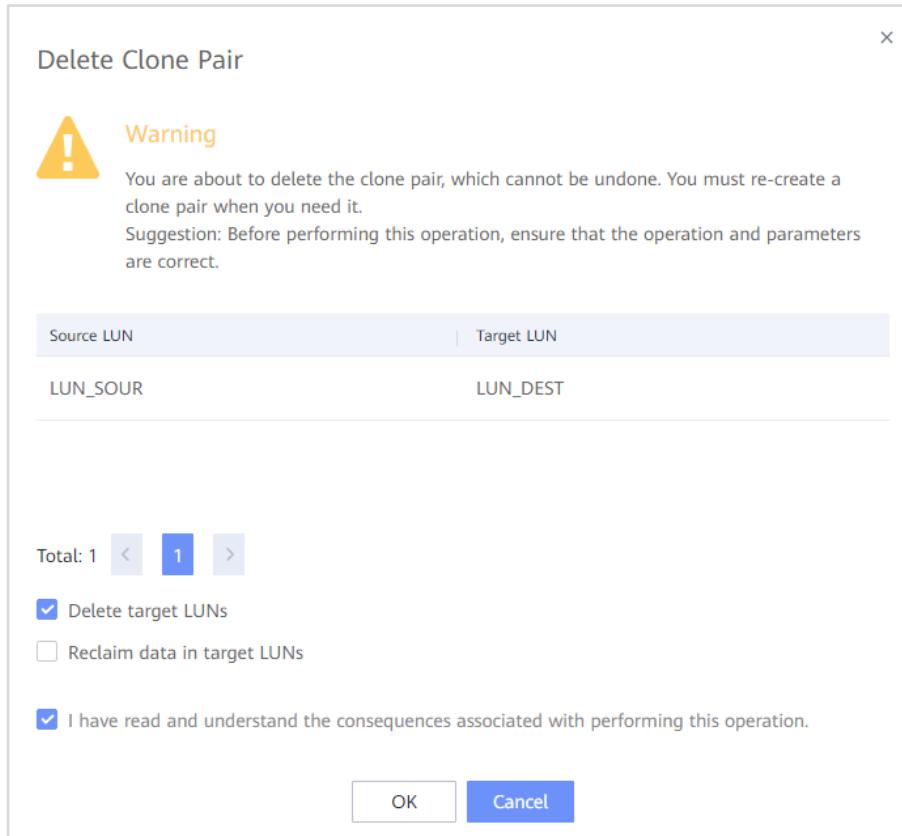
##### [Suggested Procedure]

For details about operations on DeviceManager, see **Configure > HyperClone Feature Guide for Block > Configuring and Managing HyperClone (System User) > Managing Clone Pairs > Deleting a Clone Pair** in the product documentation.

1. Choose **Data Protection > Protection Entities > LUNs > Clone Pairs**.
2. Select the desired **System\_vStore** from the **vStore** drop-down list in the upper left corner.
3. Select the desired clone pair and click **Delete**. A **Warning** dialog box is displayed.



4. Select **Delete target LUNs**.



#### 2.4.1.6 Discussion

After clone synchronization is complete, can users perform synchronization again?

#### 2.4.2 Scenario-based Practice 2: HyperClone Hands-on Practice (File Services)

##### 2.4.2.1 Background

Storage engineer A has created a 10 GB file system named **FileSystem001**, CIFS share **fs01**, and an NFS share. A text file **A.txt** containing characters has been written to **FileSystem001**. Storage engineer A wants to use the clone feature to protect data in the file system. Please help him complete related configurations.

##### 2.4.2.2 Question

After a clone file system is created, are the dtree configuration and dtree data consistent with those of the parent file system?

##### 2.4.2.3 Task 1: Configuring HyperClone

Step 1     Draw a flowchart for configuring HyperClone.

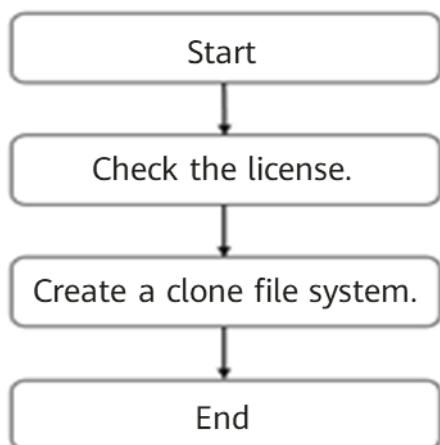
Demonstrate how to configure HyperClone.



[Suggested Procedure]

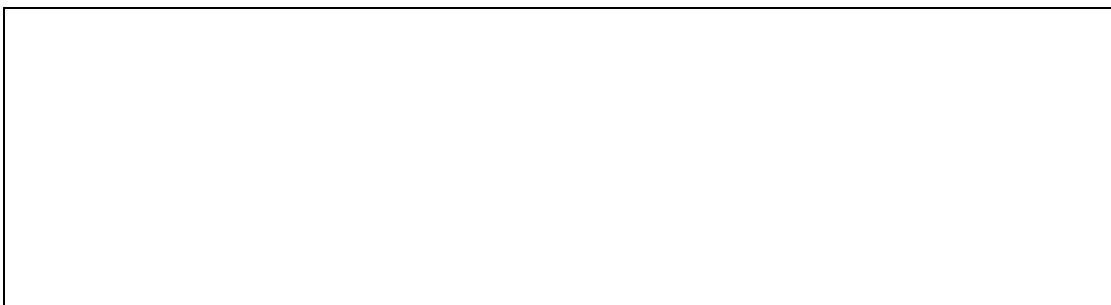
For details about how to draw a flowchart, see **Configure > HyperClone Feature Guide for File > Configuring and Managing HyperClone (System User) > Configuring HyperClone > Configuration Process** in the product documentation.

[Suggested Answer]



Step 2 View HyperClone license information.

Before configuring HyperClone, ensure that the permission for using HyperClone has been granted. Help the engineer check HyperClone license information.

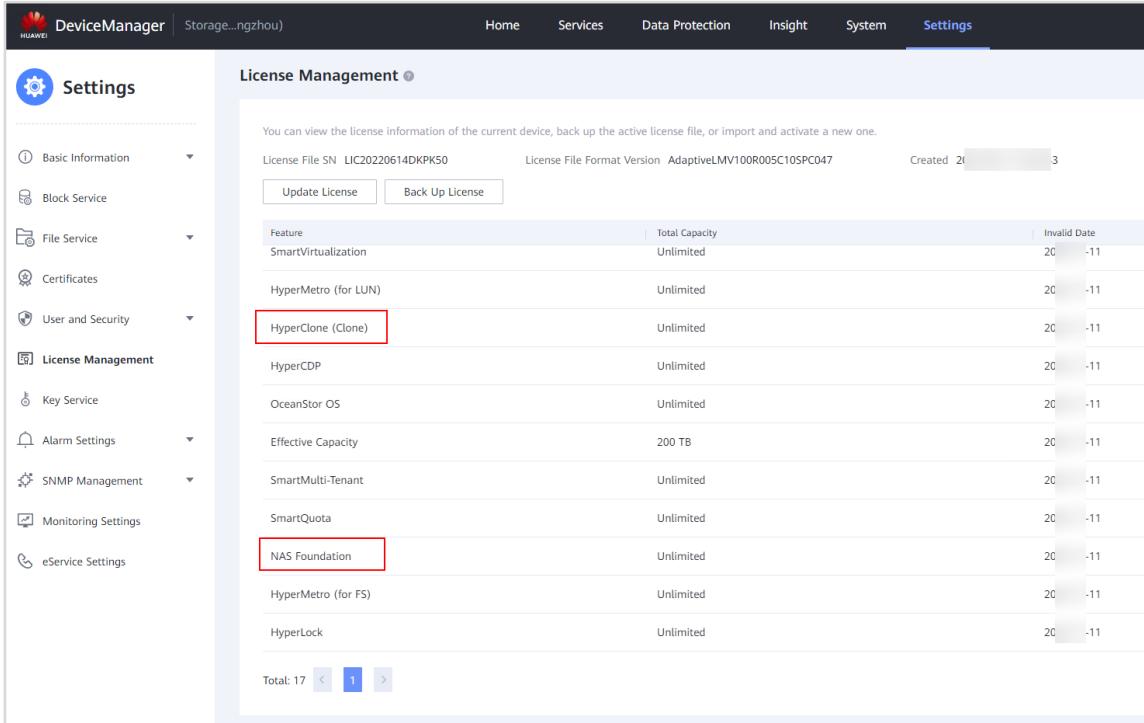


[Suggested Procedure]

For details about operations on DeviceManager, see **Configure > HyperClone Feature Guide for File > Configuring and Managing HyperClone (System User) > Configuring HyperClone > Checking the License** in the product documentation.

1. Choose **Settings > License Management**.

2. (Optional) In the middle information pane, ensure that the activated license contains **HyperClone (Clone)** and **NAS Foundation**.



The screenshot shows the DeviceManager interface with the 'Settings' tab selected. On the left, a sidebar lists various management categories. The 'License Management' section displays a table of activated features. The 'HyperClone (Clone)' and 'NAS Foundation' features are highlighted with red boxes.

Feature	Total Capacity	Invalid Date
SmartVirtualization	Unlimited	2020-11
HyperMetro (for LUN)	Unlimited	2020-11
<b>HyperClone (Clone)</b>	Unlimited	2020-11
HyperCDP	Unlimited	2020-11
OceanStor OS	Unlimited	2020-11
Effective Capacity	200 TB	2020-11
SmartMulti-Tenant	Unlimited	2020-11
SmartQuota	Unlimited	2020-11
<b>NAS Foundation</b>	Unlimited	2020-11
HyperMetro (for FS)	Unlimited	2020-11
HyperLock	Unlimited	2020-11

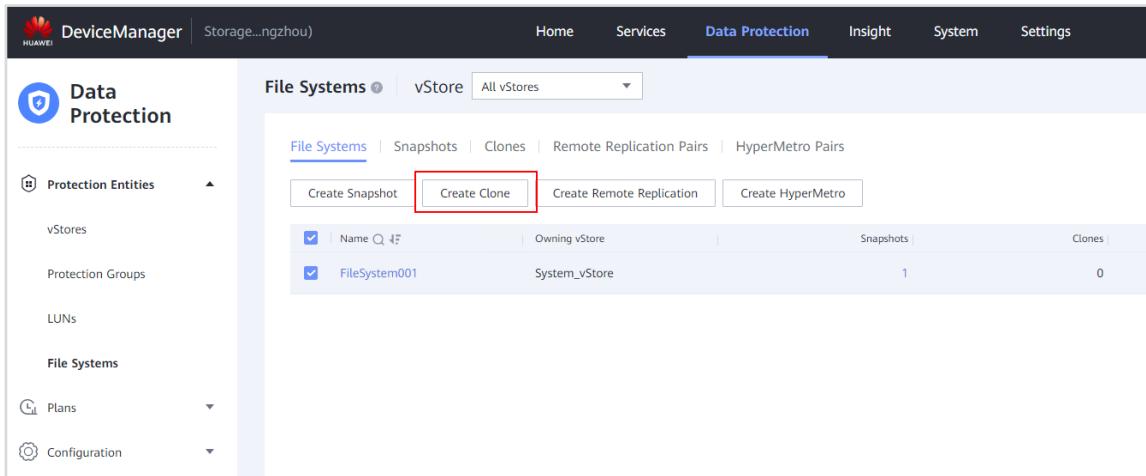
### Step 3 Create a clone pair.

Help the engineer to create a clone pair for **FileSystem001**. The clone file system name is **FileSystem001\_DEST**.

[Suggested Procedure]

For details about operations on DeviceManager, see **Configure > HyperClone Feature Guide for File > Configuring and Managing HyperClone (System User) > Configuring HyperClone > Creating a Clone File System** in the product documentation.

1. Choose **Data Protection > Protection Entities > File Systems > Clones**.
2. Select the vStore to which the parent file system belongs from the **vStore** drop-down list in the upper left corner.
3. Select the desired file system for which you want to create a clone.
4. Click **Create**.



The screenshot shows the DeviceManager interface for Data Protection. The left sidebar has sections for Protection Entities (vStores, Protection Groups, LUNs, File Systems), Plans, and Configuration. The main area is titled 'File Systems' and shows a table with one row:

Name	Owning vStore	Snapshots	Clones
FileSystem001	System_vStore	1	0

At the top of the main area, there are buttons for Create Snapshot, Create Clone (which is highlighted with a red box), Create Remote Replication, and Create HyperMetro.

5. Set the creation mode to **Select a single parent file system** and set the clone file system name to **FileSystem001\_DEST**.
6. Click **OK**.

**Create Clone File System** [?](#)  Advanced

\* Creation Mode  Select a single parent file system  Select multiple parent file systems

Parent File System Name FileSystem001

Owning vStore of Parent File System System\_vStore

\* Clone File System Name

\* Owning vStore of Clone File System

Description

\* Snapshot Type  New snapshot  Existing snapshot

**OK** **Cancel**

#### 2.4.2.4 Question

What creation modes are supported by the file system clone feature?

#### 2.4.2.5 Task 2: Managing HyperClone

In practice, unexpected situations may occur during the use of HyperClone, for example, the service load increases sharply during clone synchronization. In this case, manage the clone file system. Please help the engineer manage clone file systems.

Step 1     Modify properties of a clone file system.

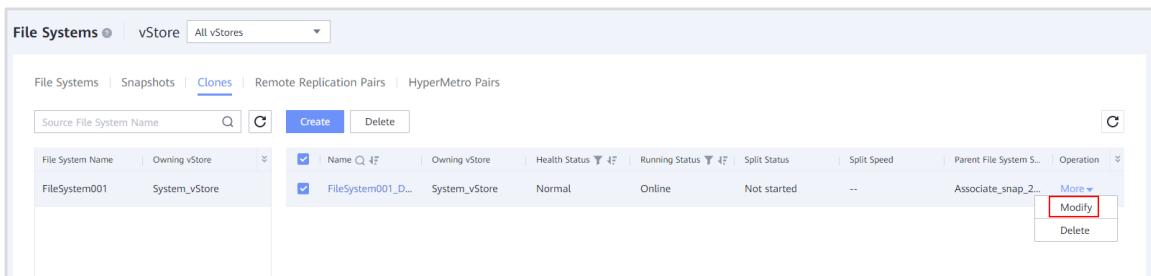
After clone synchronization is complete, help engineers modify the name and description of the clone file system.



[Suggested Procedure]

For details about operations on DeviceManager, see **Configure > HyperClone Feature Guide for File > Configuring and Managing HyperClone (System User) > Managing Clone Pairs > Modifying Properties of a Clone File System** in the product documentation.

1. Choose **Data Protection > Protection Entities > File Systems > Clones**.
2. Select the vStore to which the parent file system belongs from the **vStore** drop-down list in the upper left corner.
3. Select the desired file system, click **More** on the right of the clone file system, and select **Modify**.



The screenshot shows the 'File Systems' interface in DeviceManager. The 'Clones' tab is selected. A table lists clone pairs. A red box highlights the 'More' dropdown menu for the second row, which contains 'FileSystem001\_Clone' and 'System\_vStore'. The 'More' menu includes options like 'Modify' and 'Delete'.

Source File System Name	Owning vStore	Name	Owning vStore	Health Status	Running Status	Split Status	Split Speed	Parent File System ...	Operation
FileSystem001	System_vStore	FileSystem001_Clone	System_vStore	Normal	Online	Not started	--	Associate_snap_2...	<b>More</b>
									<b>Modify</b>
									<b>Delete</b>

4. Set the name of the clone file system to **FileSystem001\_Clone**.
5. Modify the description of the clone file system.
6. Set **Security Style** to **UNIX** based on service requirements.
7. Click **OK**.

### Modify Clone File System ?

\* Name

Description

\* Security Style

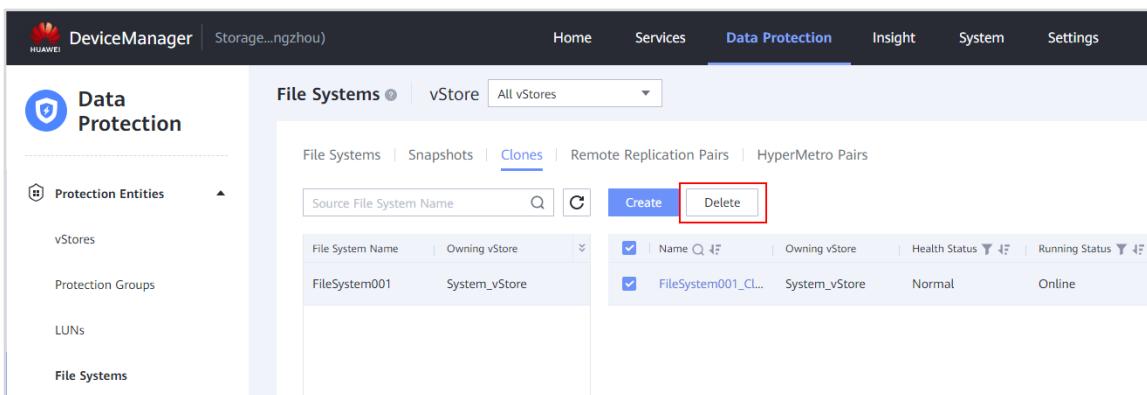
Step 2 Delete a clone file system.

Help the engineer to delete the clone file system that is no longer used.

[Suggested Procedure]

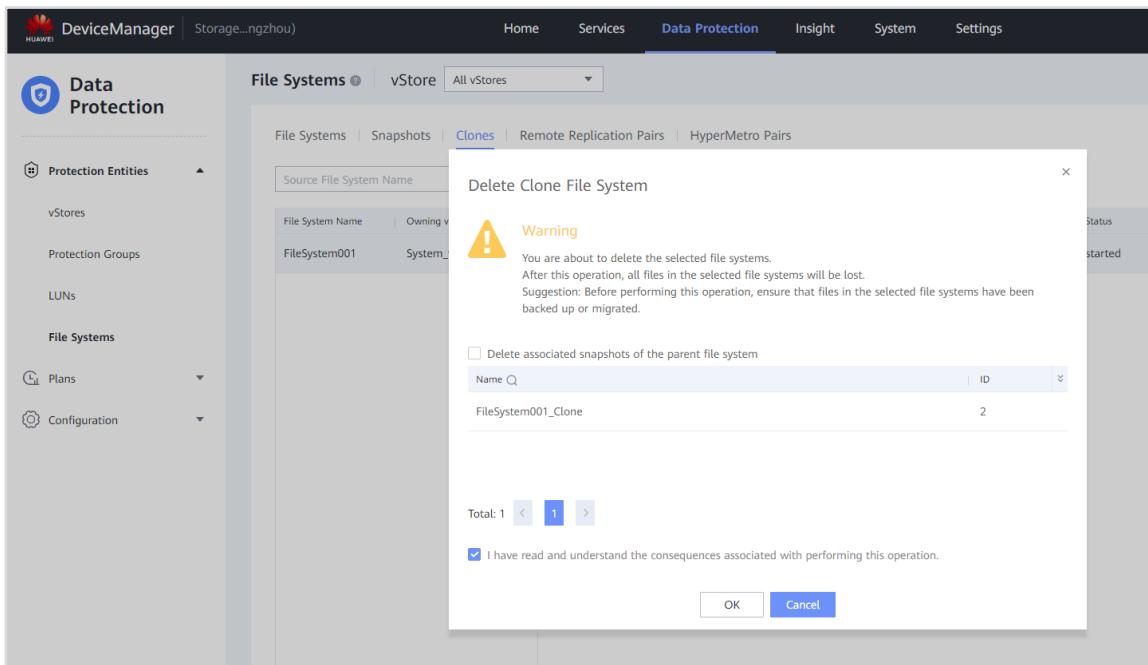
For details about operations on DeviceManager, see **Configure > HyperClone Feature Guide for File > Configuring and Managing HyperClone (System User) > Managing Clone Pairs > Deleting a Clone File System** in the product documentation.

1. Choose **Data Protection > Protection Entities > File Systems > Clones**.
2. Select the vStore to which the parent file system belongs from the **vStore** drop-down list in the upper left corner.
3. Select a file system. Then select the clone file system to be deleted and click **Delete**.



The screenshot shows the DeviceManager interface under the Data Protection tab. On the left, there's a sidebar with 'Data Protection' selected. The main area has tabs for 'File Systems', 'Snapshots', 'Clones' (which is active), 'Remote Replication Pairs', and 'HyperMetro Pairs'. Below these tabs is a search bar and a 'Create' button. To the right of the search bar is a 'Delete' button, which is highlighted with a red box. The main table lists file systems, with one row selected: 'FileSystem001' under 'Owning vStore' 'System\_vStore'. There are checkboxes for 'Name' and 'File System001\_Cl...' in the table header, and columns for 'Name', 'Owning vStore', 'Health Status', and 'Running Status'.

4. Deselect **Delete associated snapshots of the parent file system**.
5. Confirm your operation as prompted.



#### 2.4.2.6 Discussion

What properties of the parent file system are inherited by a clone file system?

### 2.5 Summary and Conclusion

My Opinion:

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Huawei Storage Certification Training

# HCIA-Storage

## Scenario-based Practice of HyperSnap

ISSUE: 5.0

(For Trainees)



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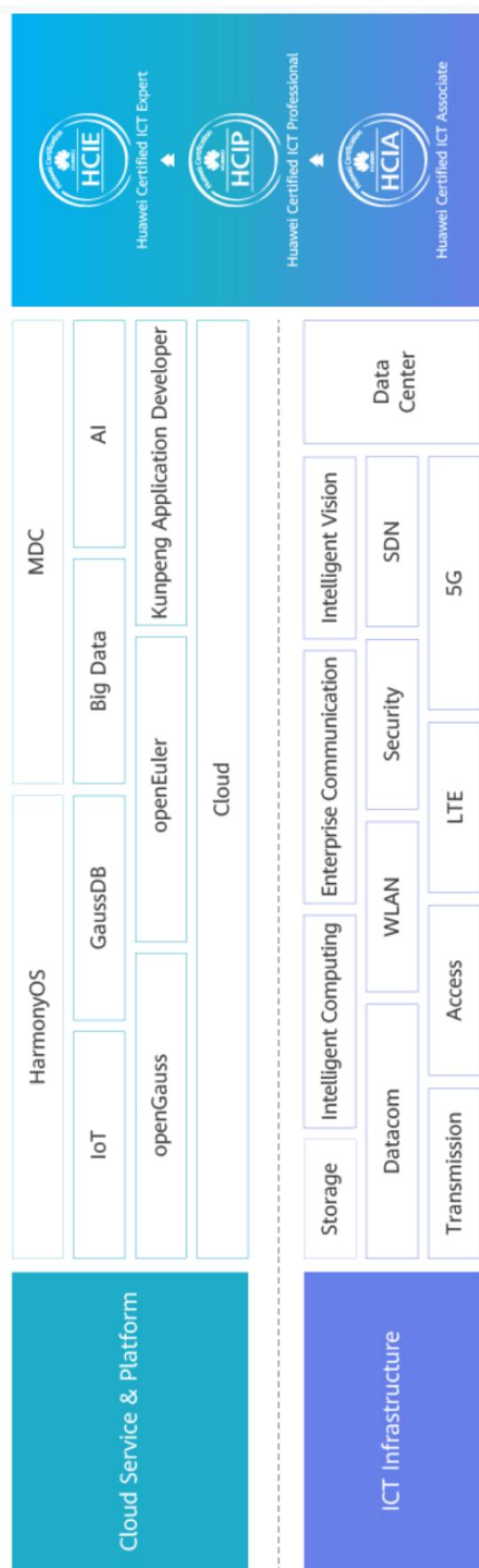
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# 1

# References and Tools

Commands and documents listed in this document are for reference only, and actual ones may vary with product versions.

## 1.1 References

1. Huawei OceanStor Dorado all-flash series product documentation

 **NOTE**

The specifications of HyperSnap vary with products. For details, see the product documentation of the desired product model. Log in to the Huawei technical support website (<https://support.huawei.com/enterprise/>) and type the name of a documentation or tool in the search box to search for, browse, and download the desired documentation or tool.

2. Huawei SmartKit product documentation

 **NOTE**

Log in to the Huawei technical support website (<https://support.huawei.com/enterprise/>) and type the name of a documentation or tool in the search box to search for, browse, and download the desired documentation or tool.

## 1.2 Software Tools

1. PuTTY

 **NOTE**

You are advised to use the open-source software PuTTY to log in to a terminal. You can use the common domain name ([putty.org](http://putty.org)) of PuTTY to browse or download the desired documentation or tool.

