MacroSAN MS Series Storage Devices Basic Configuration

GUI User Manual

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MacroSAN Technologies Co., Ltd.

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Statement

This manual is only for operational reference. Due to upgrades of software version or other reasons, this manual may lag behind the latest software version or device configuration. MacroSAN Technologies Co., Ltd. reserves the right of modify the manual without inform or notice.

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Appendixes	Device default configurations	This chapter introduces device's default configurations.	Device default configurations
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Part 1: Overview

1 Preface

1.1 Intended Audiences

This manual is used to guide the configuration, management and maintenance of MacroSAN MS series storage devices. It is intended for MacroSAN employees, partners, storage architects, system administrators and maintainers. Readers are required to be familiar with the basic knowledge of storage systems.

1.2 Manual Guidance

The manual guidance contains all the documents in the *MacroSAN MS Series Storage Devices GUI User Manual*, which helps you select the required documents.

Table 1-1 List of user manual

Name	Main content
MacroSAN MS Series Storage Devices Basic Configuration GUI User Manual	This manual introduces the basic configuration, management and maintenance of MacroSAN MS series storage devices.
MacroSAN MS Series Storage Devices Snapshot Feature GUI User Manual	This manual introduces the configuration for snapshot feature of MacroSAN MS series storage devices.
MacroSAN MS Series Storage Devices Replication Feature GUI User Manual	This manual introduces the configuration for replication feature of MacroSAN MS series storage devices.
MacroSAN MS Series Storage Devices HotCache Feature GUI User Manual	This manual introduces the configuration for HotCache feature of MacroSAN MS series storage devices.
MacroSAN MS Series Storage Devices Performance Statistics Feature GUI User Manual	This manual introduces the configuration for performance statistics feature of MacroSAN MS series storage devices.
MacroSAN MS Series Storage Devices QoS Feature GUI User Manual	This manual introduces the configuration for QoS feature of MacroSAN MS series storage devices.
MacroSAN MS Series Storage Devices Remote Mirror Feature GUI User Manual	This manual introduces the configuration for remote mirror feature of MacroSAN MS series storage devices.
MacroSAN MS Series Storage Devices Dual-Active Feature GUI User Manual	This manual introduces the configuration for dual-active feature of MacroSAN MS series storage devices.
MacroSAN MS Series Storage Devices Thin Provisioning Feature GUI User Manual	This manual introduces the configuration for thin provisioning feature of MacroSAN MS series storage devices.
MacroSAN MS Series Storage Devices Virtualization Feature GUI User Manual	This manual introduces the configuration for virtualization feature of MacroSAN MS series storage devices.
MacroSAN MS Series Storage Devices Local Mirror Feature GUI User Manual	This manual introduces the configuration for local mirror feature of MacroSAN MS series storage devices.

MacroSAN MS Series Storage Devices Local Clone Feature GUI User Manual	This manual introduces the configuration for local clone feature of MacroSAN MS series storage devices.
MacroSAN MS Series Storage Devices Auto-Tiering Feature GUI User Manual	This manual introduces the configuration for auto-tiering feature of MacroSAN MS series storage devices.
MacroSAN MS Series Storage Devices NDM Feature GUI User Manual	This manual introduces the configuration for NDM feature of MacroSAN MS series storage devices.
MacroSAN MS Series Storage Devices Deduplication and Compression Feature GUI User Manual	This manual introduces the configuration for deduplication and compression feature of MacroSAN MS series storage devices.
MacroSAN MS Series Storage Devices VVol Feature GUI User Manual	This manual introduces the configuration for VVol feature of MacroSAN MS series storage devices.
MacroSAN MS Series Storage Devices Clone Feature GUI User Manual	This manual introduces the configuration for clone feature of MacroSAN MS series storage devices.
MacroSAN MS Series Storage Devices Multi-Tenant Feature GUI User Manual	This manual introduces the configuration for multi-tenant feature of MacroSAN MS series storage devices.
MacroSAN MS Series Storage Devices R3DC Feature