## 2. SmartKit

 **NOTE**

Log in to the Huawei technical support website (<https://support.huawei.com/enterprise/>) and type the name of a documentation or tool in the search box to search for, browse, and download the desired documentation or tool.

## 1.3 Version Description

The recommended platform and software versions in the practice tasks are as follows:

Name	Version	Quantity	Remarks
OceanStor Dorado V6	6.1.3	1	Recommended version
SmartKit software	SmartKit 22.0	--	This version or later is recommended.
Windows operating system (OS)	Windows Server 2012 and Windows Server 2016	--	Recommended version
Linux OS	SUSE, Red Hat, CentOS, and EulerOS	--	Recommended version

# 2

# Scenario-based Practice of HyperSnap

## 2.1 Course Overview

This course provides case study and scenario-based practices to help trainees consolidate their knowledge on the use of HyperSnap. HyperSnap is a common advanced storage technology. Before using HyperSnap, you are advised to learn how to configure basic storage services.

## 2.2 Objectives

- To be able to configure the snapshot of the block storage and file system
- To be able to roll back data using a snapshot

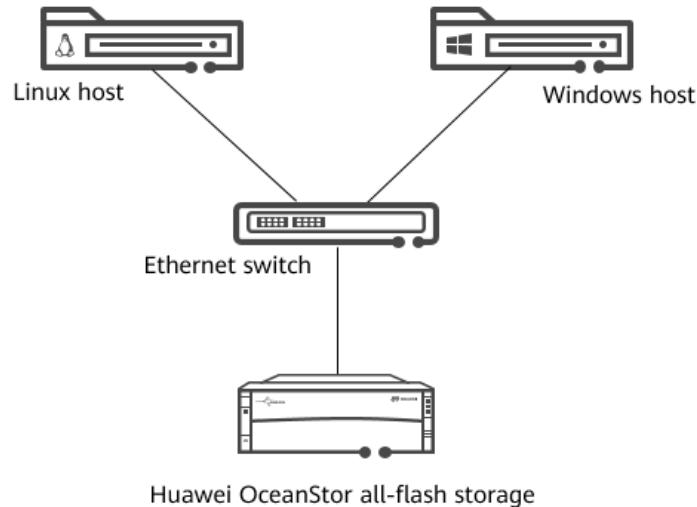
## 2.3 Case Background

### NOTE

Cases in this document are examples only. The actual configurations may vary according to actual environments. For details, see the corresponding product document. The names of storage pools and LUNs involved in this document can be customized (for example, LUN\_XXX) for different trainees if they use the same device.

An enterprise has an OceanStor all-flash storage device. To shorten the backup window, the enterprise purchased HyperSnap. Help storage engineers get familiar with operations related to HyperSnap.

The following figure shows the live network topology of the enterprise.

**Figure 2-1 Network topology**

## 2.4 Tasks and Suggested Answers

### 2.4.1 Scenario-based Practice 1: HyperSnap Hands-on Practice (Block Services)

#### 2.4.1.1 Background

A 5 GB LUN named **LUN\_SOUR** has been created and mapped to a host. A file system has been created for **LUN\_SOUR** on the host and has been mounted. Two text files **A.txt** and **B.txt** containing characters have been written to **LUN\_SOUR**.

#### 2.4.1.2 Question

What are COW and ROW?

#### 2.4.1.3 Task 1: Configuring a Snapshot of a LUN

After a snapshot is created for a source LUN, the snapshot stores data of the source LUN at the snapshot creation time point.

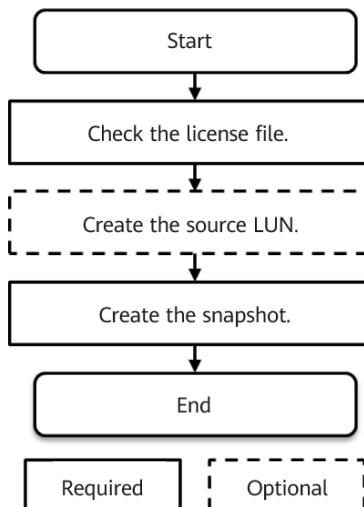
## Step 1 Draw a flowchart for configuring HyperSnap.

Demonstrate how to configure HyperSnap.

[Suggested Procedure]

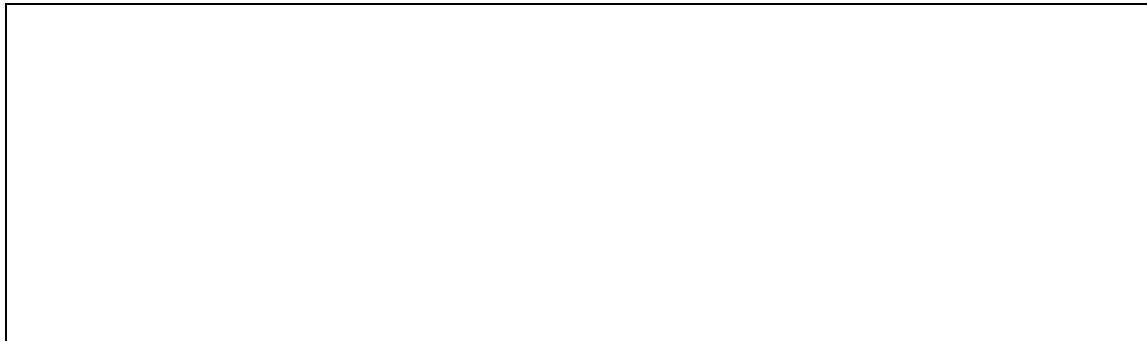
For details about how to draw the flowchart, see **Configure > HyperSnap Feature Guide for Block > Configuring and Managing Snapshots (System User) > Configuring Snapshots > Configuration Process** in the product documentation.

[Suggested Answer]



## Step 2 View license information.

Before configuring HyperSnap, ensure that the permission for using HyperSnap has been granted. Check HyperSnap license information.



[Suggested Procedure]

For details about operations on DeviceManager, see **Configure > HyperSnap Feature Guide for Block > Configuring and Managing Snapshots (System User) > Configuring Snapshots > Checking the License** in the product documentation.

1. Log in to DeviceManager.
2. Choose **Settings > License Management**.
3. View the license information of the device.

### License Management

You can view the license information of the current device, back up the active license file, or import a new license file.

License File SN: [redacted] License File Format Version: AdaptiveLMV100R005C10SPC047

[Update License](#) [Back Up License](#)

Feature	Total Capacity
Management Console	Unlimited
SmartThin	Unlimited
SmartMigration	Unlimited
SmartDedupe (for LUN)	Unlimited
SmartCompression (for LUN)	Unlimited
SmartQoS	Unlimited
HyperSnap (Snapshot)	Unlimited

For details about operations on the CLI, see **Reference > Command Reference > License Management Commands > license > show license** in the product documentation.

```
admin:/>show license

CopyRight      : Huawei Technologies Co., Ltd. All rights reserved.
License SN     : LIC20220614DKPK50
File Creator   : Huawei Technologies Co., Ltd.
Created On     :
Country        : English
Operator        : RD of Huawei Technologies Co., Ltd.
Region         : ShenZhen

Feature Name    : Effective Capacity
Feature ID      : 104
Trial Days      : 60
Running Deadline:
Resource Name   : capacity
Maximal Resource Number : 200

Feature Name    : Management Console
Feature ID      : 28
License Status  : Valid
Open Status     : Open
Left Day(s)     : 127
Resource Limit  : 0

-----
Feature Name    : HyperSnap
Feature ID      : 2
License Status  : Valid
Open Status     : Open
Left Day(s)     : 127
Resource Limit  : 0
```

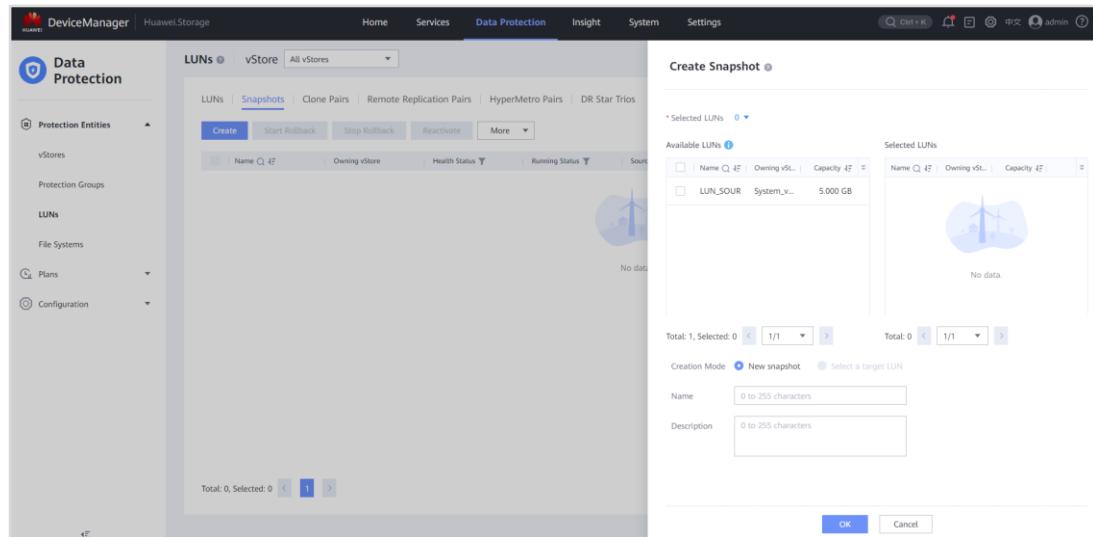
### Step 3 Create a snapshot.

Use **LUN\_SOUR** as the source LUN. Create a snapshot named **Snap01** for **LUN\_SOUR** and set the rollback speed to the **Highest**.

[Suggested Procedure]

For details about operations on DeviceManager, see **Configure > HyperSnap Feature Guide for Block > Configuring and Managing Snapshots (System User) > Configuring Snapshots > Creating a Snapshot** in the product documentation.

1. Choose **Data Protection > Protection Entities > LUNs > Snapshots**.
2. Select the vStore to which the desired LUN belongs from the **vStore** drop-down list in the upper left corner.
3. Click **Create**.
4. The **Create Snapshot** page is displayed on the right.



5. Select the LUNs for which you want to create snapshots from **Available LUNs**.
6. If you select a single LUN, you can select a snapshot creation mode. Possible options are:
  - **New snapshot:** Create a snapshot for the source LUN.
  - **Select a target LUN:** Select an existing target LUN from the **Target LUN** drop-down list and convert the target LUN into a snapshot of the source LUN.
7. Set the snapshot name to **Snap01**.
8. Add the snapshot description.
9. Click **OK**.

**Create Snapshot**

\* Selected LUNs 1 ▾

Available LUNs			Selected LUNs		
<input checked="" type="checkbox"/>	Name	Owning vSt...	Name	Owning vSt...	Capacity
<input checked="" type="checkbox"/>	LUN_SOUR	System_v...	LUN_SOUR	System_v...	5.000 GB

Total: 1, Selected: 1 < 1/1 > Total: 1 < 1/1 >

Creation Mode  New snapshot  Select a target LUN

Name	Snap01
Description	11:42

**OK** **Cancel**

#### 2.4.1.4 Question

Why can a snapshot of a LUN be used to restore data without saving all copies of the source LUN?

#### 2.4.1.5 Task 2: Rolling Back Data Using a Snapshot

After configuring the snapshot of the LUN, the engineer mistakenly modifies data on the source LUN. In this case, the engineer needs to roll back data on the source LUN using the snapshot. Modify the files in **LUN\_SOUR**, such as deleting the **A.txt** file, and explain how to roll back the data using the snapshot.

Step 1 Check the snapshot status.

Before the rollback, check whether the snapshot is activated.



#### [Suggested Procedure]

For details about operations on DeviceManager, see **Configure > HyperSnap Feature Guide for Block > Configuring and Managing Snapshots (System User) > Managing Snapshots of LUNs > Viewing Snapshots** in the product documentation.

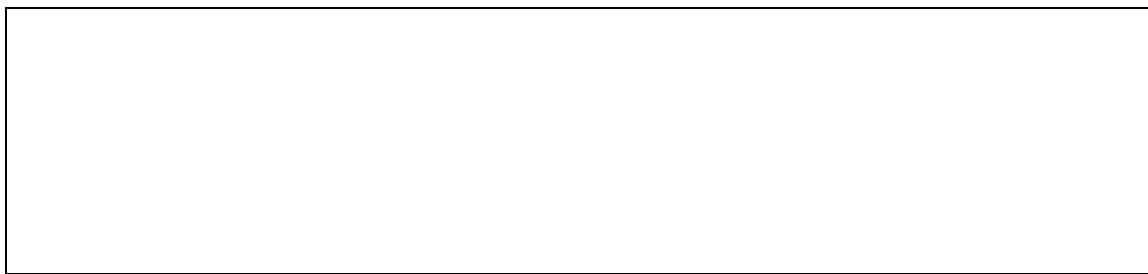


Name	Health Status	Running Status	Source LUN	Parent Object	Activated	Owning Snapshot CG	Operation
Snap01	Normal	Activated	LUN_SOURCE	LUN_SOURCE	██████████		More ▾

Query result: **Running Status of Snap01 is Activated.**

**Step 2** Cancel the mapping between the source LUN and the host.

To ensure data consistency, stop host services before data rollback. Cancel the mapping between **LUN\_SOURCE** and the host.



#### [Suggested Procedure]

For details, see **Configure > Basic Storage Service Configuration Guide for Block > Managing Basic Storage Services > Managing LUNs > Unmapping a LUN** in the product documentation.

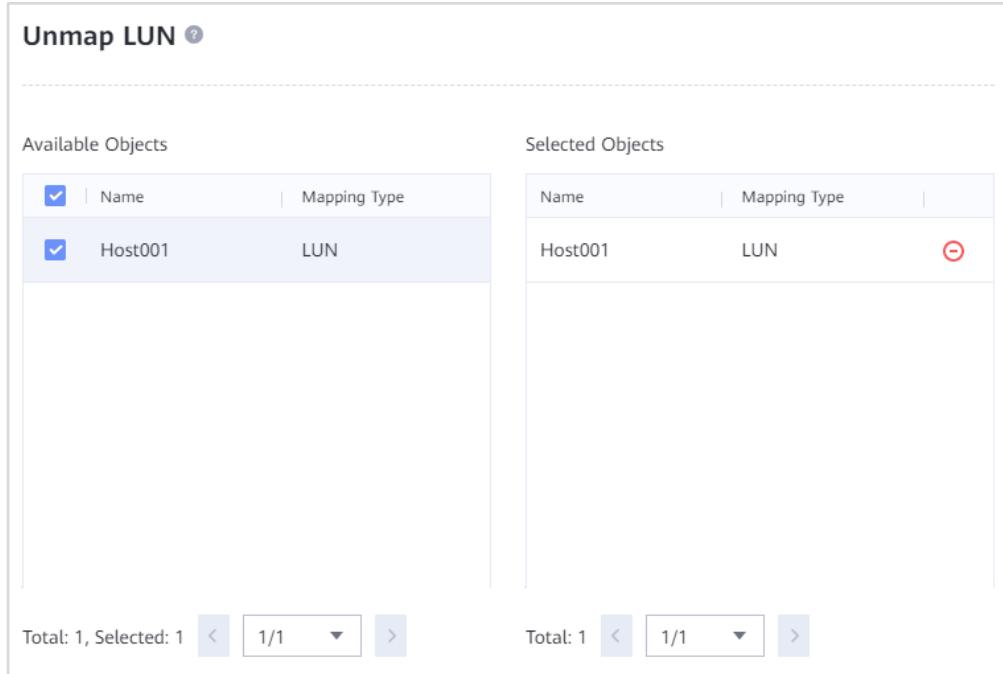
1. Choose **Services > Block Service > LUN Groups > LUNs**.
2. Select the vStore to which the desired LUN belongs from the **vStore** drop-down list in the upper left corner.

3. Click **More** on the right of the LUN and choose **Unmap**. The **Unmap LUN** page is displayed on the right.
4. Select **Host001** from **Available Objects**.
5. Click **OK**.

**Unmap LUN** ?

Available Objects		Selected Objects	
<input checked="" type="checkbox"/>	Name	Mapping Type	
<input checked="" type="checkbox"/>	Host001	LUN	

Total: 1, Selected: 1 < 1/1 > Total: 1 < 1/1 >



6. The mapping is successfully canceled. On DeviceManager, the status of **LUN\_SOURCE** is **Unmapped**.

LUN Groups											vStore	All vStores					
LUN Groups		LUNs	Recycle Bin														
		Create	Map	Protect	▼	Delete											
<input type="checkbox"/>	Name	Q_47	Capacity	47	Health Status	▼	Running Status	▼	Created	▼	47	Data Protection	Local WWN	Function	Mapping	Application Type	Operation
<input type="checkbox"/>	LUN_SOURCE		0.00%	5.000 GB	Normal		Online		2022-08-17 11:26:52			6210000100040...	LUN	Unmapped	Default	More	
<input type="checkbox"/>	Snap1		0.00%	5.000 GB	Normal		Online		2022-08-17 11:29:34			6210000100040...	Snapshot	Unmapped	Default	More	

### Step 3 Roll back data using the snapshot.

Use **Snap01** to roll back data on **LUN\_SOURCE**. After the rollback is complete, map **LUN\_SOURCE** to the host again, mount the file system, and check whether the data on **LUN\_SOURCE** has been rolled back to the time point when the snapshot was activated.

#### [Suggested Procedure]

For details about operations on DeviceManager, see **Configure > HyperSnap Feature Guide for Block > Configuring and Managing Snapshots (System User) > Managing Snapshots of LUNs > Rolling Back to a Snapshot** in the product documentation.

1. Choose **Data Protection > Protection Entities > LUNs > Snapshots**.
  2. Select **System\_vStore** to which the desired snapshot belongs from the **vStore** drop-down list in the upper left corner.
- 

3. Select **Snap01** and click **Start Rollback**. The **Start Snapshot Rollback** page is displayed on the right.

LUNs		vStore	System_vStore	
LUNs   <a href="#">Snapshots</a>   Clone Pairs   Remote Replication Pairs   HyperMetro Pairs   DR Star Trios				
<a href="#">Create</a> <a href="#">Start Rollback</a> <a href="#">Stop Rollback</a> <a href="#">Reactivate</a> <a href="#">More</a> ▾				
<input type="checkbox"/>	Name	Q_47	Health Status	▼
<input type="checkbox"/>	Snap01	Normal	Running Status	▼
			Source LUN	Q
			LUN_SOURCE	

4. Set **Rollback Object** to **Source LUN** and **Rollback Speed** to **Medium**.

**Start Snapshot Rollback** ?

\* Rollback Object      Source LUN      ▾  
LUN\_SOUR

Rollback To      Snap01

\* Rollback Speed      Medium      ▾

Click **OK**.

Name	Health Status	Running Status	Source LUN	Parent Object
Snap01	Normal	Rolling back 0%	LUN_SOUR	LUN_SOUR

5. Verify whether data is restored.

Log in to the host and check whether the A.txt file exists.

#### 2.4.1.6 Question

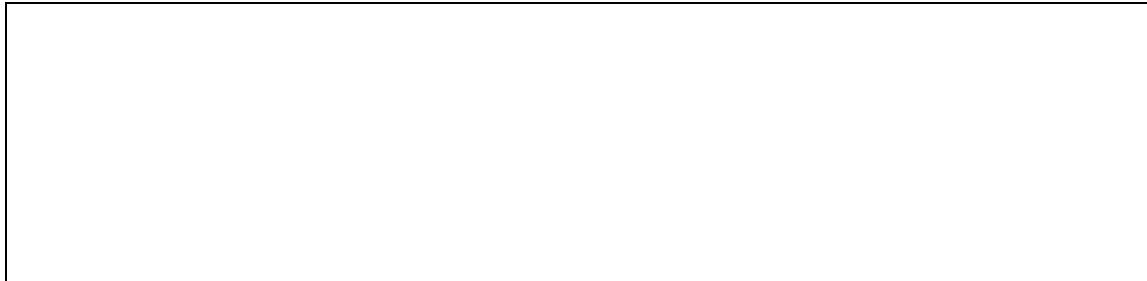
For a writable snapshot, if data on the snapshot LUN is modified, can the snapshot LUN be used to restore data on the source LUN?

#### 2.4.1.7 Task 3: Managing Snapshots

After configuring the snapshot and rolling back data using the snapshot, the engineer wants to learn about routine snapshot management operations, such as managing and modifying snapshot properties. Help the engineer get familiar with these operations.

## Step 1 Modify the snapshot.

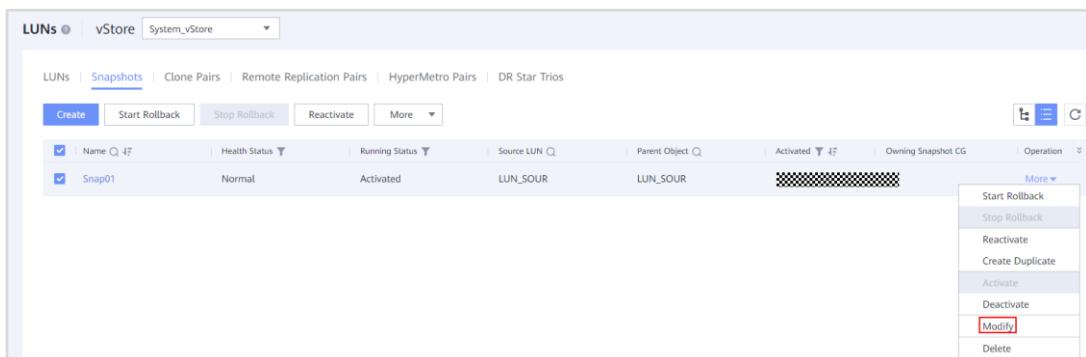
View the snapshot information, modify the snapshot name to **Snap\_Test**, and set the rollback speed to **Low**.



### [Suggested Procedure]

For details about operations on DeviceManager, see **Configure > HyperSnap Feature Guide for Block > Configuring and Managing Snapshots (System User) > Managing Snapshots of LUNs > Modifying Attributes of a Snapshot** in the product documentation.

1. Choose **Data Protection > Protection Entities > LUNs > Snapshots**.
2. Select **System\_vStore** to which the desired snapshot belongs from the **vStore** drop-down list in the upper left corner.
3. Click **More** on the right of **Snap01** and choose **Modify**.



The screenshot shows the DeviceManager interface with the 'Snapshots' tab selected under 'System\_vStore'. A context menu is open over the row for 'Snap01', with the 'Modify' option highlighted.

Name	Health Status	Running Status	Source LUN	Parent Object	Activated	Owning Snapshot CG	Operation
Snap01	Normal	Activated	LUN_SOURCE	LUN_SOURCE	4F		<span>More ▾</span>

Context menu options include:

- Start Rollback
- Stop Rollback
- Reactivate
- Create Duplicate
- Activate
- Deactivate
- Modify** (highlighted)
- Delete

4. The **Modify Snapshot** page is displayed on the right.

**Modify Snapshot** ?

* Name	Snap01
Description	11:42
* Rollback Speed	Medium

5. Change the snapshot name to **Snap\_test** and **Rollback Speed** to **Low**.

**Modify Snapshot** ?

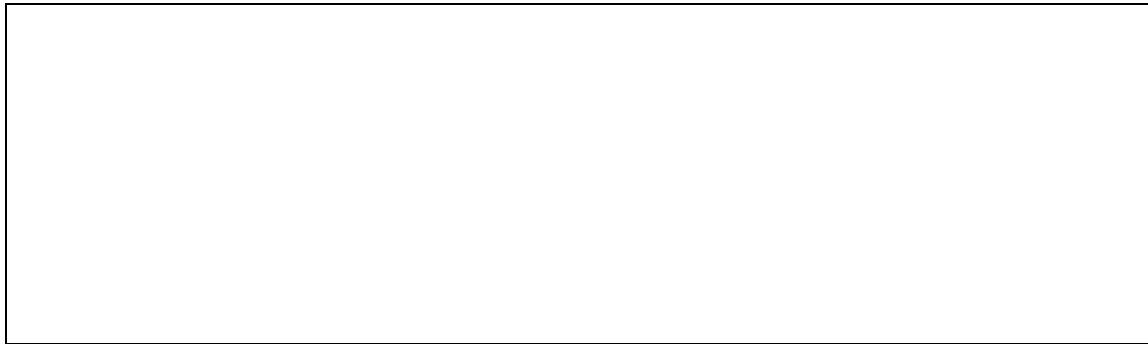
* Name	Snap_test
Description	11:42
* Rollback Speed	Low

6. Click **OK**.

Name	Health Status	Running Status	Source LUN	Parent Object	Owning Snapshot CG	Rollback Speed
<input checked="" type="checkbox"/> Snap_test	Normal	Activated	LUN_SOUR	LUN_SOUR	--	Low

## Step 2 Delete the snapshot.

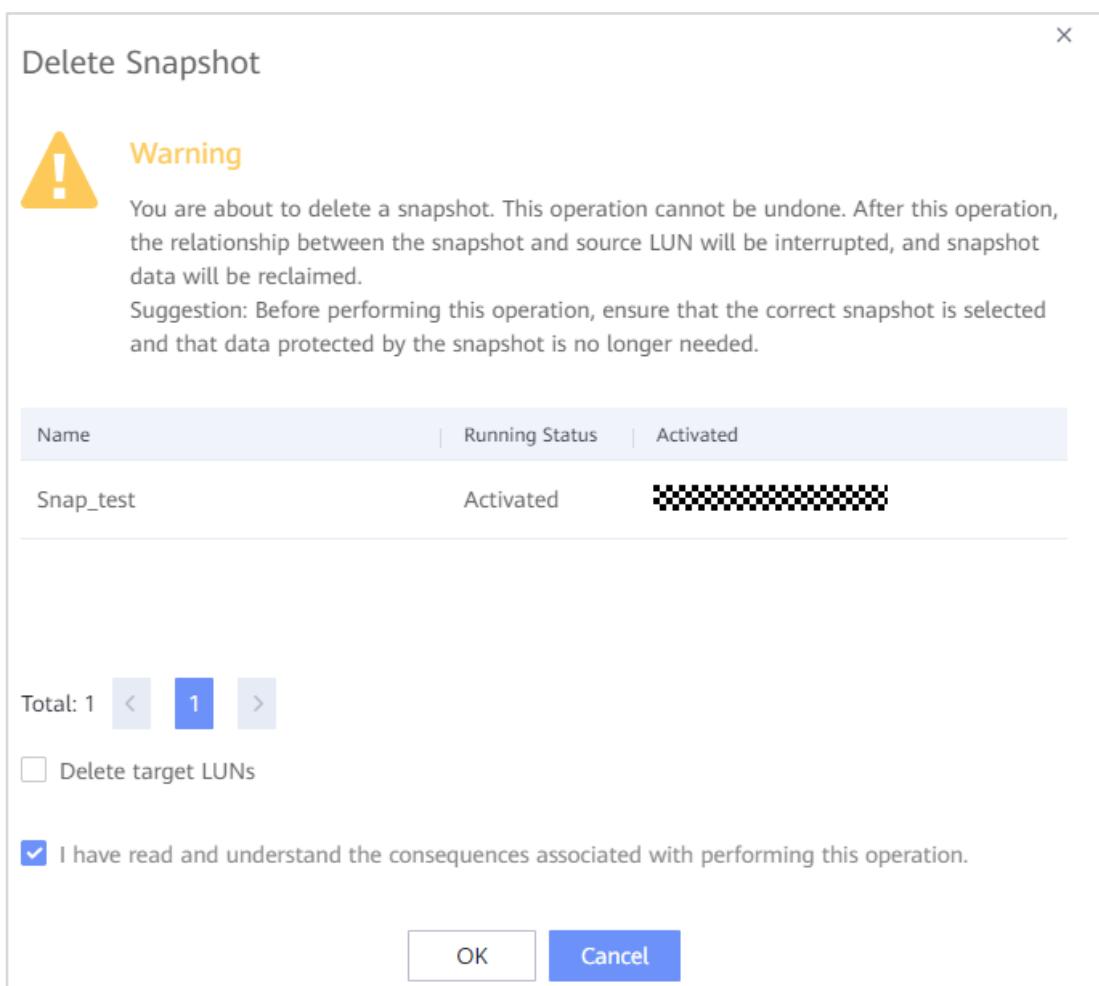
After completing the preceding operations, delete the snapshot.



[Suggested Procedure]

For details about operations on DeviceManager, see **Configure > HyperSnap Feature Guide for Block > Configuring and Managing Snapshots (System User) > Managing Snapshots of LUNs > Deleting a Snapshot** in the product documentation.

1. Choose **Data Protection > Protection Entities > LUNs > Snapshots**.
2. Select **System\_vStore** to which the desired snapshot belongs from the vStore drop-down list in the upper left corner.
3. Select **Snap\_test** and choose **More > Delete**.



4. Click **OK**.

#### 2.4.1.8 Discussion

In addition to the methods listed in this document, describe the other methods to implement the preceding tasks.

### 2.4.2 Scenario-based Practice 2: HyperSnap Hands-on Practice (File Services)

#### 2.4.2.1 Background

A storage pool has been created and a file system named **Filesystem001** has been created in the storage pool. Two text files **A.txt** and **B.txt** containing characters have been created in the directory of the file system.

#### 2.4.2.2 Question

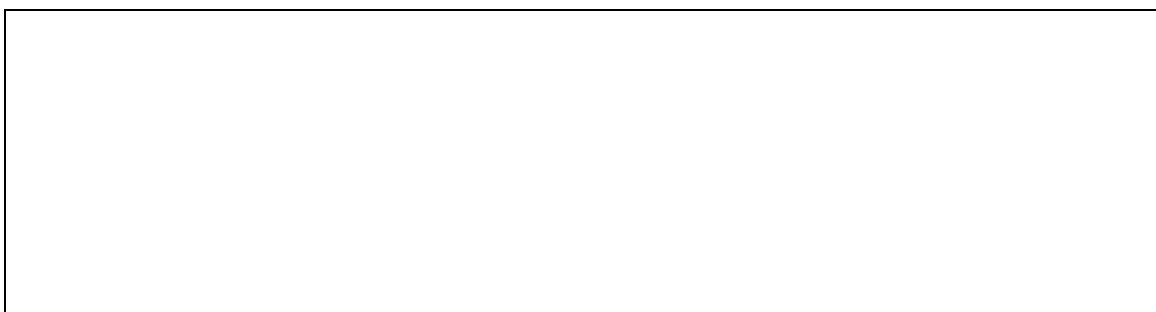
Why can the Huawei OceanStor all-flash storage system implement lossless performance using the ROW technology?

#### 2.4.2.3 Task 1: Creating a File System Snapshot

Create a snapshot for the file system. The roadmap is as follows:

##### Step 1 View license information.

Before configuring HyperSnap, ensure that the permission for using HyperSnap has been granted. Check HyperSnap license information.



##### [Suggested Procedure]

For details about operations on DeviceManager, see **Configure > HyperSnap Feature Guide for File > Configuring and Managing File System Snapshots (System User) > Configuring File System Snapshots > Checking the License** in the product documentation.

1. Log in to DeviceManager.
2. Choose **Settings > License Management**.
3. View the license information of the device.

License Management ?		
You can view the license information of the current device, back up the active license file, or import and activate a new one.		
License File SN	License File Format Version	Created
	AdaptiveLMV100R005C10SPC047	
<a href="#">Update License</a>	<a href="#">Back Up License</a>	
Feature	Total Capacity	
HyperSnap (Snapshot)	Unlimited	
HyperReplication (Remote Replication)	Unlimited	
SmartVirtualization	Unlimited	
HyperMetro (for LUN)	Unlimited	
HyperClone (Clone)	Unlimited	
CloudBackup	Unlimited	
HyperCDP	Unlimited	
CloudReplication	Unlimited	
OceanStor OS	Unlimited	
Special Scenarios	Unlimited	
Effective Capacity	Unlimited	
SmartMulti-Tenant	Unlimited	
SmartQuota	Unlimited	
NAS Foundation	Unlimited	

For details about operations on the CLI, see **Reference > Command Reference > License Management Commands > license > show license** in the product documentation.

```
admin:/>show license

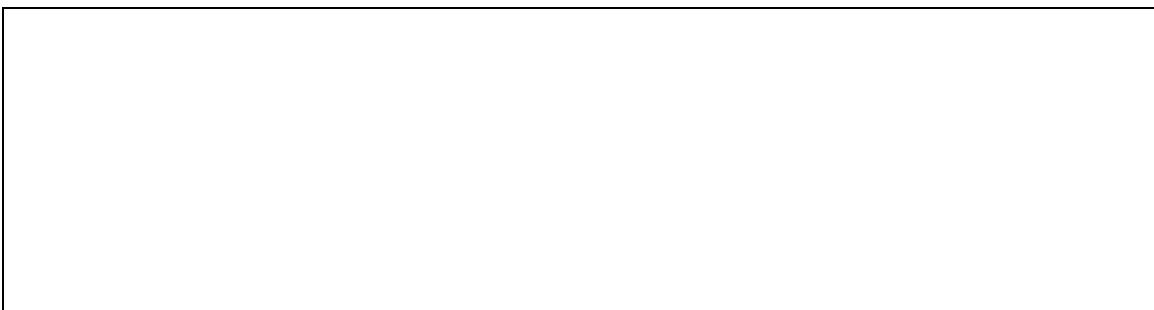
CopyRight      : Huawei Technologies Co., Ltd.All rights reserved.
License SN     : LIC20220614DKPK50
File Creator   : Huawei Technologies Co., Ltd.
Created On     :
Country        : English
Operator       : RD of Huawei Technologies Co., Ltd.
Region         : ShenZhen

Feature Name    : Effective Capacity
Feature ID      : 104
Trial Days      : 60
```

Running Deadline	:
Resource Name	: capacity
Maximal Resource Number	: 200
Feature Name	: Management Console
Feature ID	: 28
License Status	: Valid
Open Status	: Open
Left Day(s)	: 127
Resource Limit	: 0
Feature Name	: HyperSnap
Feature ID	: 2
License Status	: Valid
Open Status	: Open
Left Day(s)	: 127
Resource Limit	: 0

## Step 2 Create a file system snapshot.

Create a snapshot file system named **FSNAP001** for source file system **FileSystem001** and activate the snapshot.

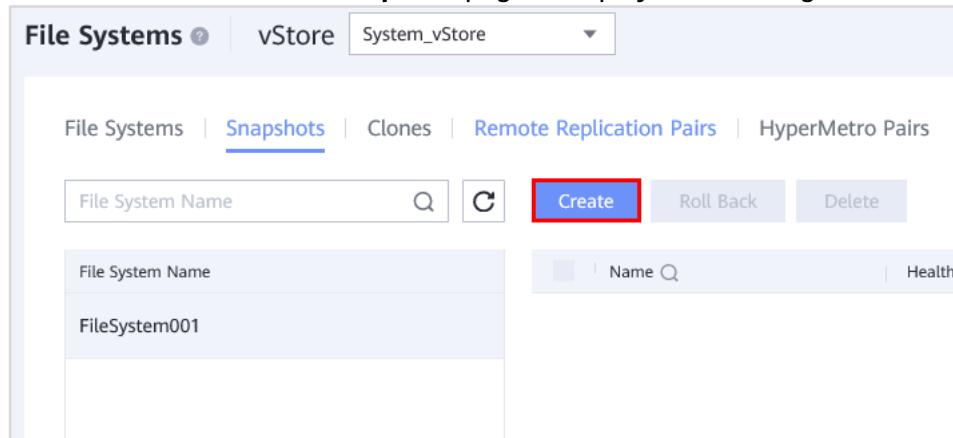


### [Suggested Procedure]

For details about operations on DeviceManager, see **Configure > HyperSnap Feature Guide for File > Configuring and Managing File System Snapshots (System User) > Configuring File System Snapshots > Creating a Snapshot** in the product documentation.

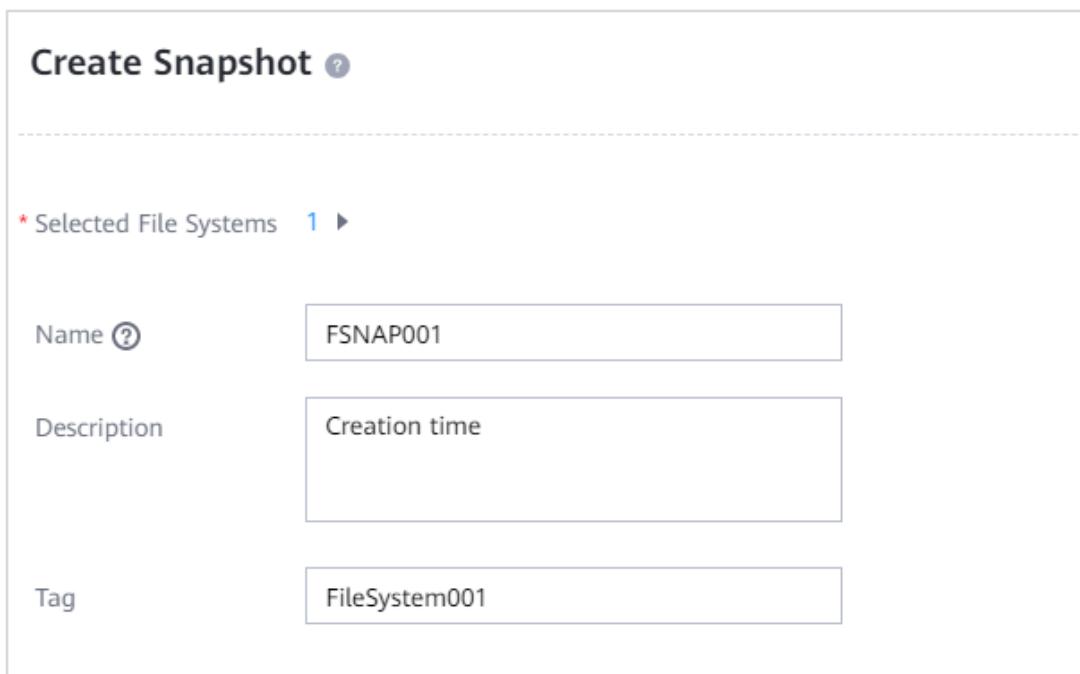
1. Choose **Data Protection > Protection Entities > File Systems > Snapshots**.
2. Select **System\_vStore** to which the desired file system belongs from the vStore drop-down list in the upper left corner.
3. In the left pane, select **FileSystem001** for which you want to create a snapshot.

4. Click **Create**. The **Create Snapshot** page is displayed on the right.



The screenshot shows the 'File Systems' interface with the 'Snapshots' tab selected. At the top, there are tabs for 'File Systems', 'Snapshots' (which is underlined in blue), 'Clones', 'Remote Replication Pairs', and 'HyperMetro Pairs'. Below the tabs is a search bar with a magnifying glass icon and a 'Create' button, which is highlighted with a red box. To the right of the search bar are 'Roll Back' and 'Delete' buttons. The main area displays a table with columns for 'File System Name', 'Name', and 'Health'. One row in the table is selected, showing 'FileSystem001' in the first column. There is also a search bar for 'Name' and a 'Health' filter.

5. Set the snapshot name to **FSNAP001**, description, and tag.



The screenshot shows the 'Create Snapshot' dialog box. At the top, it says 'Selected File Systems 1 ►'. Below that, there are three input fields: 'Name' with the value 'FSNAP001', 'Description' with the value 'Creation time', and 'Tag' with the value 'FileSystem001'.

#### 2.4.2.4 Task 2: Verifying the Snapshot Rollback Function

Delete **file B.txt** from file system **FileSystem001** to simulate file loss. Then, verify that the snapshot file system can be used to roll back the source file system data to the point in time when the snapshot was activated.

Step 1 Roll back a snapshot.

Use the snapshot to roll back the source file system.



[Suggested Procedure]

For details about operations on DeviceManager, see **Configure > HyperSnap Feature Guide for File > Configuring and Managing File System Snapshots (System User) > Configuring File System Snapshots > Creating a Snapshot** in the product documentation.

1. Choose **Data Protection > Protection Entities > File Systems > Snapshots**.
2. Select **System\_vStore** to which the desired file system belongs from the vStore drop-down list in the upper left corner.
3. Select a file system, select the desired snapshot, and click **Roll Back**.

File System Name	Name	Health Status	Rollback Progress	Created	Type	Operation
FileSystem001	<input checked="" type="checkbox"/> FSNAP001	Normal	--	2022-09-28 09:25:01	User snapshot	<a href="#">Roll Back</a> <span style="margin-left: 10px;">More</span>

4. Set **Rollback Speed** to **High**.

\* Rollback Speed ?

High

5. Click **OK**.

File System Name	Name	Health Status	Rollback Progress	Created	Type	Operation
FileSystem001	<input checked="" type="checkbox"/> FSNAP001	Normal	<div style="width: 0%; background-color: #ccc;">0%</div>	2022-09-28 09:25:01	User snapshot	<a href="#">More</a>

Step 2 Confirm that the files are restored.

Check whether **A.txt** and **B.txt** files exist in the source file system.

#### 2.4.2.5 Discussion

Does the snapshot-based rollback of file storage services interrupt Windows services?  
What other methods can be used to restore files?

### 2.5 Summary and Conclusion

My Opinion:

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Huawei Storage Certification Training

# HCIA-Storage

## Scenario-based Practice of

## SmartQoS

ISSUE: 5.0

(For Trainees)



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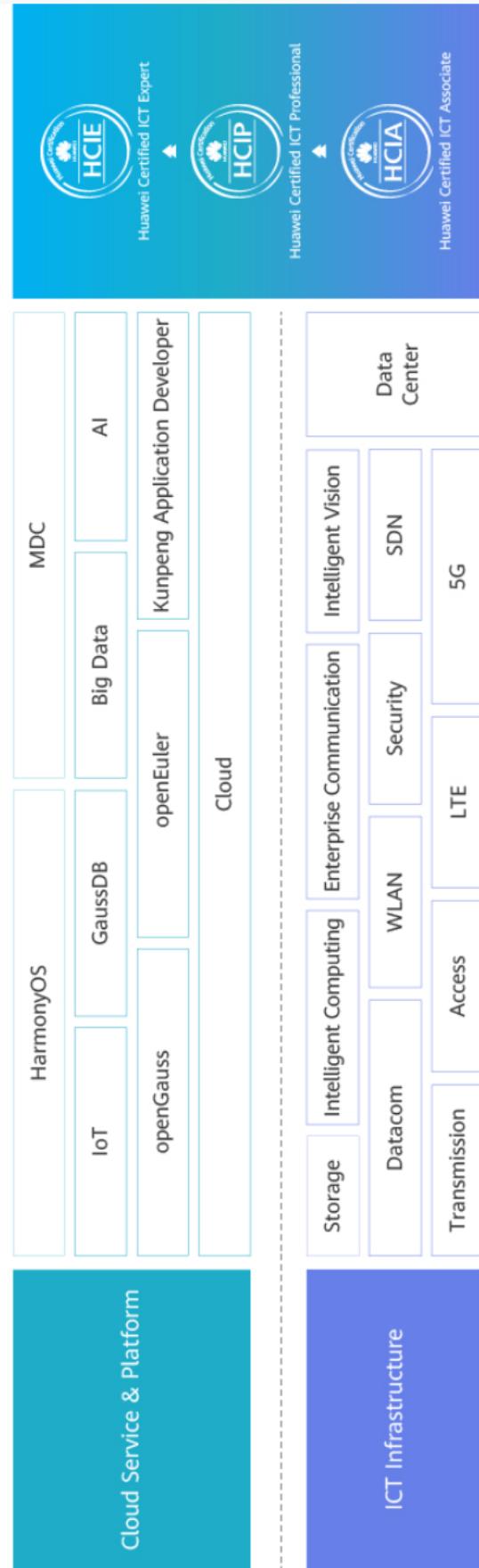
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# 1

# References and Tools

Commands and documents listed in this document are for reference only. The actual commands and documents may vary with product versions.

## 1.1 References

Huawei OceagggnStor Dorado all-flash series product documentation

 **NOTE**

Log in to the Huawei technical support website (<https://support.huawei.com/enterprise/en/index.html>) and type the name of a documentation or tool in the search box to search for, browse and download the desired documentation or tool.

## 1.2 Software Tools

PuTTY

 **NOTE**

You are advised to use the open-source software PuTTY to log in to a terminal. You can use the common domain name (putty.org) of PuTTY to browse or download the desired document or tool.

## 1.3 Version Description

The recommended platforms and software versions in the practice tasks are as follows.

Name	Version	Quantity	Remarks
OceanStor Dorado V6	6.1.3	1	Recommended version
Windows OS	Windows Server 2012 or Windows Server 2016	--	Recommended version

Name	Version	Quantity	Remarks
Linux OS	SUSE, Red Hat, CentOS, or EulerOS	--	Recommended version

# 2

# Scenario-based Practice of SmartQoS

## 2.1 Course Overview

This course provides case study and scenario-based practices to help trainees consolidate their knowledge on the use of SmartQoS. SmartQoS is a common advanced storage technology. Before using SmartQoS, you are advised to learn how to configure basic storage services.

## 2.2 Objectives

- To know the application scenarios of SmartQoS
- To be able to configure SmartQoS

## 2.3 Case Background

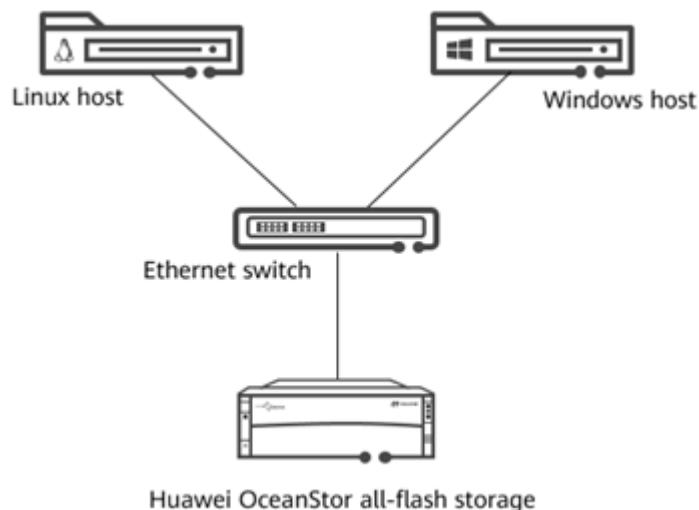
### NOTE

Cases in this document are examples only. The actual configuration may vary according to actual environments. For details, see the corresponding product documentation. The names of storage pools and LUNs involved in this document can be customized (for example, LUN \_XXX) for different trainees if they use the same device.

A company uses a Huawei OceanStor all-flash storage device to run services. Multiple LUNs have been created to support different services. LUN\_0 mapped to a Linux host carries critical services, and LUN\_1 and LUN\_2 mapped to a Windows host carry non-critical services. To ensure that LUN\_0 can obtain storage resources preferentially, the company purchases SmartQoS. Help storage engineers get familiar with operations related to this feature.

The following figure shows the live network topology of the enterprise.

**Figure 1-1 Network topology**



## 2.4 Tasks and Suggested Answers

### 2.4.1 Scenario-based Practice: SmartQoS Hands-on Practice

#### 2.4.1.1 Background

A 5 GB LUN named **LUN\_SOUR** has been created and mapped to a host. A file system has been created for **LUN\_SOUR** on the host and has been mounted. A text file **A.txt** containing characters has been written to **LUN\_SOUR**.

SmartQoS is configured to accurately limit the performance of applications and prevent non-critical applications from contending for too many storage resources.

#### 2.4.1.2 Question

How do we set metrics (bandwidth and IOPS) to implement traffic control?

#### 2.4.1.3 Task 1: Configuring SmartQoS

Help the engineer configure SmartQoS.

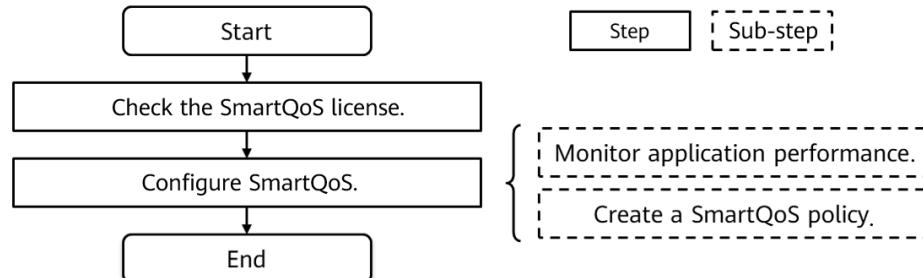
Step 1 Draw a configuration flowchart.

Demonstrate how to configure SmartQoS.

[Suggested Procedure]

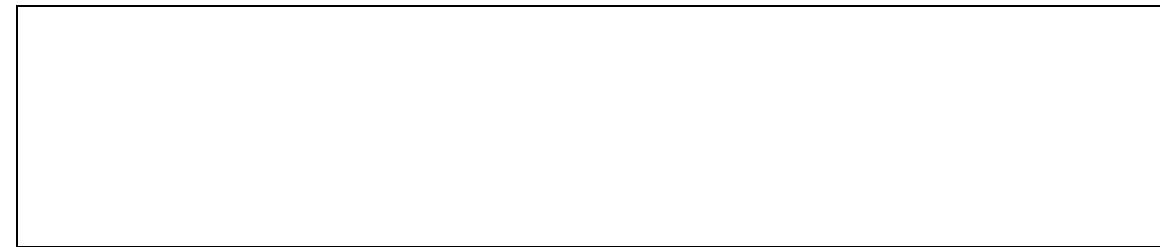
For details about how to draw a flowchart, see **Configure > SmartQoS Feature Guide > Configuring and Managing SmartQoS (System User) > Configuring SmartQoS > Configuration Process** in the product documentation.

[Suggested Answer]



Step 2 View license information.

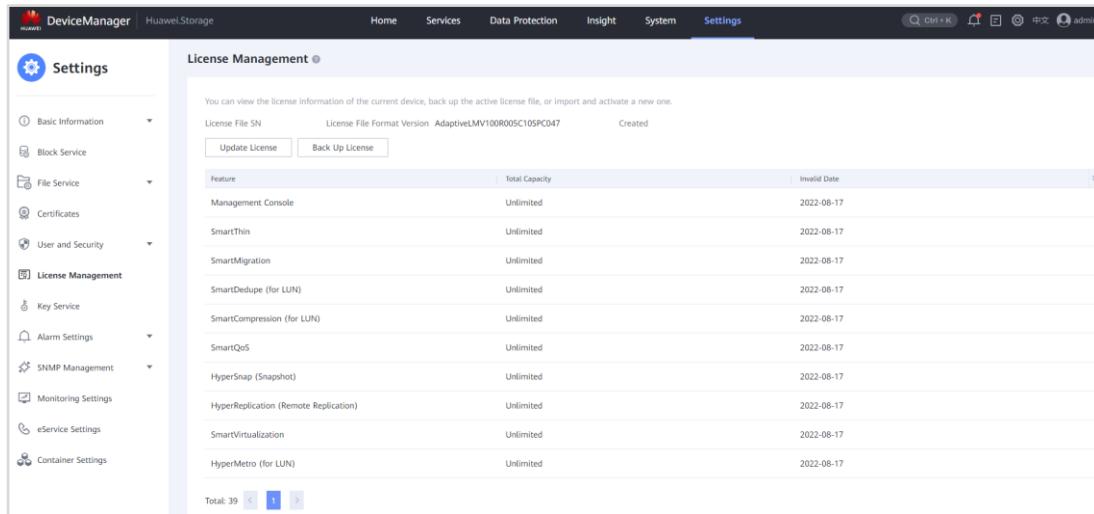
Before configuring SmartQoS, ensure that the permission for using SmartQoS has been granted. Help the engineer check SmartQoS license information.



[Suggested Procedure]

For details about operations on DeviceManager, see **Configure > SmartQoS Feature Guide > Configuring and Managing SmartQoS (System User) > Configuring SmartQoS > Checking the SmartQoS License** in the product documentation.

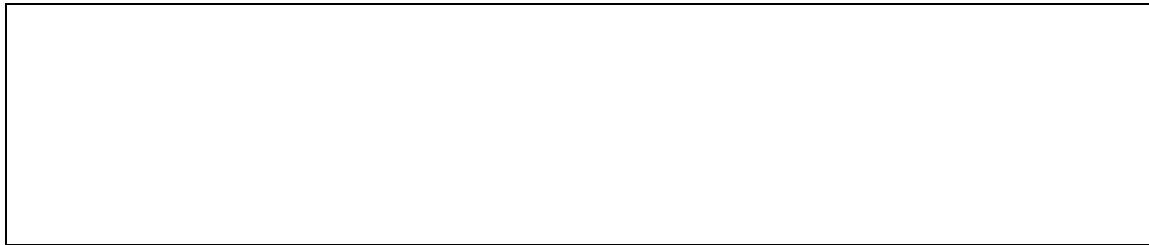
1. Log in to DeviceManager.
2. Choose **Settings > License Management**.
3. In the middle information pane, view the information of the active license file.



The screenshot shows the 'License Management' page in DeviceManager. The left sidebar has a 'Settings' icon and a tree view with nodes like 'Basic Information', 'Block Service', 'File Service', 'Certificates', 'User and Security', 'License Management' (which is expanded), 'Key Service', 'Alarm Settings', 'SNMP Management', 'Monitoring Settings', 'eService Settings', and 'Container Settings'. The main area has a title 'License Management' with a help icon. It displays the license file information: License File SN, License File Format Version (AdaptiveLMV100R005C10SPC047), and Created date (2022-08-17). Below this are two buttons: 'Update License' and 'Back Up License'. A table lists various features with their total capacity and invalid date. The features listed are: Management Console (Unlimited, 2022-08-17), SmartThin (Unlimited, 2022-08-17), SmartMigration (Unlimited, 2022-08-17), SmartDedupe (for LUN) (Unlimited, 2022-08-17), SmartCompression (for LUN) (Unlimited, 2022-08-17), SmartQoS (Unlimited, 2022-08-17), HyperSnap (Snapshot) (Unlimited, 2022-08-17), HyperReplication (Remote Replication) (Unlimited, 2022-08-17), SmartVirtualization (Unlimited, 2022-08-17), and HyperMetro (for LUN) (Unlimited, 2022-08-17). At the bottom, it says 'Total: 39' with navigation icons.

### Step 3 Monitor service performance.

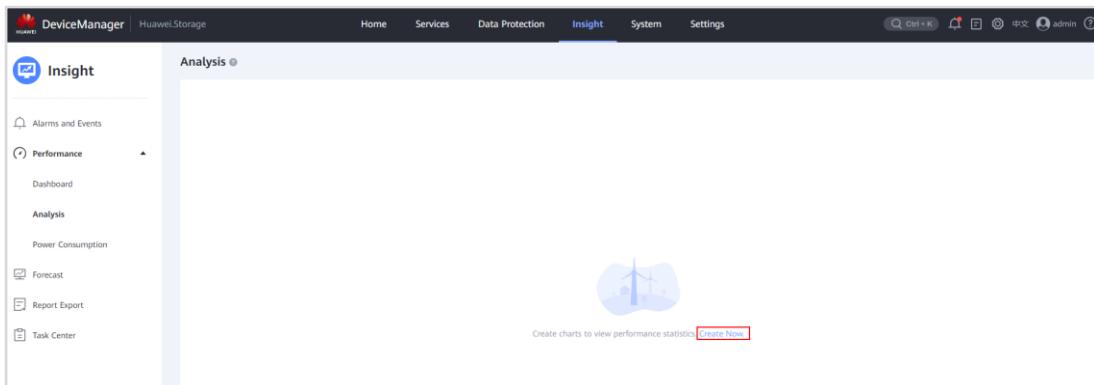
Obtain the I/O characteristics of LUNs by using the service monitoring function of storage systems and use these characteristics as a basis of SmartQoS policies. View the total IOPS of LUNs.



#### [Suggested Procedure]

For details about operations on DeviceManager, see **Configure > SmartQoS Feature Guide > Configuring and Managing SmartQoS (System User) > Configuring SmartQoS > Monitoring Application Performance** in the product documentation.

1. Choose Insight > Performance > Analysis.
2. Click Create Now.



The screenshot shows the 'Analysis' page in DeviceManager under the 'Insight' tab. The left sidebar has an 'Insight' icon and a tree view with nodes like 'Alarms and Events', 'Performance' (which is expanded), 'Dashboard', 'Analysis', 'Power Consumption', 'Forecast', 'Report Export', and 'Task Center'. The main area has a title 'Analysis' with a help icon. It features a large central area with a windmill icon and the text 'Create charts to view performance statistic'. Below this is a red-bordered button labeled 'Create Now'.

3. Enter the chart name (for example, Monitor).

4. Set the chart analysis period to Last 30 min.
5. Set the values displayed in the chart, that is, the average values of a statistical metric within a statistical period.
6. In the Monitored Object area, add a monitored object. Set Object Type to LUN, and select Top 10 and Avg. I/O Response Time.
7. In the Statistical Metric area, set the statistical metric to be monitored to IOPS (IO/s).
8. In Chart Display Mode, set the display mode of the performance metric.
9. Click **OK**. The system starts monitoring object performance.

**Create Chart** ?

**Basic Information**

\* Chart Name

\* Period  ▾

Data Value Avg

**Monitored Object**

\* Object Type  ▾

▾  ▾

**Statistical Metric**

\* Statistical Metric

[More ▶](#)

**Chart Display Mode**

One metric for multiple objects

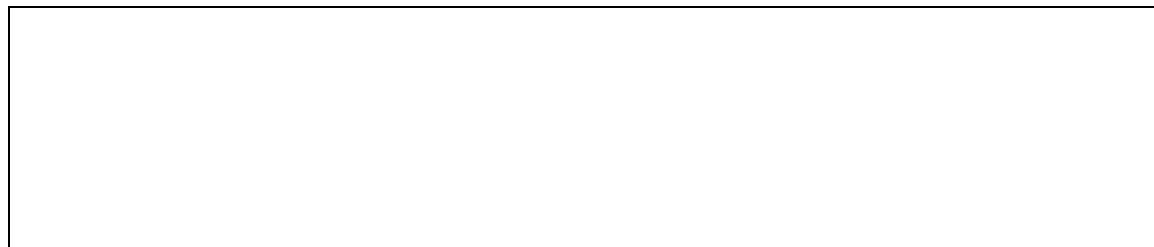
### [Reference Result]

The IOPS curve is displayed in the monitoring chart when LUNs are read and written.



#### Step 4 Create a SmartQoS policy.

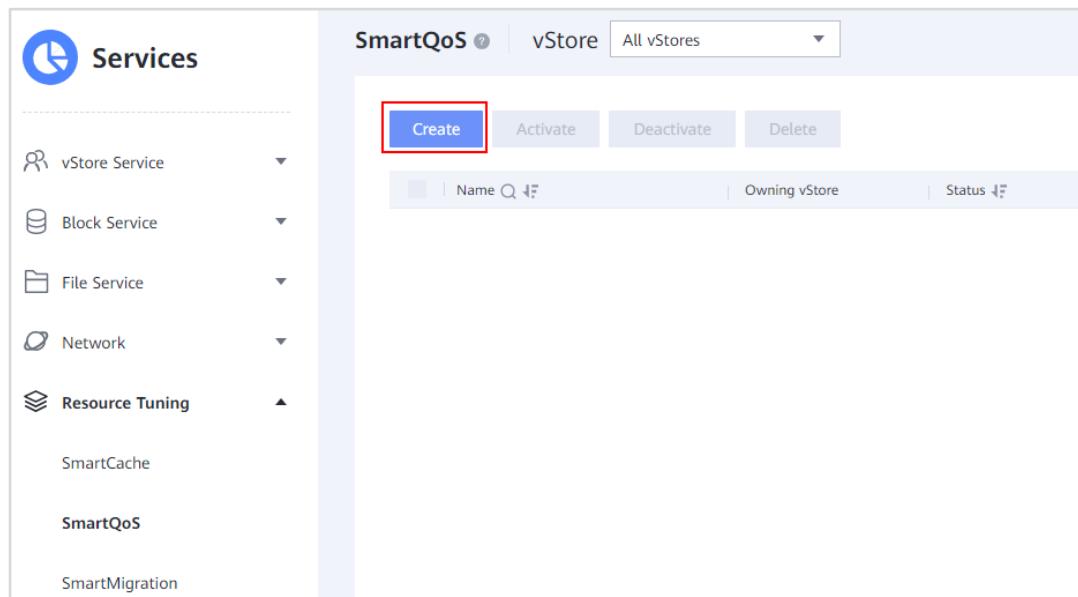
After analyzing the performance monitoring data, the engineer concludes that the IOPS of **LUN\_1** should be within 200. Help the engineer configure SmartQoS policy **Policy01** to set the maximum IOPS to 200.



##### [Suggested Procedure]

For details about operations on DeviceManager, see **Configure > SmartQoS Feature Guide > Configuring and Managing SmartQoS (System User) > Configuring SmartQoS > Creating a SmartQoS Policy** in the product documentation.

1. Choose Services > Resource Tuning > SmartQoS.
2. Select the vStore to which the desired objects belong from the **vStore** drop-down list in the upper left corner.



The screenshot shows the DeviceManager interface with the following details:

- Services** sidebar: vStore Service, Block Service, File Service, Network, Resource Tuning (selected), SmartCache, SmartQoS, SmartMigration.
- SmartQoS** section:
  - vStore dropdown: All vStores.
  - Action buttons: Create (highlighted with a red box), Activate, Deactivate, Delete.
  - Table headers: Name, Owning vStore, Status.

3. Click **Create**. The **Create SmartQoS Policy** page is displayed on the right.

4. In the **Name** text box, enter the SmartQoS policy name (for example, **Policy01**).
5. In **Owning vStore**, select a vStore to which the control objects belong to system built-in tenant **System\_vStore**.
6. Set **Type** to **Common**.
7. Specify **Description** to facilitate management.

**Create SmartQoS Policy** ?

1 Configure QoS      2 Specify Object      3 Confirm

**Basic Information**

* Name	Policy01
* Owning vStore	System_vStore
* Type	Common
Description	0 to 255 characters

8. Set the control objective.
  - In the **Bandwidth (MB/s)** area, set **Min.** to **1**, **Max.** to **50**, and **Burst** to **60**.
  - In the **Normalized IOPS (8 KB)** area, set **Min.** to **100**, **Max.** to **200**, and **Burst** to **300**, and **Max. Burst Duration** to **60**.
  - In the **Normalized Latency (8 KB)** area, set **Max.** to **0.5 ms**.

Control Objective						
Bandwidth (MB/s)						
Min.	1					
Max.	50					
Burst	60					
Normalized IOPS (8 KB)						
I/O Size	8 KB (normalized)	16 KB	32 KB	64 KB	128 KB	<a href="#">More</a>
Min.	100	50	25	20	10	
Max.	200	100	50	40	20	
Burst	300	150	75	60	30	
Max. Burst Duration	60	seconds				
Normalized Latency (8 KB)						
I/O Size	8 KB (normalized)	16 KB	32 KB	64 KB	128 KB	<a href="#">More</a>
Max.	0.5 ms	1 ms	2 ms	2.5 ms	5 ms	

9. Click **Advanced** and set the triggering policy for the SmartQoS policy.

- Set **Execution Period** to **Weekly**.
- Set **Start Date** to the date when the experiment is conducted, and select all the days in a week.
- Set **Start Time** to **00:00**.
- Set **Duration** to **24 hours**.

Advanced ▾						
* Execution Period	<input type="radio"/> One-off	<input checked="" type="radio"/> Weekly	<input type="radio"/> Daily			
* Start Date	<input type="text"/>  <input checked="" type="checkbox"/> Sun <input checked="" type="checkbox"/> Mon <input checked="" type="checkbox"/> Tue <input checked="" type="checkbox"/> Wed <input checked="" type="checkbox"/> Thu <input checked="" type="checkbox"/> Fri <input checked="" type="checkbox"/> Sat					
* Start Time	<input type="text"/> 00 : 00					
* Duration	24	hours	0	minutes		
End Time	00:00 next day					

10. Click Next.

11. Select control object LUN\_SOURCE.

Create SmartQoS Policy ?

1 Configure QoS      2 Specify Object      3 Confirm

Object Type  LUN  LUN group  File system

Available Objects

Name
LUN_SOUR

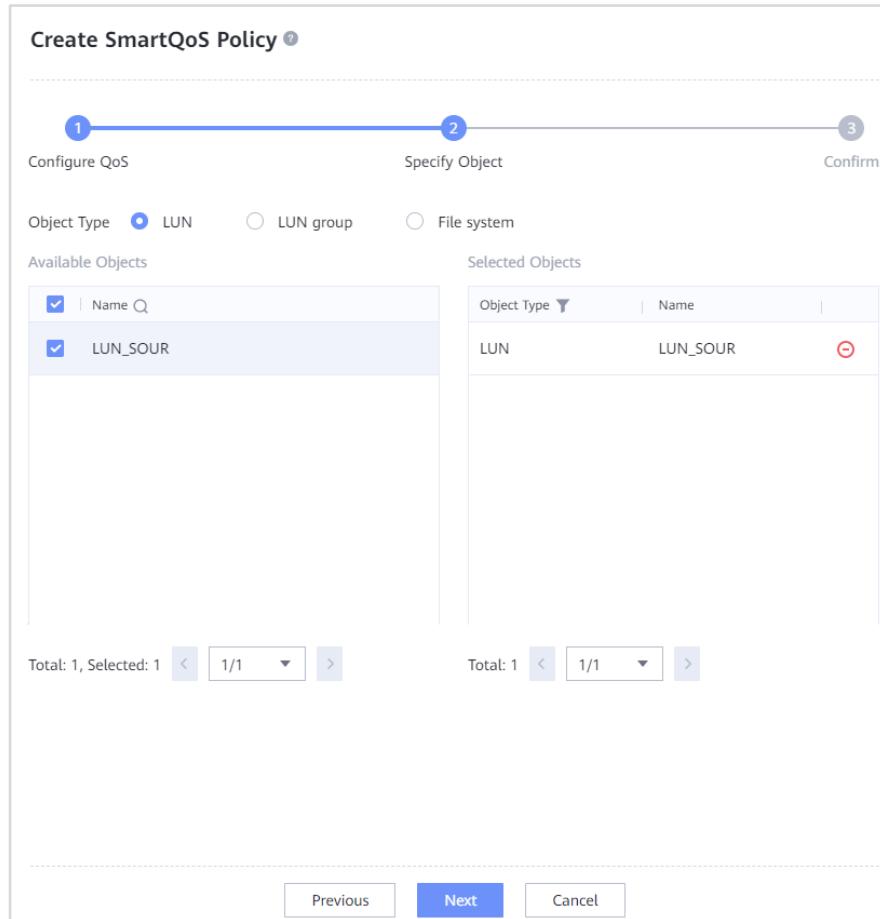
Total: 1, Selected: 1 < 1/1 >

Selected Objects

Object Type	Name
LUN	LUN_SOUR

Total: 1 < 1/1 >

Previous Next Cancel



12. Click Next.

13. Confirm the SmartQoS policy information, select Activate Now, and click OK.

**Create SmartQoS Policy** 

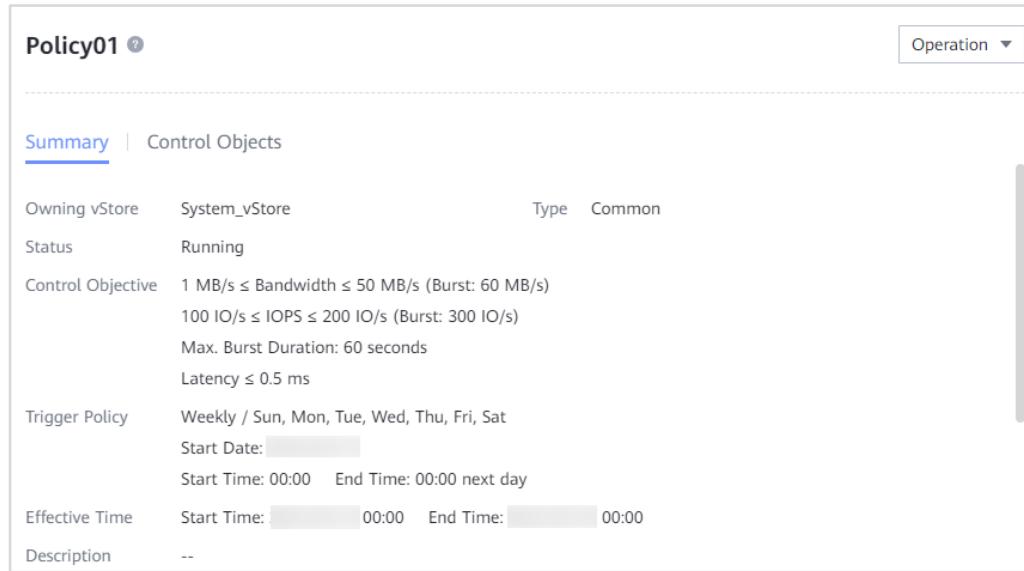
1 Configure QoS      2 Specify Object      3 Confirm

Name	Policy01
Type	Common
Control Objective	1 MB/s ≤ Bandwidth ≤ 50 MB/s (Burst: 60 MB/s) 100 IO/s ≤ IOPS ≤ 200 IO/s (Burst: 300 IO/s) Max. Burst Duration: 60 seconds Latency ≤ 0.5 ms
Trigger Policy	Weekly / Sun, Mon, Tue, Wed, Thu, Fri, Sat Start Date: <input type="text"/> Start Time: 00:00 End Time: 00:00 next day
Applied LUNs	1 

Activate Now

14. The confirmation result is as follows:

The SmartQoS policy is created successfully. You can view the summary information about the SmartQoS policy on DeviceManager.



The screenshot shows the 'Policy01' configuration page in DeviceManager. The 'Summary' tab is selected, displaying the following details:

Owning vStore	System_vStore	Type	Common
Status	Running		
Control Objective	1 MB/s ≤ Bandwidth ≤ 50 MB/s (Burst: 60 MB/s) 100 IO/s ≤ IOPS ≤ 200 IO/s (Burst: 300 IO/s) Max. Burst Duration: 60 seconds Latency ≤ 0.5 ms		
Trigger Policy	Weekly / Sun, Mon, Tue, Wed, Thu, Fri, Sat Start Date: Start Time: 00:00 End Time: 00:00 next day		
Effective Time	Start Time: 00:00 End Time: 00:00		
Description	--		

#### 2.4.1.4 Question

Why can the SmartQoS policy be adjusted based on the performance data of LUNs?

#### 2.4.1.5 Task 2: Managing SmartQoS

After configuring SmartQoS, the engineer needs to manage SmartQoS to adjust data flows, thereby properly allocating storage resources. Explain to the engineer how to manage SmartQoS.

Step 1 Add an object.

On DeviceManager, you can add new objects to the SmartQoS policy as required. Add object **LUN\_1** to **Policy01**.

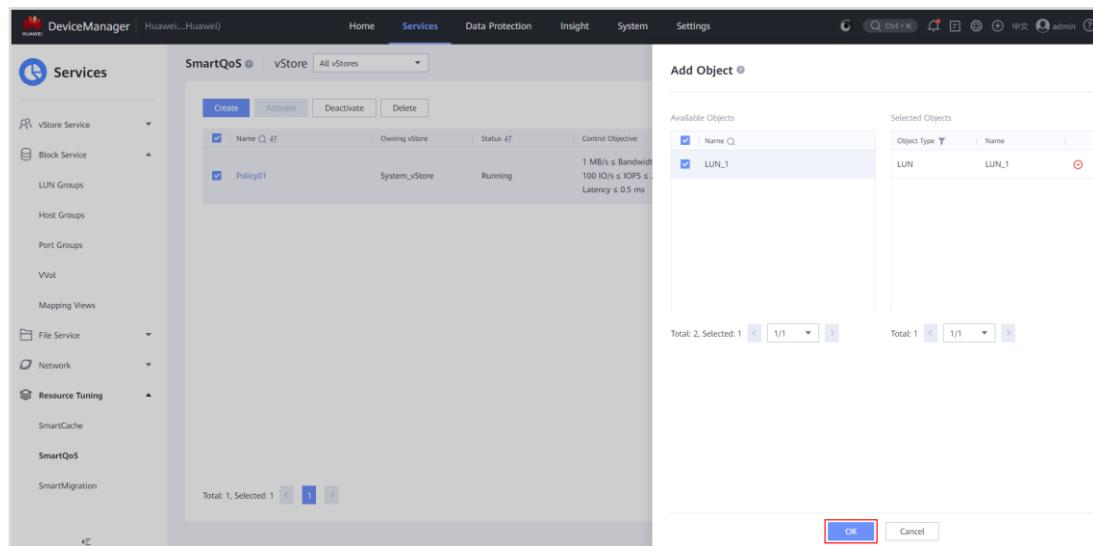


[Suggested Procedure]

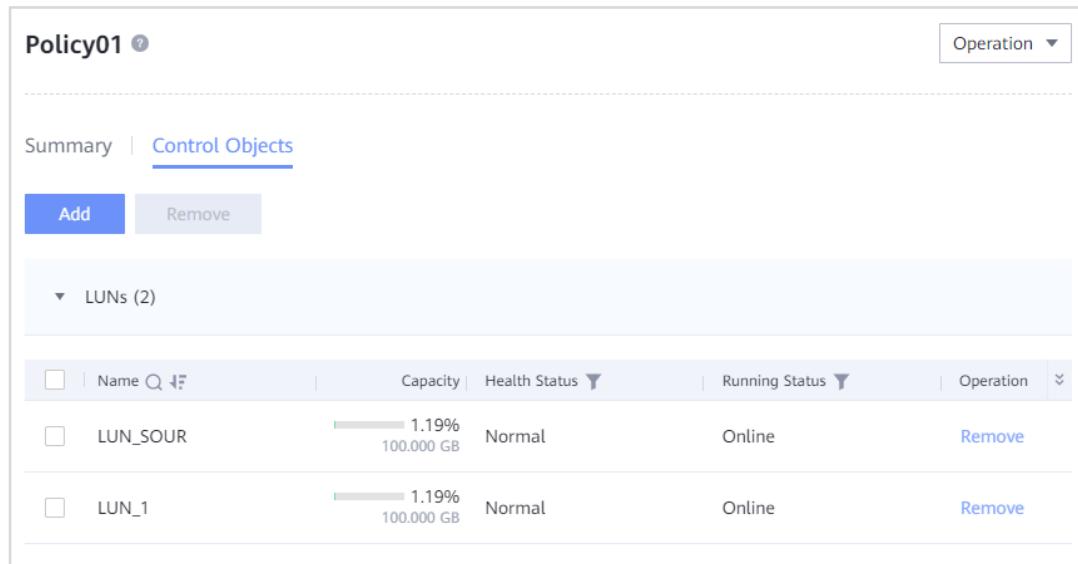
For details about operations on DeviceManager, see **Configure > SmartQoS Feature Guide > Configuring and Managing SmartQoS (System User) > Managing SmartQoS > Adding a Control Object** in the product documentation.

1. Choose Services > Resource Tuning > SmartQoS.
2. Select the vStore to which the desired SmartQoS policy belongs from the vStore drop-down list in the upper left corner.

3. Click More on the right of the desired SmartQoS policy and select Add Object.
4. Select object LUN\_1. It is automatically added to the right list.
5. Click OK.



6. The object is added successfully. You can view **LUN\_SOUR** and **LUN\_1** in the control objects of **Policy01** on DeviceManager.



Name	Capacity	Health Status	Running Status	Operation
LUN_SOUR	100.000 GB	Normal	Online	<a href="#">Remove</a>
LUN_1	100.000 GB	Normal	Online	<a href="#">Remove</a>

## Step 2 Remove an object.

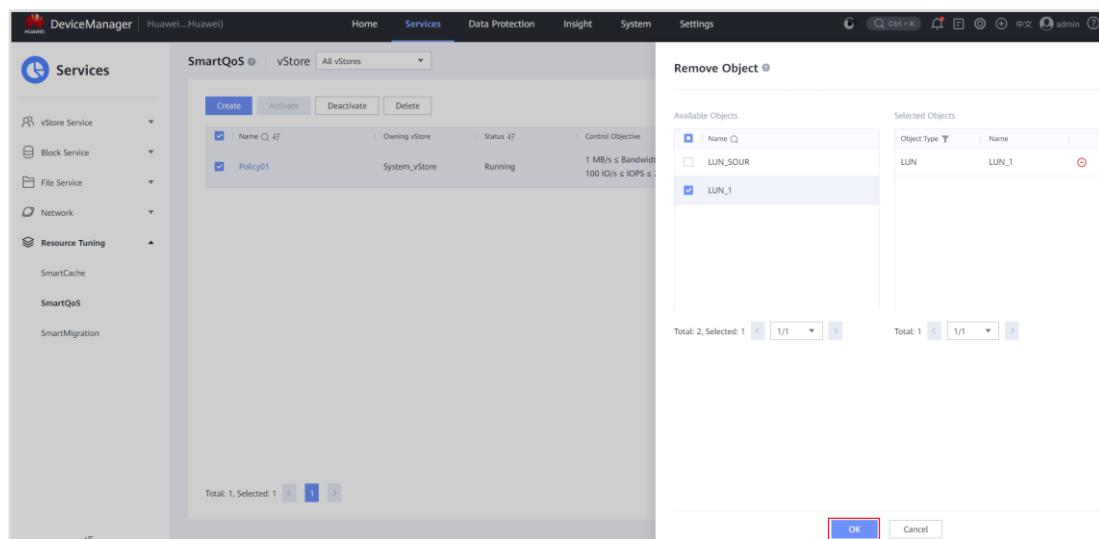
On DeviceManager, you can remove objects from a SmartQoS policy as required. Remove object **LUN\_1** from **Policy01**.



### [Suggested Procedure]

For details about operations on DeviceManager, see **Configure > SmartQoS Feature Guide > Configuring and Managing SmartQoS (System User) > Managing SmartQoS > Removing a Control Object** in the product documentation.

1. Choose Services > Resource Tuning > SmartQoS.
2. Select the vStore to which the desired SmartQoS policy belongs from the vStore drop-down list in the upper left corner.
3. Click More on the right of the desired SmartQoS policy and select Remove Object.
4. Select object LUN\_1.
5. Click OK.



### Step 3 Activate and deactivate a SmartQoS policy.

A SmartQoS policy can take effect according to its triggering policy after it is activated. In a storage system where only one type of applications is available or all LUNs or LUN groups need the same amount of resources, you can deactivate SmartQoS policies because adjusting and controlling performance of I/O classes is unnecessary. Help the engineer get familiar with the activation and deactivation of **Policy01**.



### [Suggested Procedure]

For details about operations on DeviceManager, see **Configure > SmartQoS Feature Guide > Configuring and Managing SmartQoS (System User) > Managing SmartQoS > Activating a SmartQoS Policy and Deactivating a SmartQoS Policy** in the product documentation.

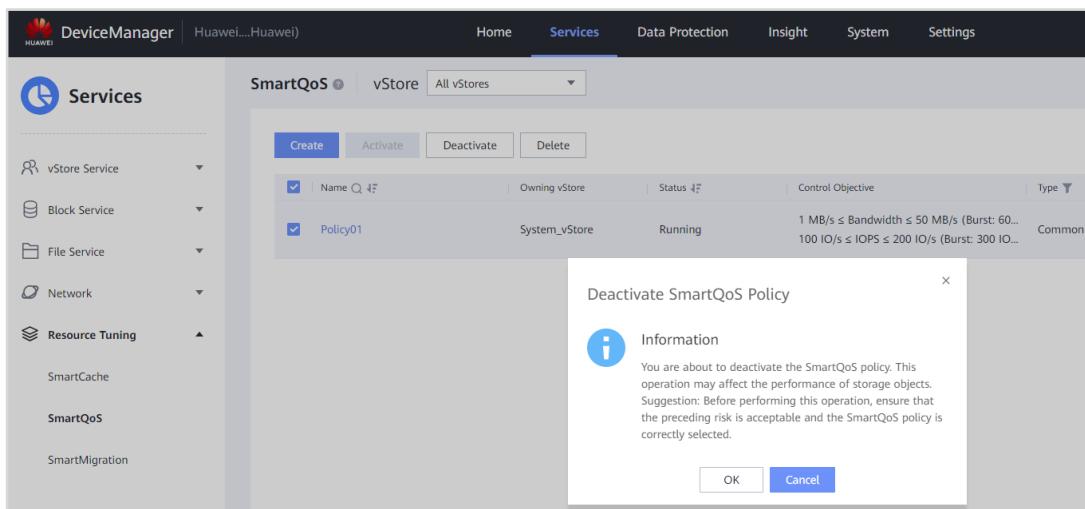
To activate a SmartQoS policy, perform the following steps:

1. Choose Services > Resource Tuning > SmartQoS.
2. Select the vStore to which the desired SmartQoS policy belongs from the vStore drop-down list in the upper left corner.
3. Click More on the right of the desired SmartQoS policy and select Activate.
4. Confirm your operation as prompted.

The screenshot shows the DeviceManager interface with the 'Services' tab selected. On the left, there's a sidebar with 'Services' and 'Resource Tuning' sections. Under 'Resource Tuning', 'SmartQoS' is listed. In the main area, a table lists a single policy named 'Policy01'. To the right of the table, a modal dialog box titled 'Activate SmartQoS Policy' contains an 'Information' section with a warning message about activating the policy and its potential impact on storage objects. It also includes 'OK' and 'Cancel' buttons.

To deactivate a SmartQoS policy, perform the following steps:

1. Choose Services > Resource Tuning > SmartQoS.
2. Select the vStore to which the desired SmartQoS policy belongs from the vStore drop-down list in the upper left corner.
3. Click More on the right of the desired SmartQoS policy and select Deactivate.
4. Confirm your operation as prompted.



The screenshot shows the DeviceManager interface with the 'Services' tab selected. In the 'SmartQoS' section, there is a table with one row for 'Policy01'. A modal dialog titled 'Deactivate SmartQoS Policy' is displayed, containing an information message about the potential impact of deactivation and a suggestion to ensure risk is acceptable. Buttons for 'OK' and 'Cancel' are at the bottom of the modal.

#### Step 4 Modify a SmartQoS policy.

In off-peak hours, the engineer considers that the IOPS limit for non-critical services can be adjusted to 300. Help the engineer change the maximum IOPS limit to 300 for **Policy01**.

##### [Suggested Procedure]

For details about operations on DeviceManager, see **Configure > SmartQoS Feature Guide > Configuring and Managing SmartQoS (System User) > Managing SmartQoS > Modifying a SmartQoS Policy** in the product documentation.

1. Choose Services > Resource Tuning > SmartQoS.
2. Select the vStore to which the desired SmartQoS policy belongs from the vStore drop-down list in the upper left corner.
3. Click More on the right of the desired SmartQoS policy and select Modify.
4. Change Name of the SmartQoS policy to Policy02.
5. Modify Description of the SmartQoS policy.

### Modify SmartQoS Policy

#### Basic Information

\* Name

\* Type Common

Description

6. Modify the control objective. In the **Bandwidth (MB/s)** area, change **Min.** to **10**.

### Modify SmartQoS Policy

#### Control Objective

Bandwidth (MB/s)

Min.

Max.

Burst

7. Click **Advanced** and modify the triggering policy for the SmartQoS policy. Deselect **Sun** and **Sat** from **Start Date**.

8. Click **OK**.

#### Advanced

\* Execution Period  One-off  Weekly  Daily

\* Start Date



Sun  Mon  Tue  Wed  Thu  Fri  Sat

\* Start Time

\* Duration  hours  minutes

End Time 00:00 next day

### Step 5 Delete a SmartQoS policy.

As the company develops, critical services are migrated to other storage devices and do not need to compete for resources with non-critical services. Therefore,

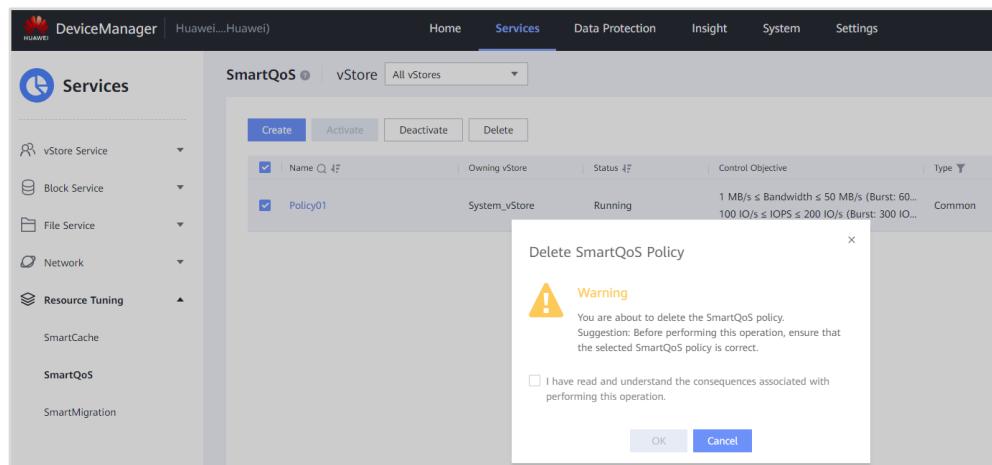
the original SmartQoS policy can be deleted. Help the engineer delete SmartQoS policy **Policy01**.



#### [Suggested Procedure]

For details about operations on DeviceManager, see **Configure > SmartQoS Feature Guide > Configuring and Managing SmartQoS (System User) > Managing SmartQoS > Deleting a SmartQoS Policy** in the product documentation.

1. Choose Services > Resource Tuning > SmartQoS.
2. Select the vStore to which the desired SmartQoS policy belongs from the **vStore** drop-down list in the upper left corner.
3. Select SmartQoS policy **Policy01** and click **Delete**.
4. Confirm your operation as prompted.



#### 2.4.1.6 Discussion

In a storage system, what are the performance metrics and their applicable scenarios?

## 2.5 Summary and Conclusion

My Opinion:

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Huawei Storage Certification Training

# HCIA-Storage

## Scenario-based Practice of Storage O&M Management

(For Trainees)

Issue: 5.0



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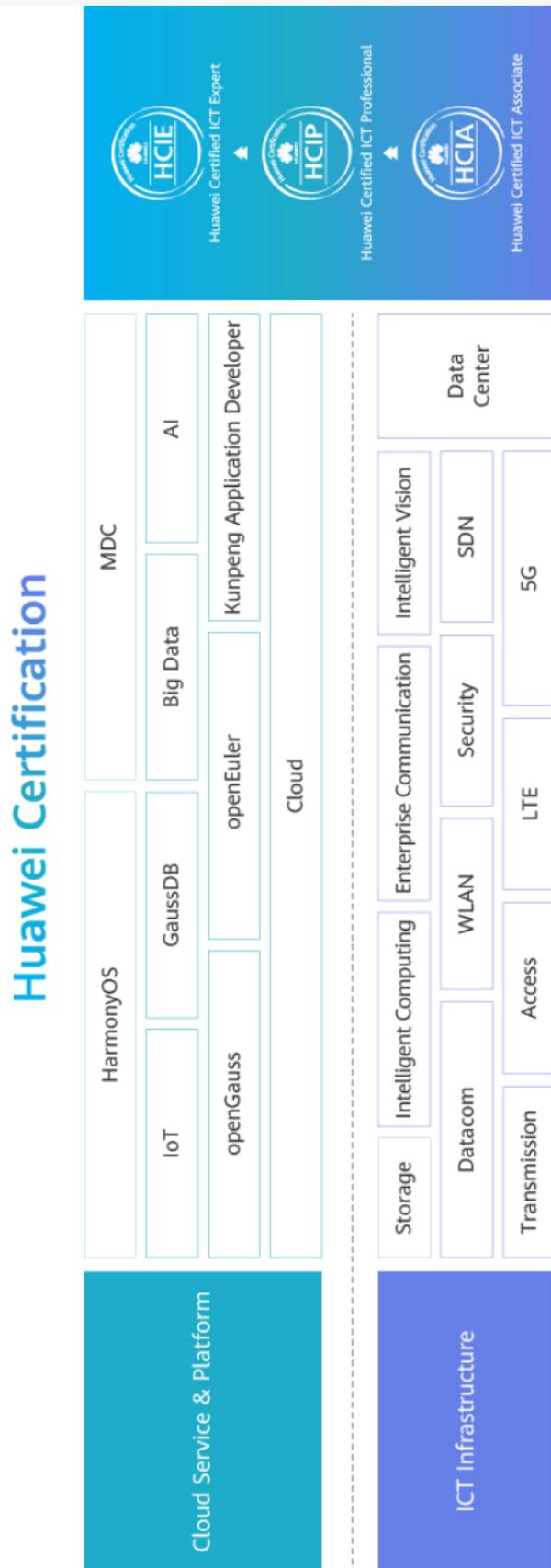
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The HCIA-Storage certificate system introduces you to the industry and market, helps you in innovation, and enables you to stand atop the storage frontiers.

## Huawei Certification



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# 1

# References and Tools

---

Commands and documents listed in this document are for reference only. The actual commands and documents may vary with product versions.

## 1.1 References

1. Huawei OceanStor Dorado all-flash series product documentation



You can log in to Huawei's technical support website (<https://support.huawei.com/enterprise/en/index.html>) and type the name of a document or tool in the search box to browse and download the desired document or tool.

2. Huawei SmartKit product documentation



You can log in to Huawei's technical support website (<https://support.huawei.com/enterprise/en/index.html>) and type the name of a document or tool in the search box to browse and download the desired document or tool.

## 1.2 Software Tools

1. PuTTY



You are advised to use the open-source software PuTTY to log in to a terminal. You can use the common domain name (putty.org) of PuTTY to browse or download the desired document or tool.

2. SmartKit



You can log in to Huawei's technical support website (<https://support.huawei.com/enterprise/en/index.html>) and input the name of a document or tool in the search box to search for, browse, and download the desired document or tool.

## 1.3 Version Description

The recommended platform and software versions in the practice tasks are as follows:

Name	Version	Quantity	Remarks
OceanStor Dorado V6	6.1.3	1	Recommended version
SmartKit software	SmartKit 22.0	--	This version or later is recommended.
Windows operating system (OS)	Windows Server 2012 and Windows Server 2016	--	Recommended version
Linux OS	SUSE, RHEL, CentOS, and EulerOS	--	Recommended version

# 2

## Scenario-based Practice of Storage O&M Management

---

### 2.1 Course Overview

Based on the previous study, this course provides case studies and scenario-based practices to help trainees consolidate their knowledge and capabilities on storage device O&M management.

### 2.2 Objectives

- To use DeviceManager to check devices and collect logs.
- To use CLI commands to query basic information about device components and resource pools.
- To use SmartKit to inspect devices and collect logs.

### 2.3 Case Background



#### Note:

Cases in this document are for reference only and actual configurations may vary according to the actual environment. For details, see the corresponding product documentation. If multiple trainees use the same device, the trainer can ask trainees to customize the names of storage pools and LUNs involved in this practice, for example, LUN\_XXX (XXX is the custom name).

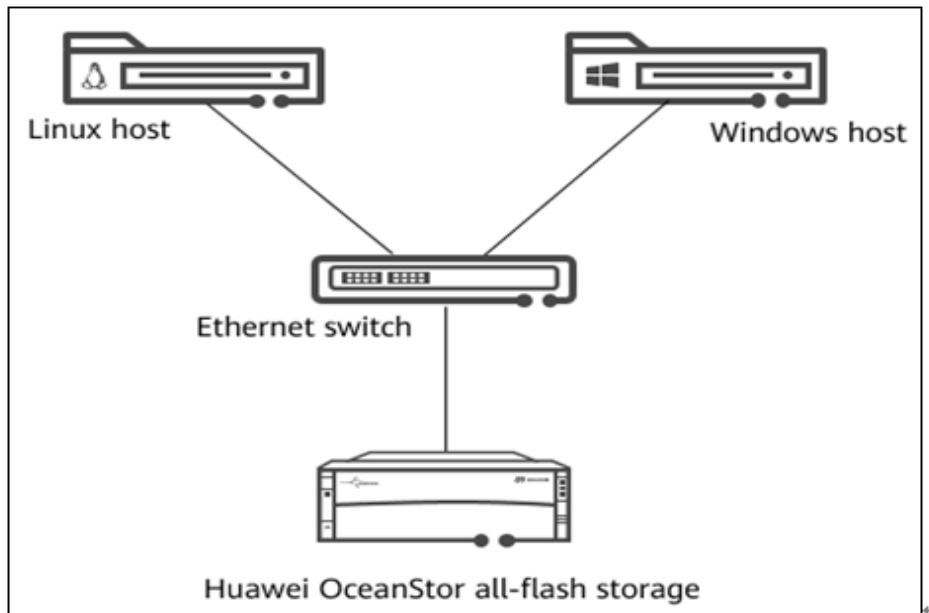
An enterprise or company has completed the acceptance of project X, where multiple Huawei OceanStor all-flash storage devices (such as Huawei OceanStor Dorado V6) are added to the data center, and devices have been installed and services have been deployed.

Routine maintenance and management are required to ensure the normal running of devices and the stability and reliability of services.

If you are the administrator who is responsible for the management and maintenance of related devices, how do you perform routine inspection?

The following figure shows the topology of the enterprise:

**Figure 2-1 Network topology**



## 2.4 Tasks and Suggested Answers

### 2.4.1 Scenario 1: Checking the Device Status

#### 2.4.1.1 Background

O&M engineers need to periodically inspect storage devices based on the plan, for example, checking whether alarms are generated and the condition of resource usage, to learn about the running status of devices in time. Once a fault occurs on a device, the fault can be detected and rectified as soon as possible to ensure service security and reliability.

If you are an engineer, how will you perform the inspection?

#### 2.4.1.2 Question

What are the routine maintenance items for a storage O&M engineer?

Maintenance Item	Maintenance Operation	
------------------	-----------------------	--

		Daily maintenance item
<b>Maintenance Item</b>	<b>Maintenance Operation</b>	Weekly maintenance item

#### 2.4.1.3 Task 1: Performing O&M Checks on DeviceManager

Step 1 View the device information.

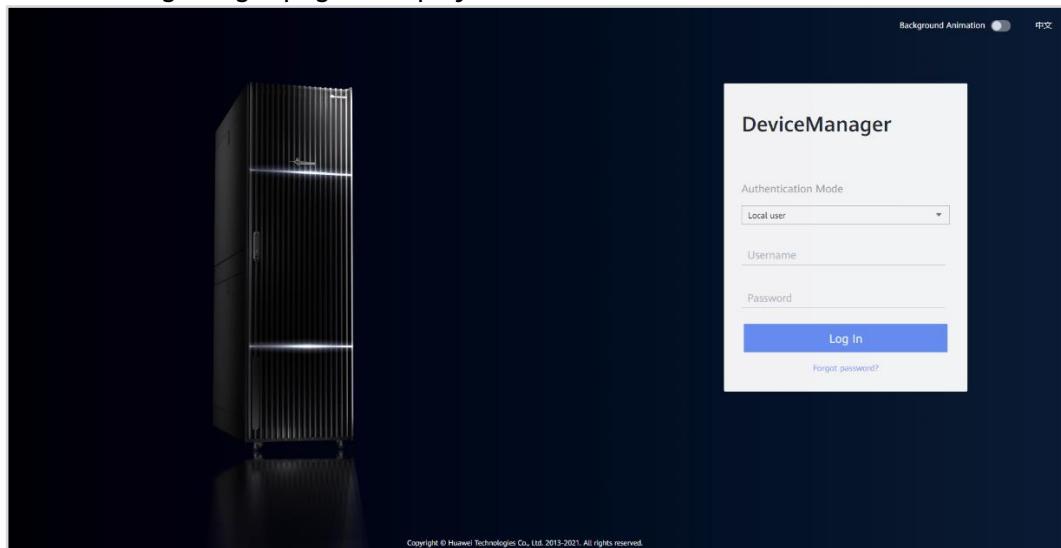
Log in to DeviceManager and view the storage device information, such as the health status, storage version, and equipment serial number (ESN).

[Suggested Procedure]

For details, see **Operation and Maintenance > Administrator Guide > Routine Maintenance > Manual Inspection > Checking the Running Status of the Storage Device** in the desired product documentation.

1. Run a browser on the maintenance terminal.
2. Enter the IP address (**<https://XXX.XXX.XXX.XXX:8088>**) of the management network port on the controller enclosure in the address box and press **Enter**. The

DeviceManager login page is displayed.



3. Check the storage system status on the DeviceManager home page.



## Step 2 View the alarm information.

View the alarm information of storage devices on DeviceManager.



[Suggested Procedure]

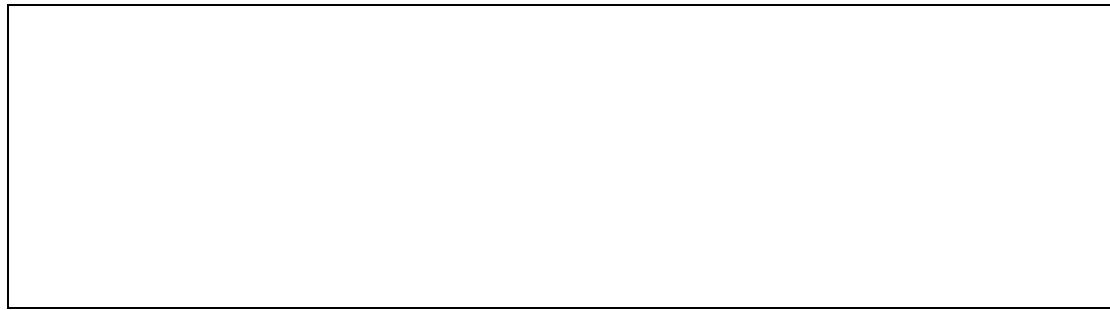
For details, see **Operation and Maintenance > Administrator Guide > Routine Maintenance > Manual Inspection > Viewing and Handling Alarms** in the desired product documentation.

1. Log in to DeviceManager.
2. Choose **Insight > Alarms and Events > Current Alarms**.

Alarms and Events						
Current Alarms		All Events				
		Description			Object	Occurred
Severity	ID	Description	Object	Occurred	Sequence No.	
<span style="color: yellow;">!</span> Warning	0xF3C030002	No backup link is configured for quorum server (ID 0).	Quorum server	44		
<span style="color: yellow;">!</span> Warning	0xF00E00042	No redundant link exists between the local array and remote device (remote device ID 0).	Remote device	39		
<span style="color: orange;">●</span> Major	0xF00060028	The cable between SAS port CTE0.A0.P1 on controller enclosure (SN 6534789a12d459654b11... Port	Port	20		
<span style="color: orange;">●</span> Major	0xF00060028	The cable between SAS port CTE0.B0.P1 on controller enclosure (SN 6534789a12d459654b11...	Port	19		

Step 3 Check the status of devices such as controllers and disks.

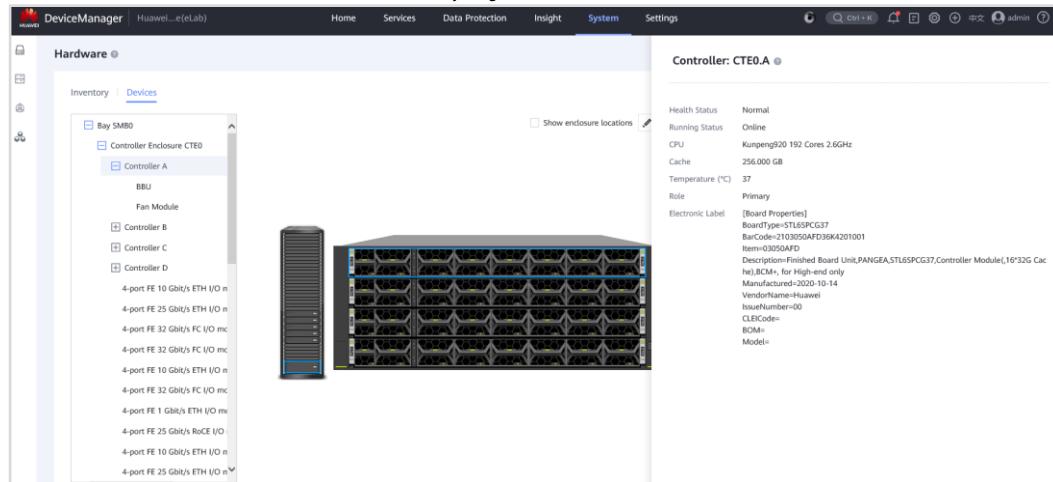
On DeviceManager, view the status of controller enclosures, controllers, disks, and ports.



[Suggested Procedure]

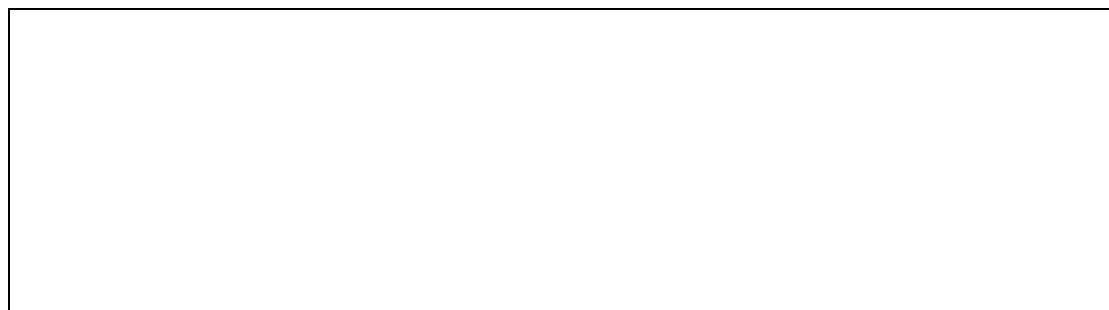
For details, see **Operation and Maintenance > Administrator Guide > Routine Maintenance > Manual Inspection > Checking the Running Status of the Storage Device > Checking the Storage System Inventory** in the desired product documentation.

1. Choose **System > Hardware > Devices**.
2. Click the desired controller enclosure or disk enclosure. The detailed information is displayed.
3. View the enclosure information displayed.



#### Step 4 Check the status of BBUs and fans.

Use DeviceManager to query the status of devices such as BBUs, fans, and power supplies.

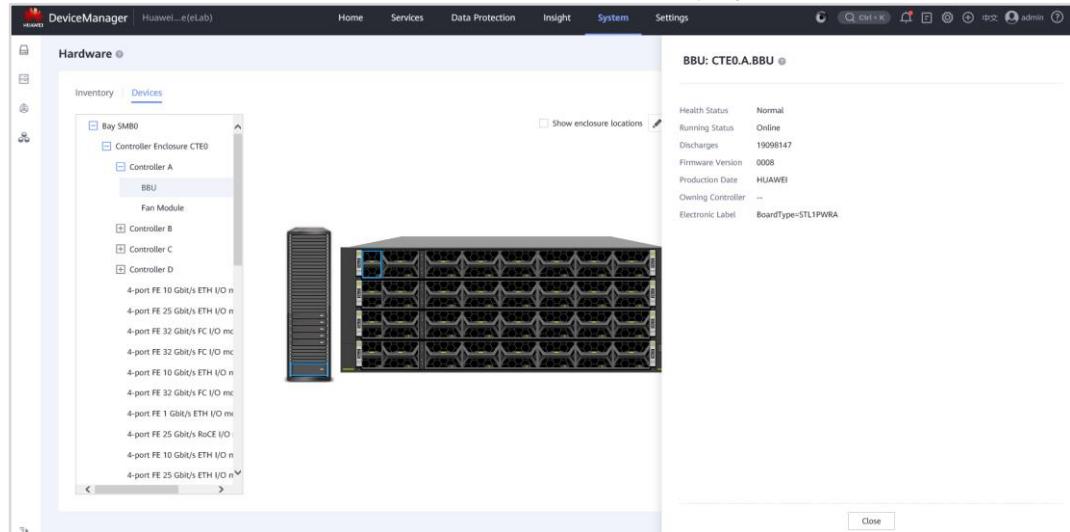


#### [Suggested Procedure]

For details, see **Operation and Maintenance > Administrator Guide > Routine Maintenance > Manual Inspection > Checking the Running Status of the Storage Device > Checking Controller Enclosure BBUs/Checking Fan Modules/Checking Power Modules** in the desired product documentation.

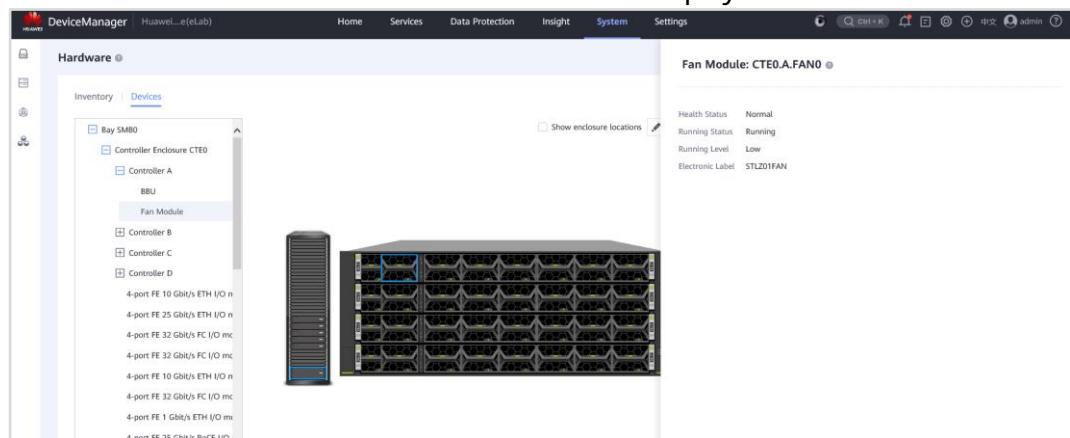
#### Checking the BBU Status

1. Choose **System > Hardware > Devices**.
2. In the navigation tree on the left, select the controller enclosure where the BBU to be checked resides.
3. Click the desired BBU module in the device view.
4. The detailed information about the BBU module is displayed.



### Checking the Fan Status

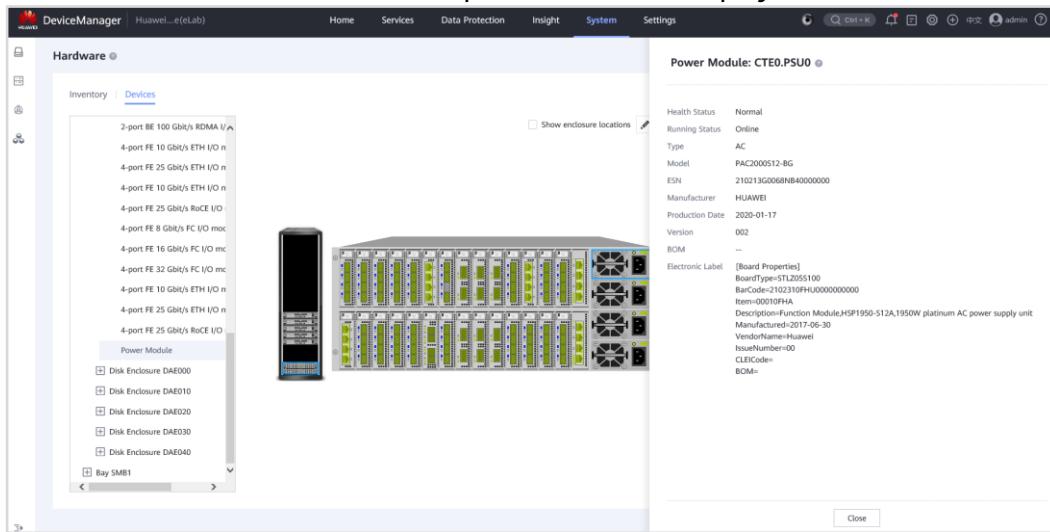
1. Choose **System > Hardware > Devices**.
2. In the navigation tree on the left, select the disk enclosure or controller enclosure where the fan module to be checked resides.
3. Click the desired fan module in the device view.
4. The detailed information about the fan module is displayed.



### Checking the Power Supply Status

1. Choose **System > Hardware > Devices**.
2. In the navigation tree on the left, select the controller enclosure or disk enclosure where the power module to be checked resides.
3. Click the desired power module in the device view.

4. The detailed information about the power module is displayed.



The screenshot shows the DeviceManager interface for a Huawei e(eLab) storage system. The left sidebar shows a tree view of hardware components under 'Hardware'. The 'Devices' tab is selected. A central panel displays a server rack diagram with various drives and modules. On the right, a detailed card for a 'Power Module' is shown, titled 'Power Module: CTE0.PSU0'. The card includes fields for Health Status (Normal), Running Status (Online), Type (AC), Model (PAC2000512-BG), ESN (210213G0068NB40000000), Manufacturer (HUAWEI), Production Date (2020-01-17), Version (002), and BOM (empty). It also lists Electronic Labels with board properties like BoardType=PSU2055100, BarCode=210213G0068NB400000000000, ItemID=20191014, and Description=Function Module,HSP1950-512A,1950W platinum AC power supply unit. Other fields include Manufactured=2017-06-30, VendorName=Huawei, IssueNumber=00, CLIECode=BOM+, and BOM=.

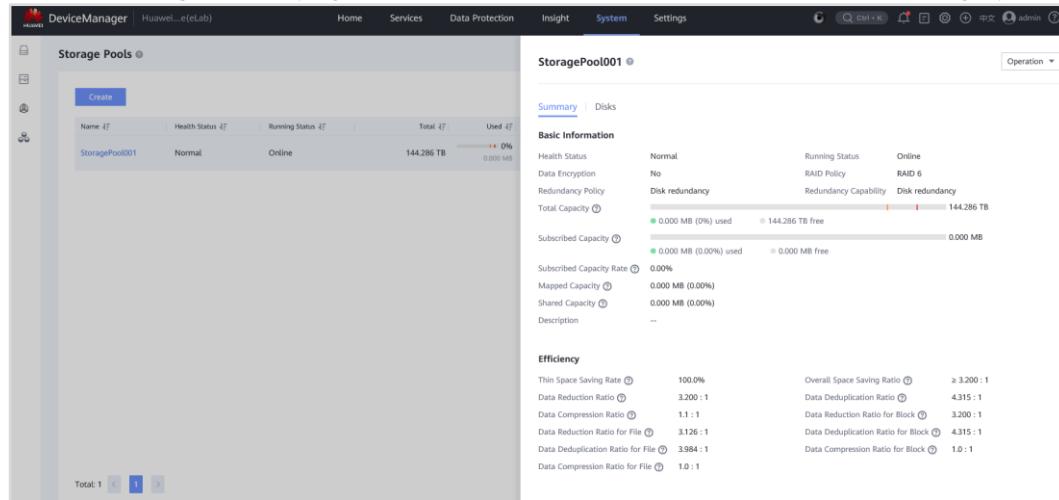
Step 5 Check the storage pool status.

On DeviceManager, check the storage pool status and its usage.

[Suggested Procedure]

For details, see **Operation and Maintenance > Administrator Guide > Routine Maintenance > Manual Inspection > Checking the Running Status of Services > Checking Storage Pools** in the desired product documentation.

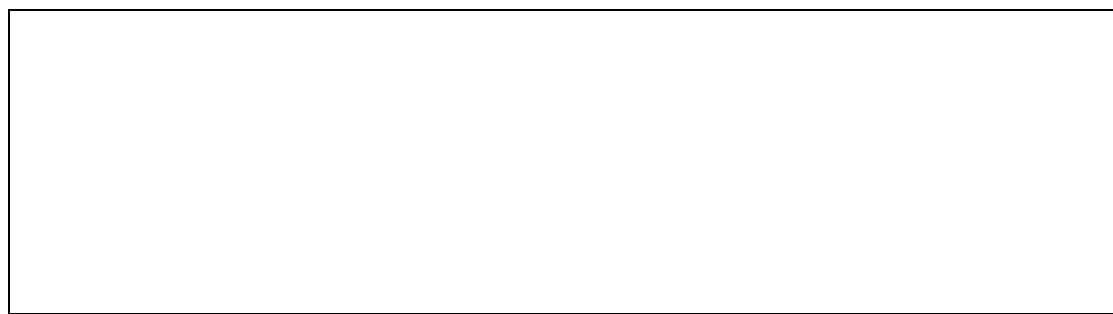
1. On the navigation bar of DeviceManager, choose **System > Storage Pools**.
2. The **Storage Pools** page is displayed.
3. On the **Storage Pools** page, view the detailed information about the storage pool.



The screenshot shows the DeviceManager interface with the 'Storage Pools' page selected. On the left, there's a sidebar with a 'Create' button and a list of storage pools. The main area shows a table for 'StoragePool001' with columns for Name, Health Status, Running Status, Total, and Used. On the right, there are two tabs: 'Summary' (selected) and 'Disks'. Under 'Basic Information', it shows Health Status as Normal, Data Encryption as No, Redundancy Policy as Disk redundancy, and Total Capacity as 144.286 TB. It also shows Subscribed Capacity (0.000 MB), Mapped Capacity (0.000 MB), Shared Capacity (0.000 MB), and a Description field. Below this, under 'Efficiency', it lists Thin Space Saving Rate (100.0%), Data Reduction Ratio (3.200 : 1), Data Compression Ratio (1.1 : 1), Data Reduction Ratio for File (3.126 : 1), Data Deduplication Ratio for File (3.984 : 1), and Data Compression Ratio for File (1.0 : 1). There are also tabs for 'Overall Space Saving Ratio' (≥ 3.200 : 1), 'Data Deduplication Ratio' (4.315 : 1), 'Data Reduction Ratio for Block' (3.200 : 1), 'Data Deduplication Ratio for Block' (4.315 : 1), and 'Data Compression Ratio for Block' (1.0 : 1).

#### Step 6 Check the storage LUN status.

Use DeviceManager to check the LUN usage and status.

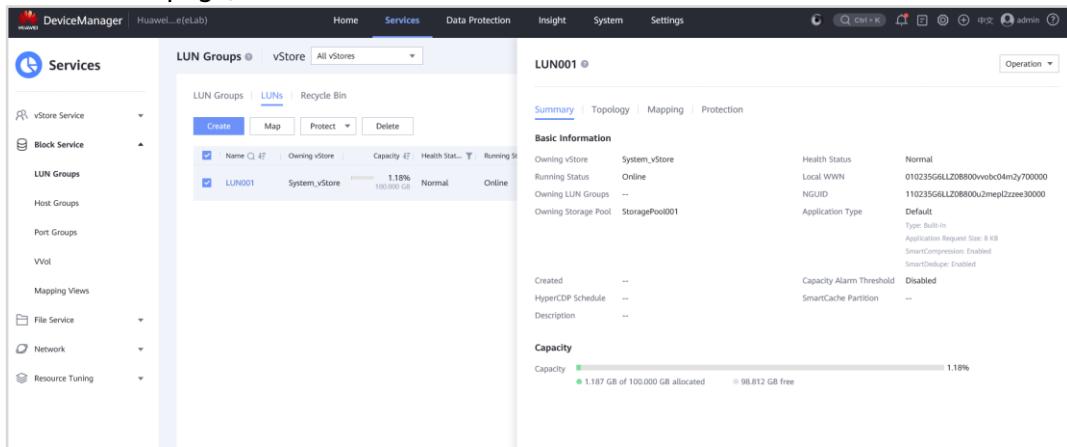


#### [Suggested Procedure]

For details, see **Operation and Maintenance > Administrator Guide > Routine Maintenance > Manual Inspection > Checking the Running Status of Services > Checking LUNs** in the desired product documentation.

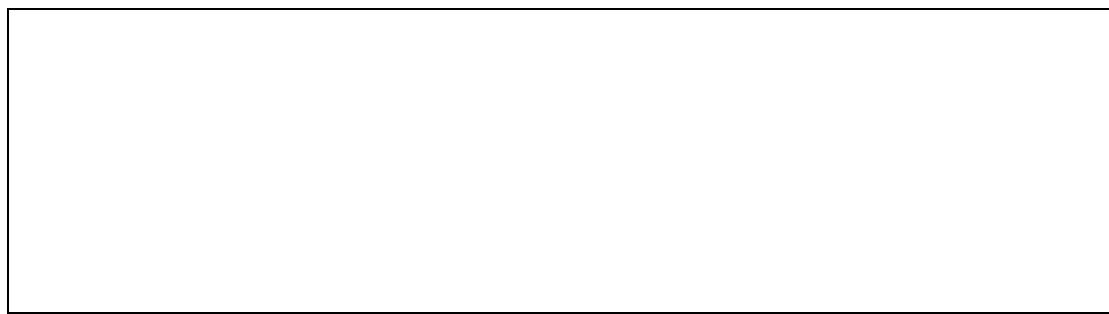
1. On the navigation bar of DeviceManager, choose **Services > Block Service > LUN Groups > LUNs**.
2. The LUN page is displayed.

### 3. On the LUN page, view the detailed LUN information.



Step 7 Export log files.

Use DeviceManager to export system logs and diagnosis files.

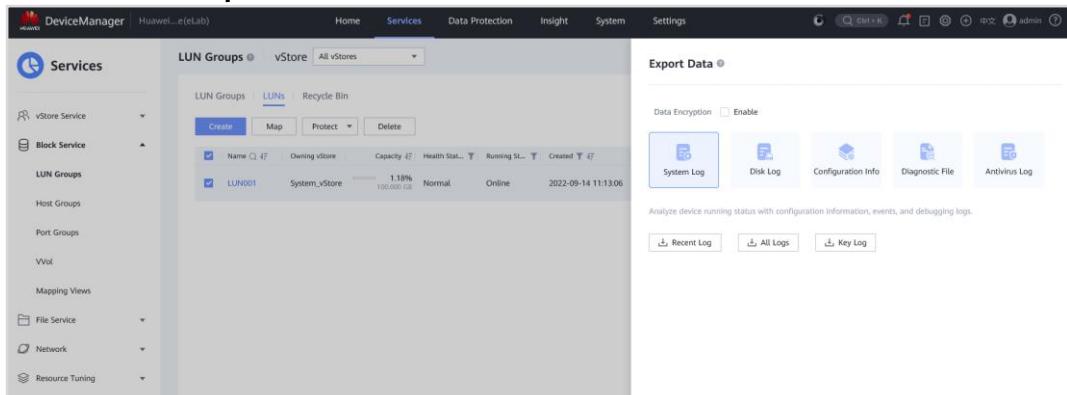


[Suggested Procedure]

For details, see **Operation and Maintenance > Administrator Guide > Routine Maintenance > Collecting Storage System Information > Collecting Logs and Alarms Using DeviceManager > Exporting System Data** in the desired product documentation.

1. Log in to DeviceManager.

2. Choose  > Export Data.



#### 2.4.1.4 Task 2: Performing O&M Checks on the CLI

Step 1 Log in to the storage system.

Log in to the storage device using the CLI.



[Suggested Procedure]

For details, see **Installation and Upgrade > Initialization Guide > Logging In to the CLI** in the desired product documentation.

Note: You can use the IP address of the management network port to log in.

**WARNING:** You have accessed the system.

You are required to have a personal authorisation from the system administrator before you use this computer. Unauthorised access to or misuse of this system is prohibited.

Step 2 Query the system information.

Query the storage system information on the CLI.



[Suggested Procedure]

For details, see **Reference > Command Reference > Basic Operation Commands > base > show system general** in the desired product documentation.

```
admin:/>show system general
System Name      : Huawei.Storage
Health Status    : Normal
Running Status   : Normal
Total Capacity   : 200.000TB
SN               : ST000000000000000000000000000002
Location         : HZ
Product Model    : OceanStor Dorado 6000 V6
Product Version  : 6.X.X
High Water Level(%): 80
Low Water Level(%): 20
WWN              : 210003000040506
Time             : 20XX-XX-XX/10:16:29 UTC+08:00
Patch Version    :
Description       :
```

Step 3 Query the following component information.

1. Query the disk information on the CLI.
2. Query the controller information on the CLI.
3. Query the fan information on the CLI.
4. Query the BBU information on the CLI.

[Suggested Procedure]

For details, see:

- 1 **Reference > Command Reference > Hardware Management Commands > disk > show disk general** in the desired product documentation;
- 2 **Reference > Command Reference > Hardware Management Commands > controller > show controller general** in the desired product documentation;
- 3 **Reference > Command Reference > Hardware Management Commands > fan > show fan** in the desired product documentation;
- 4 **Reference > Command Reference > Hardware Management Commands > bbu > show bbu general** in the desired product documentation.

**The following is an example of the query result.**

1. To query the disk information, run the following command:

admin:/>show disk general									
ID	Health	Status	Running Status	Type	Capacity	Role	Disk Domain	ID	
Speed(RPM)	Health	Mark	Bar Code	Item	AutoLock	State	Key Expiration	Time	Manufacture
Capacity									
CTE0.0	Normal		Online	SSD	79.999GB	Member Disk	0		
10000	--	--	--	OFF	--	--		85.899GB	
CTE0.1	Normal		Online	SSD	79.999GB	Member Disk	0		
10000	--	--	--	OFF	--	--		85.899GB	
CTE0.2	Normal		Online	SSD	79.999GB	Member Disk	0		
10000	--	--	--	OFF	--	--		85.899GB	
CTE0.3	Normal		Online	SSD	79.999GB	Member Disk	0		
10000	--	--	--	OFF	--	--		85.899GB	
CTE0.4	Normal		Online	SSD	79.999GB	Member Disk	0		
10000	--	--	--	OFF	--	--		85.899GB	
CTE0.5	Normal		Online	SSD	79.999GB	Member Disk	0		
10000	--	--	--	OFF	--	--		85.899GB	
CTE0.6	Normal		Online	SSD	79.999GB	Member Disk	0		
10000	--	--	--	OFF	--	--		85.899GB	

CTE0.7	Normal	Online	SSD	79.999GB	Member Disk	0	
10000	--	--	OFF	--	--		85.899GB
CTE0.8	Normal	Online	SSD	79.999GB	Member Disk	0	
10000	--	--	OFF	--	--		85.899GB
CTE0.9	Normal	Online	SSD	79.999GB	Member Disk	0	
10000	--	--	OFF	--	--		85.899GB

2. To query the controller information, run the following command:

```
admin:/>show controller general
Controller : 0A
Health Status : Normal
Running Status : Online
CPU : *3
Location : CTE0.A
Role : Master
Cache Capacity : 48.000GB
CPU Usage(%) : 9
Memory Usage(%) : 85
Temperature(Celsius) : --
Voltage(V) : 12.0
Software Version : 7.60.03.021
PCB Version : VER.A
SES Version : --
BMC Version : 20.01.73T93
Logic Version : R100
BIOS Version :
All Temperatures(Celsius) : --
Electronic Label :
Disk Version : 0:hs01
```

3. To query the fan information, run the following command:

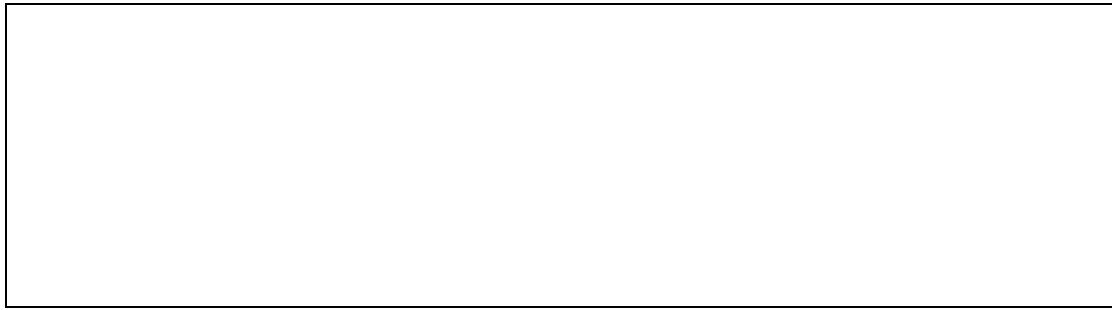
admin:/>show fan				
ID	Name	Health Status	Running Status	Running Level
CTE0.A.FAN0	FAN 0	Normal	Running	Low
CTE0.A.FAN1	FAN 1	Normal	Running	Low
CTE0.A.FAN2	FAN 2	Normal	Running	Low
CTE0.A.FAN3	FAN 3	Normal	Running	Low
CTE0.A.FAN4	FAN 4	Normal	Running	Low
CTE0.A.FAN5	FAN 5	Normal	Running	Low

4. To query the BBU information, run the following command:

admin:/>show bbu general				
ID	Health Status	Running Status	Current Voltage(V)	Number Of Discharges
CTE0.A.BBU0	Normal	Online	2.5	0

Step 4 Query the LUN information.

Query the storage LUN information on the CLI.



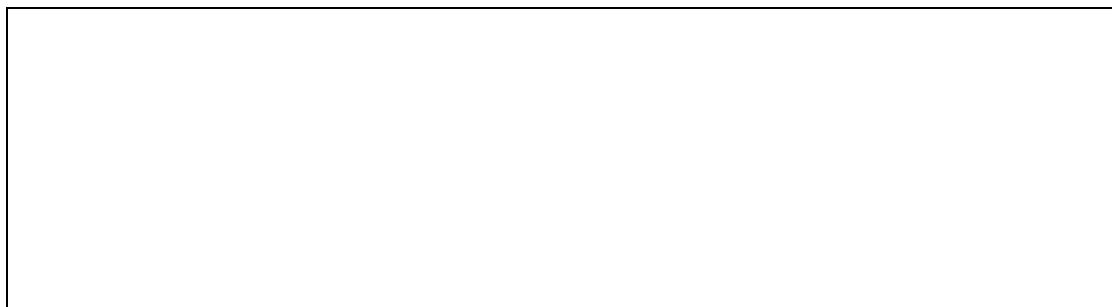
[Suggested Procedure]

For details, see **Reference > Command Reference > Storage Domain Management Commands > lun > show lun general** in the desired product documentation.

admin:/>show lun general							
ID	Name	Pool ID	Capacity	Health Status	Running Status	Type	WWN
Is Add To Lun Group	Smart Cache	Partition ID	DIF	Switch	Is Clone	Subscribed Capacity	Function Type
--	--	--	--	--	--	--	--
0	LUN0010000	0	2.000GB	Normal	Online	Thin	No
603000010004050603735c9100000000	No	--	--	--	--	--	No
No	0.000B	Lun	--	--	--	--	No
1	LUN0010001	0	2.000GB	Normal	Online	Thin	No
603000010004050603735ccb00000001	No	--	--	--	--	--	No
No	0.000B	Lun	--	--	--	--	No

Step 5 Query the storage pool information.

Query the storage pool information on the CLI.



[Suggested Procedure]

For details, see **Reference > Command Reference > Storage Domain Management Commands > storage\_pool > show storage\_pool general** in the desired product documentation.

admin:/>show storage_pool general						
ID	Name	Disk Domain ID	Health Status	Running Status	Total Capacity	Free Capacity
Usage	Type	--	--	--	--	--
--	--	--	--	--	--	--
0	StoragePool001	0	Normal	Online	424.081GB	423.872GB
LUN	--	--	--	--	--	--

## 2.4.1.5 Task 3: Managing License Files

Step 1 Check the license information.

View the license information of storage devices on DeviceManager.

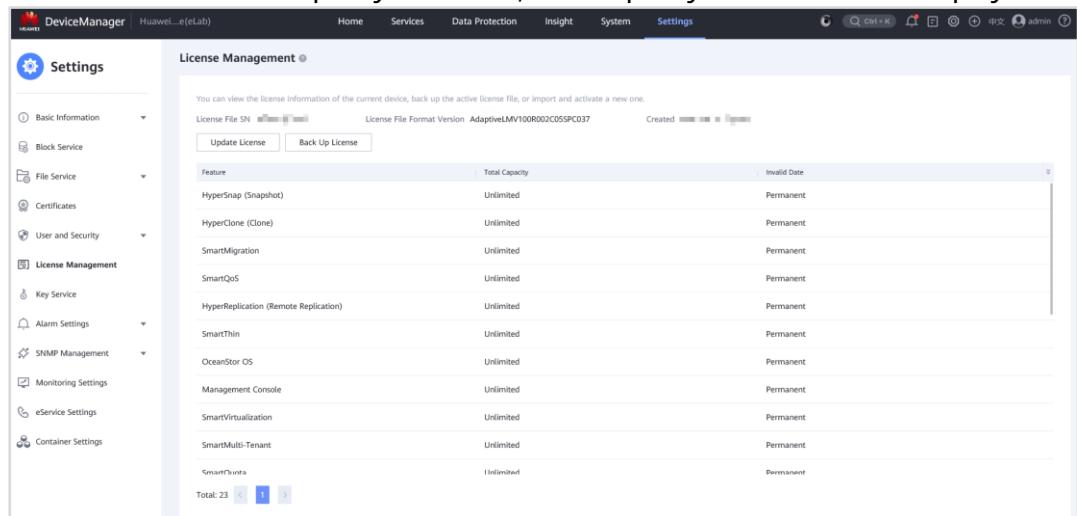


[Suggested Procedure]

Log in to the storage device through DeviceManager and check the license of the storage device. Pay attention to the license authorization items, expiration time, and licensed capacity.

For details, see **Operation and Maintenance > Administrator Guide > Routine Management > Managing License Files > Viewing an Activated License File** in the desired product documentation.

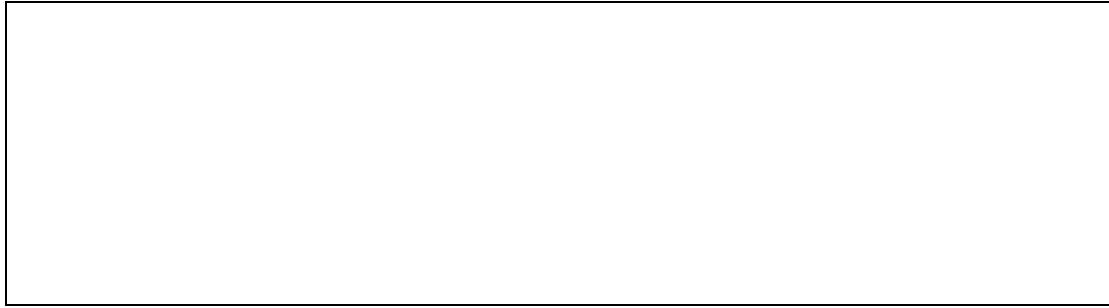
1. Log in to DeviceManager.
2. Choose **Settings > License Management**.
3. In the middle information pane, view the information about the activated license file.  
A license can be controlled in either of the following ways:
  - Control based on the running time: The expiration time of the license is displayed.
  - Control based on the capacity: The used/total capacity of the license is displayed.



Feature	Total Capacity	Invalid Date
HyperSnap (Snapshot)	Unlimited	Permanent
HyperClone (Clone)	Unlimited	Permanent
SmartMigration	Unlimited	Permanent
SmartQoS	Unlimited	Permanent
HyperReplication (Remote Replication)	Unlimited	Permanent
SmartThin	Unlimited	Permanent
OceanStor OS	Unlimited	Permanent
Management Console	Unlimited	Permanent
SmartVirtualization	Unlimited	Permanent
SmartMulti-Tenant	Unlimited	Permanent
SmartQuota	Unlimited	Permanent

Step 2 Back up the license file.

Back up the license information of storage devices on DeviceManager.

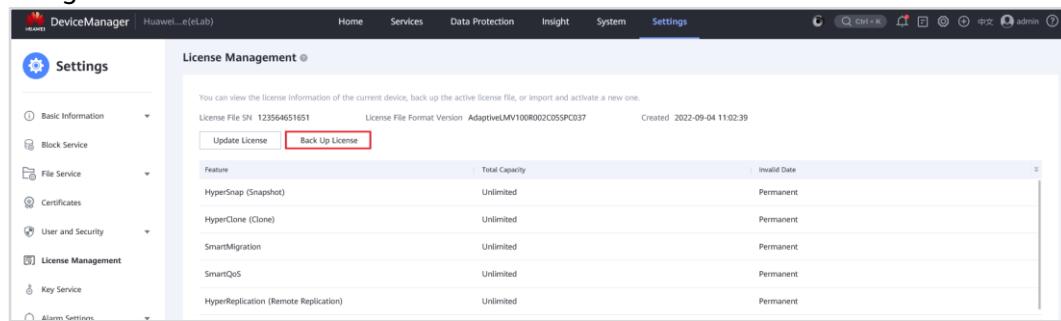


#### [Suggested Procedure]

For details, see **Operation and Maintenance > Administrator Guide > Routine Management > Managing License Files > Backing Up an Active License File** in the desired product documentation.

1. Log in to DeviceManager.
2. Choose **Settings > License Management**.
3. Back up an activated license file.

Purpose: Back up the license file so that you can re-import it if it is damaged after being activated.

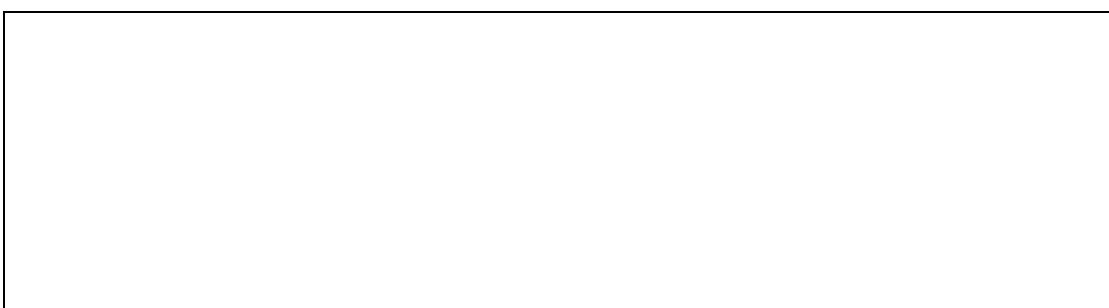


The screenshot shows the DeviceManager interface with the 'License Management' tab selected. The page displays license information for a device with SN 123564651651. It includes fields for 'License File SN', 'License File Format Version', and 'Created' date. Below these are two buttons: 'Update License' and 'Back Up License' (which is highlighted with a red box). A table lists various features and their details:

Feature	Total Capacity	Invalid Date
HyperSnap (Snapshot)	Unlimited	Permanent
HyperClone (Clone)	Unlimited	Permanent
SmartMigration	Unlimited	Permanent
SmartQoS	Unlimited	Permanent
HyperReplication (Remote Replication)	Unlimited	Permanent

#### Step 3 Query the license information.

Query the storage license information on the CLI.



#### [Suggested Procedure]

For details, see **Reference > Command Reference > License Management Commands > license > show License** in the desired product documentation.

```
admin:/>show license
CopyRight : Huawei Technologies Co., Ltd.
All rights reserved.
```

```
License SN : LIC2020052946HH50
```

File Creator : Huawei Technologies Co., Ltd.  
Created On : XXXX-XX-XX 09:58:15  
Country : English  
Operator : RD of Huawei Technologies Co., Ltd.  
Region : ShenZhen

Feature Name : Effective Capacity  
Feature ID : 104  
Trial Days : 60  
Running Deadline : XXXX-XX-XX  
Resource Name : capacity  
Maximal Resource Number : 200

Feature Name : Management Console  
Feature ID : 28  
License Status : Valid  
Open Status : Open  
Left Day(s) : 90  
Resource Limit : 0

---

Feature Name : SmartThin  
Feature ID : 25  
License Status : Valid  
Open Status : Open  
Left Day(s) : 90  
Resource Limit : 0

---

Feature Name : SmartMigration  
Feature ID : 5  
License Status : Valid  
Open Status : Open  
Left Day(s) : 90  
Resource Limit : 0

---

## 2.4.2 Scenario 2: SmartKit Inspection

### 2.4.2.1 Background

Due to service requirements, a company adjusts (for example, migration) its storage devices. O&M engineers need to check the adjusted devices to ensure that the devices are running properly and collect logs. Check items involve the device running status, device port status, and disk health status.

If you are engineer A, how do you use SmartKit to check storage devices?

### 2.4.2.2 Question

What are the typical application scenarios of SmartKit?



Reference document:

For more information, log in to Huawei Enterprise Technical Support Center (<http://support.huawei.com/enterprise/?lang=en>), type the keyword **SmartKit** in the search

box, and select the suggested path to go to the documentation page of the corresponding product. Browse or download the operation guide.

### 2.4.2.3 Task 1: Performing Inspection on SmartKit

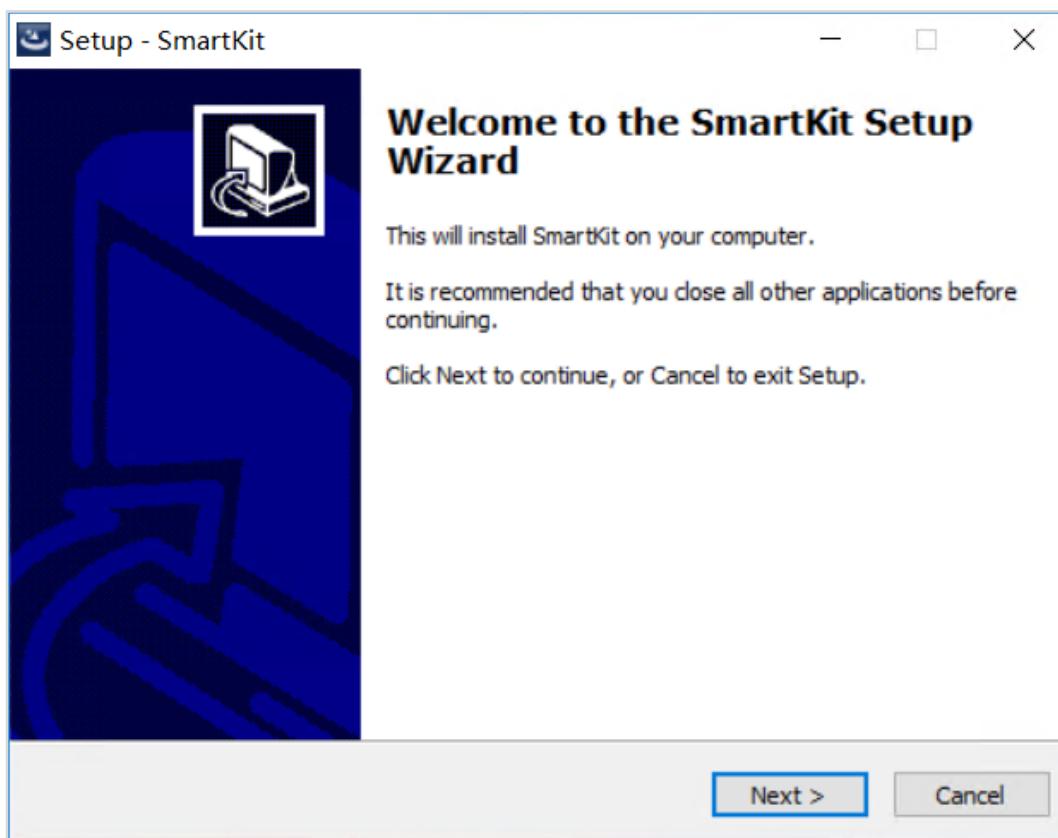
Step 1 Install the software.

Install SmartKit on the management host. If it has been installed, run it directly.



[Suggested Procedure]

After obtaining the software, double-click the software to start installation, and install the software as prompted.



Step 2 Run the software.

Run SmartKit.

Note: After the software is started, the system may prompt you to log in. If you have an account, click **Authenticate Now** and use the account to log in. If you do not have an account, select **Authenticate Later**.



[Suggested Procedure]

For details, see **Operation and Maintenance > Administrator Guide > Common Management Software and Access Method > Logging In to the Storage System O&M Software** in the desired product documentation.



1. Run **SmartKit** on the maintenance terminal.
2. If you use SmartKit for the first time, a usage wizard page is displayed introducing major functions of SmartKit.
3. Perform identity authentication.

**Identity Authentication** X

Enter your login account of the Huawei technical support website for identity authentication.  
After the authentication is successful, the download starts.

Note: Enterprise users need to sign the [User License Agreement](#)... ?

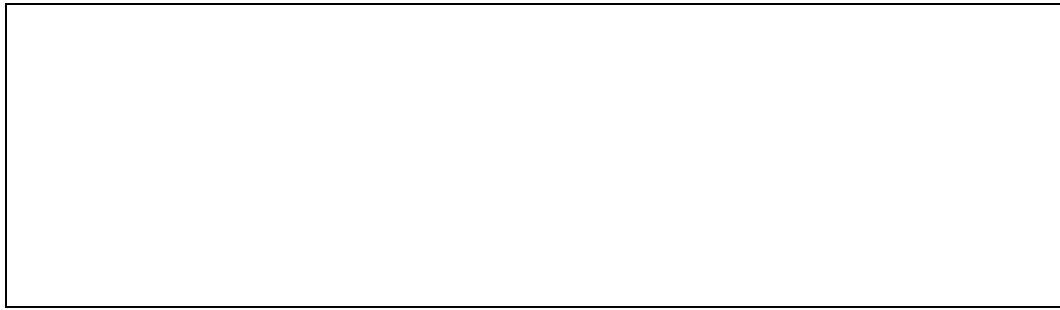
Username:

Password:

I have read and agree to [Huawei Privacy Statement](#)...

Step 3 Add devices.

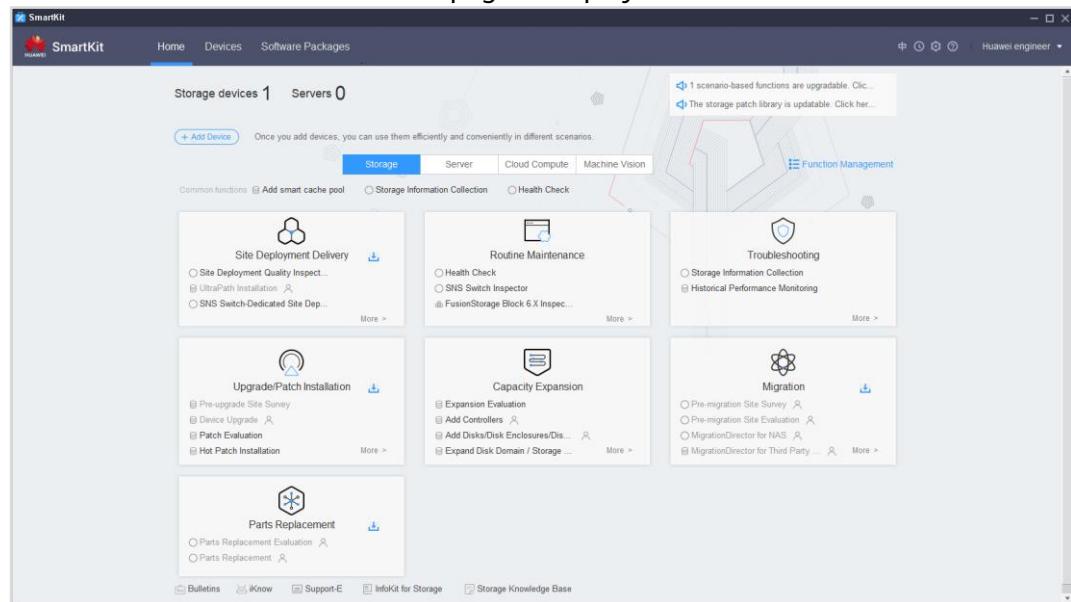
Add storage devices to be inspected on SmartKit.



### [Suggested Procedure]

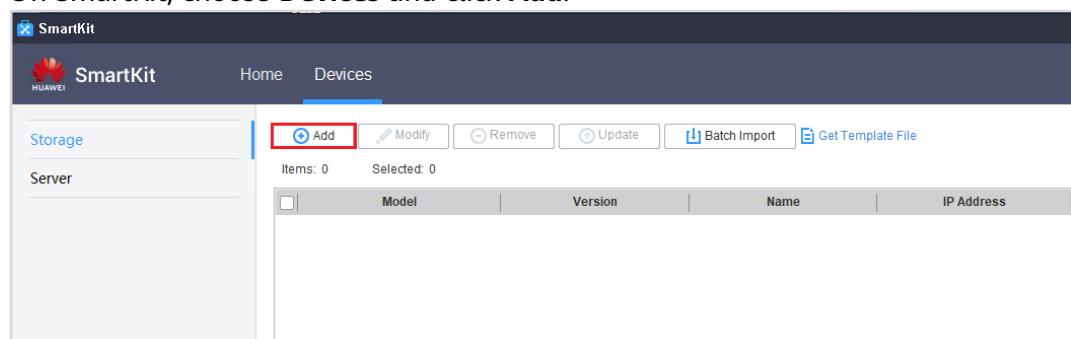
For details, see **Operation and Maintenance > Administrator Guide > Routine Maintenance > Inspection Using SmartKit** in the desired product documentation.

1. Run SmartKit. The SmartKit home page is displayed.

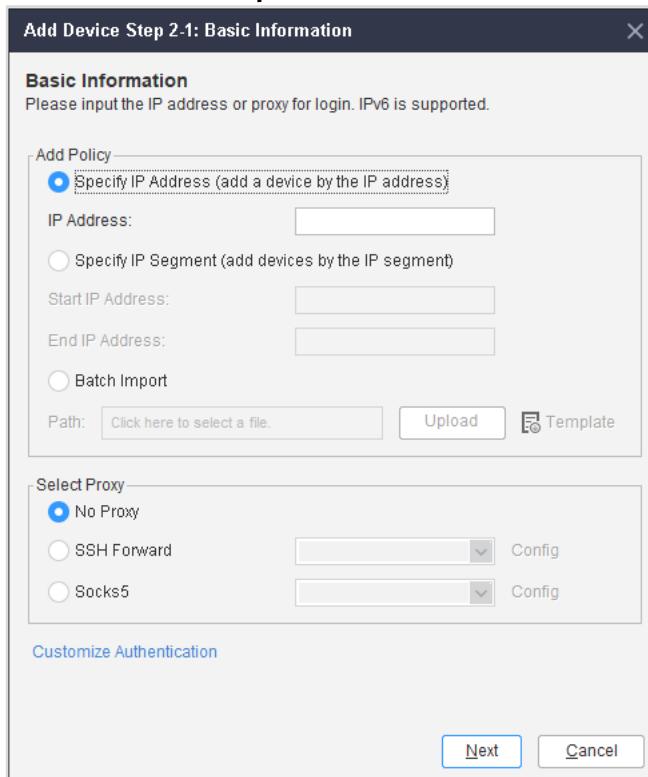


2. Add devices.

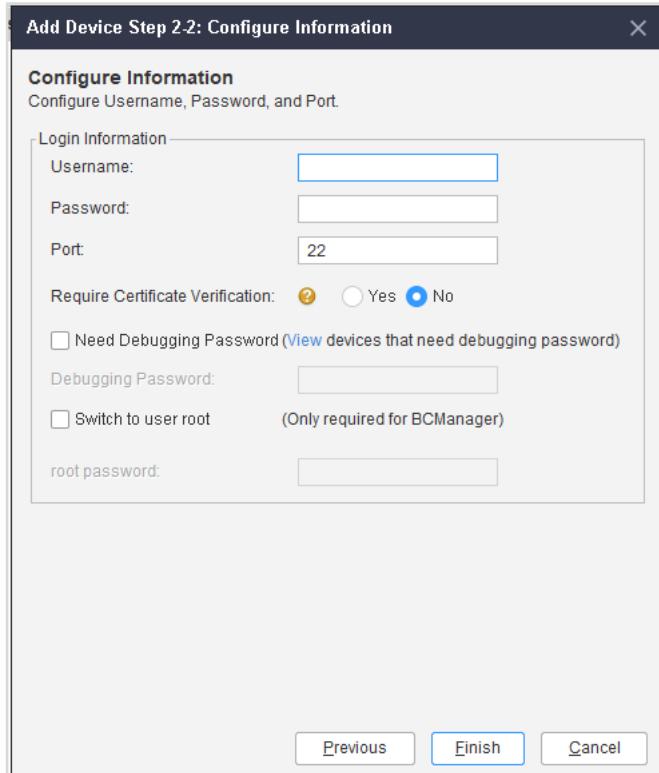
- a) On SmartKit, choose **Devices** and click **Add**.



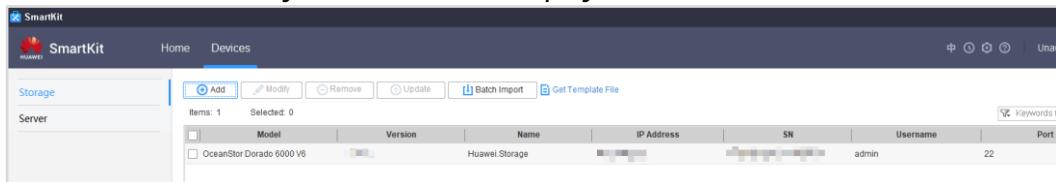
- b) The **Add device step 2-1: Basic Information** dialog box is displayed.



- c) Enter basic information, including the IP address and proxy. In the **Add Policy** and **Select Proxy** areas, select **Specify IP Address (add a device by the IP address)** and **No Proxy**, respectively.
- d) Enter configurations, including the user name, password, and port of the device. Click **Next**. In the **Login Information** area, enter **Username**, **Password**, and **Port** of the device to be added. The default value of **Port** is 22.



- e) Click **Finish**. The newly added device is displayed in the device list.

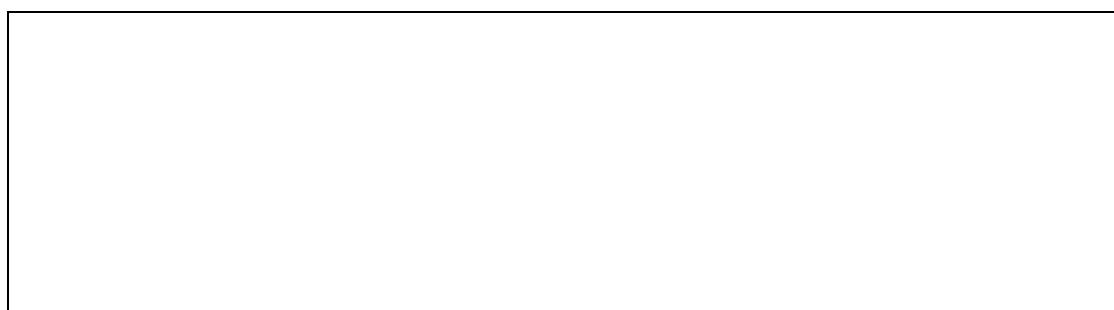


Note: The device account and password are those of the device management network. If there are multiple devices, repeat the preceding steps.

#### Step 4 Inspect devices.

Inspect storage devices.

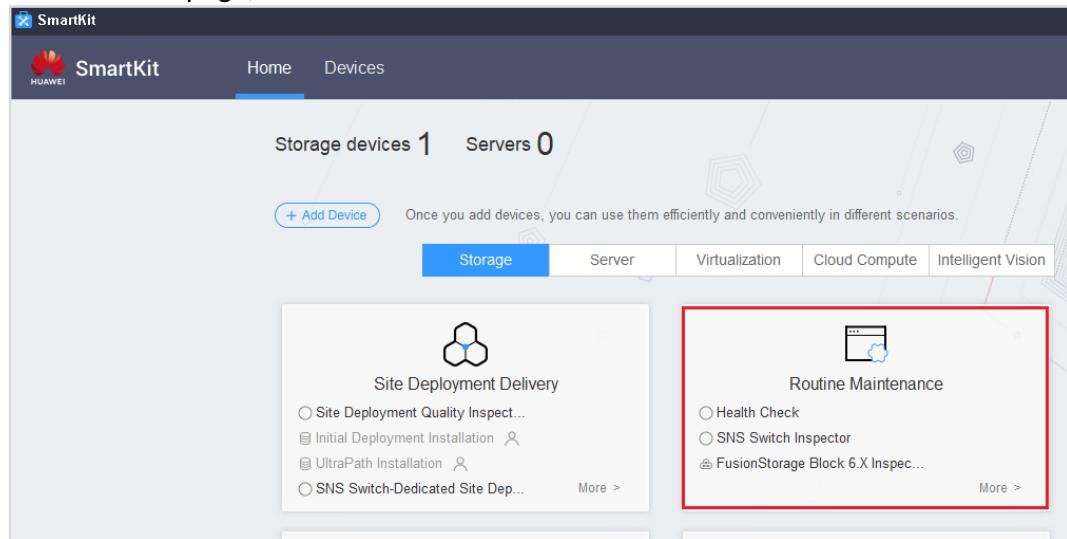
Use SmartKit to inspect the newly added devices.



[Suggested Procedure]

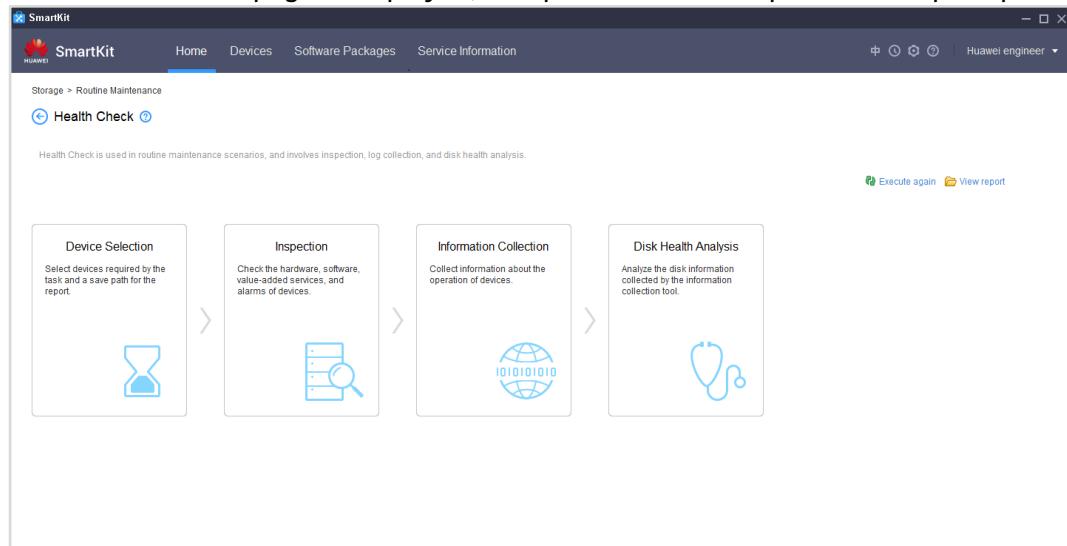
For details, see **Operation and Maintenance > Administrator Guide > Routine Maintenance > Inspection Using SmartKit** in the desired product documentation.

- On the home page, choose **Routine Maintenance > Health Check**.



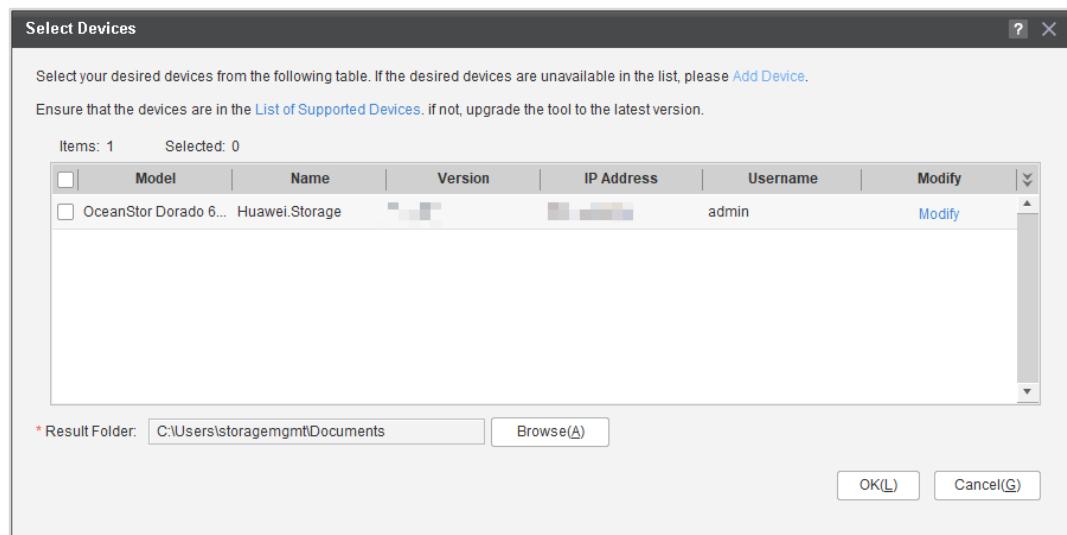
The screenshot shows the SmartKit interface. At the top, there's a navigation bar with the Huawei logo, 'SmartKit', and tabs for 'Home' and 'Devices'. Below the navigation bar, it says 'Storage devices 1 Servers 0'. There's a button '+ Add Device' and a note: 'Once you add devices, you can use them efficiently and conveniently in different scenarios.' Under the 'Storage' tab, there are two main sections: 'Site Deployment Delivery' and 'Routine Maintenance'. The 'Routine Maintenance' section is highlighted with a red box. It contains three options: 'Health Check', 'SNS Switch Inspector', and 'FusionStorage Block 6.X Inspec...'. A 'More >' link is also present.

- The **Health Check** page is displayed, and perform related operations as prompted.



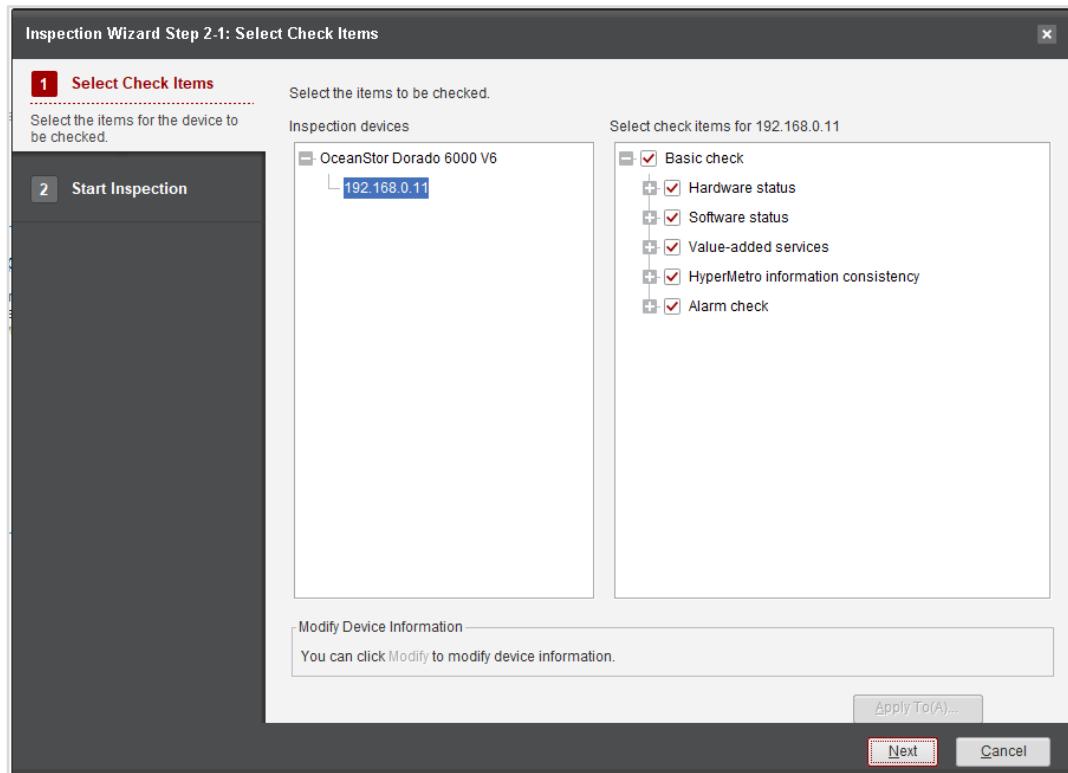
The screenshot shows the 'Storage > Routine Maintenance > Health Check' page. It has a header with tabs for 'Home', 'Devices', 'Software Packages', and 'Service Information'. Below the header, it says 'Storage > Routine Maintenance' and 'Health Check'. A note states: 'Health Check is used in routine maintenance scenarios, and involves inspection, log collection, and disk health analysis.' There are four steps shown: 'Device Selection' (hourglass icon), 'Inspection' (server with magnifying glass icon), 'Information Collection' (globe icon), and 'Disk Health Analysis' (stethoscope icon). At the bottom right, there are links for 'Execute again' and 'View report'.

- Click "Device Selection".

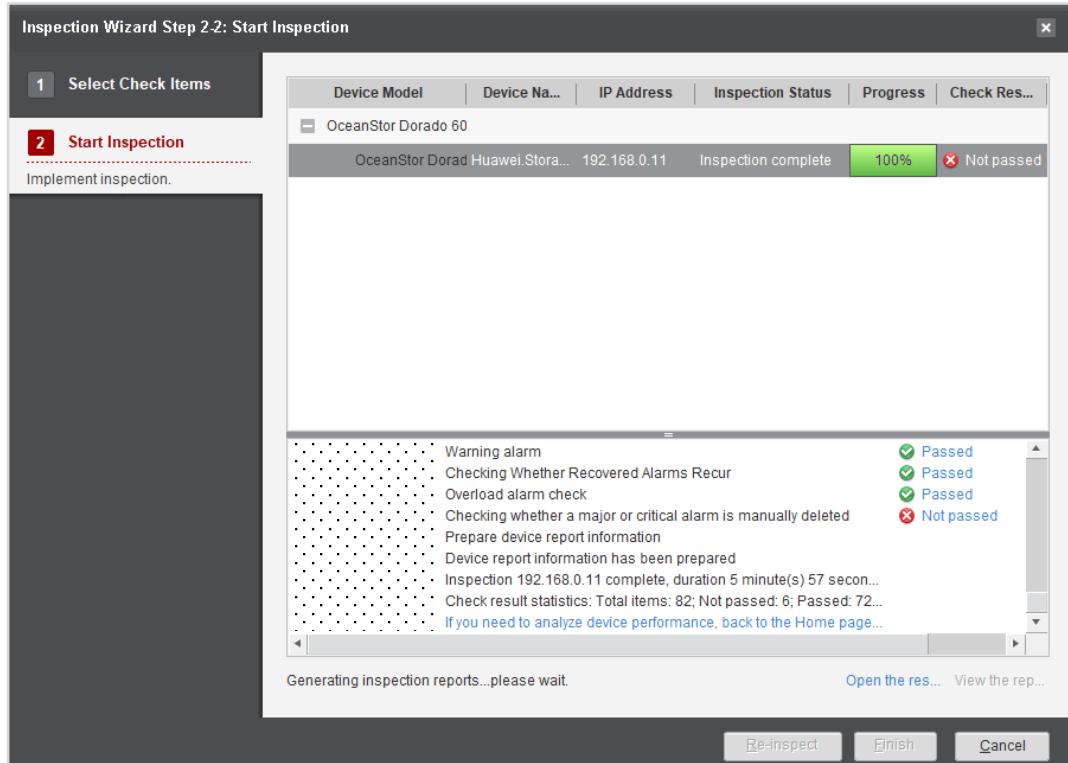


The screenshot shows the 'Select Devices' dialog box. It has a title bar with a question mark icon, a close button, and a cancel button. The main area contains instructions: 'Select your desired devices from the following table. If the desired devices are unavailable in the list, please [Add Device](#). Ensure that the devices are in the [List of Supported Devices](#). if not, upgrade the tool to the latest version.' Below this, there's a table with columns: Model, Name, Version, IP Address, Username, and Modify. One row is visible: 'OceanStor Dorado 6...' by 'Huawei.Storage' with IP '192.168.1.100', Username 'admin', and a 'Modify' button. At the bottom, there's a 'Result Folder' field with 'C:\Users\storage\mgmt\Documents', a 'Browse(△)' button, and 'OK(L)' and 'Cancel(G)' buttons.

#### 4. Select Check Items.



#### 5. The storage device inspection progress is complete.



Check the items that did not pass the inspection to determine the cause of the failure.

## Step 5 Collect information.

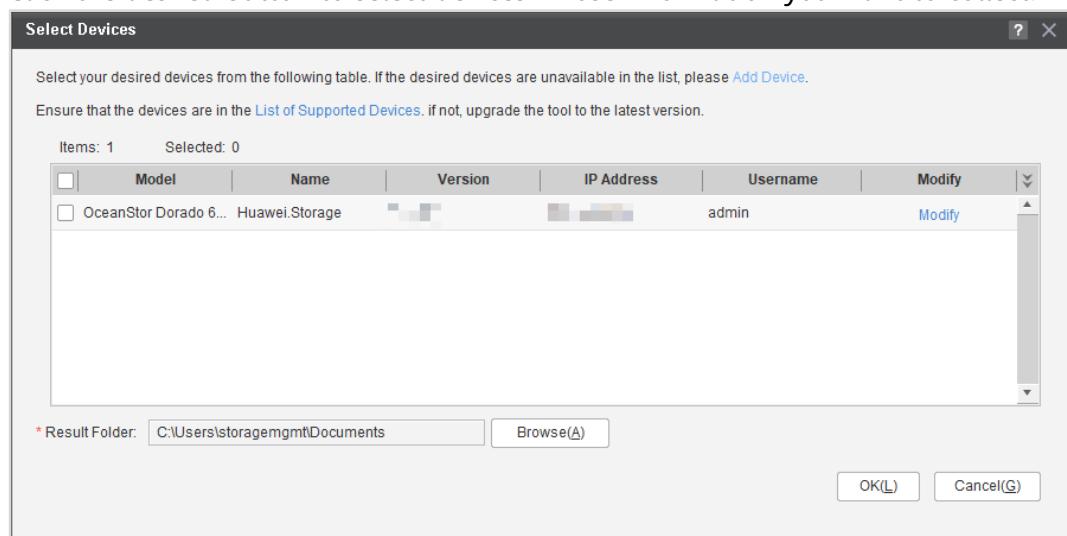
Collect storage device information on SmartKit.



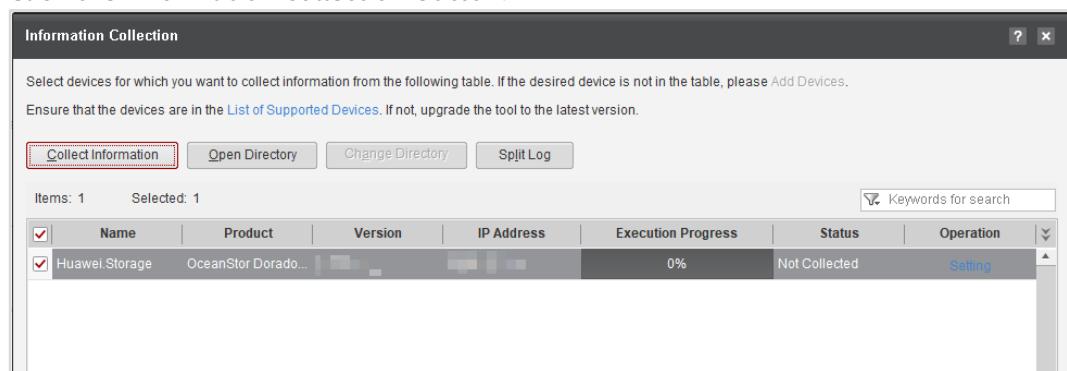
### [Suggested Procedure]

For details, see **Operation and Maintenance > Administrator Guide > Routine Maintenance > Inspection Using SmartKit** in the desired product documentation.

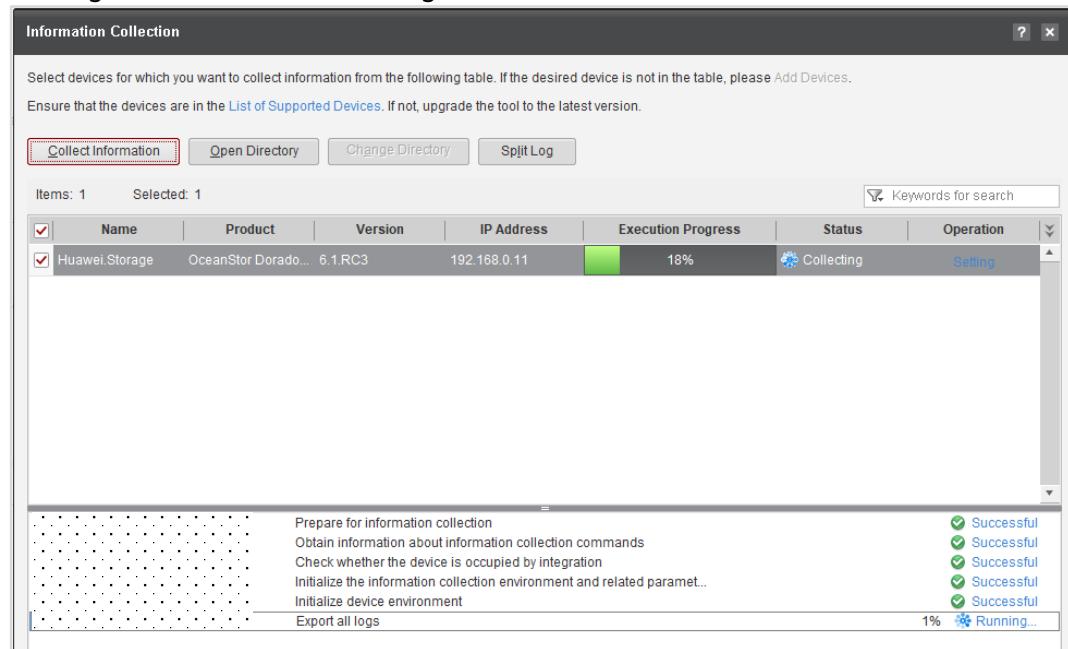
1. On the home page, choose **Routine Maintenance > Health Check**.
2. The **Health Check** page is displayed.
3. Click the desired button to select devices whose information you want to collect.



4. Click the information collection button.



5. The log information of the storage devices is collected.



Note: On the information collection page, select devices to collect logs and inspection reports. Once the information is collected, it is compressed into a package and saved on the local PC.

#### 2.4.2.4 Discussion

What information needs to be collected if a fault occurs on a device?

Information Type	Name	Description
Basic information		
Fault information		
Storage device information		

Information Type	Name	Description
Networking information		
Application server information		

## 2.5 Case Summary

My Case Summary:

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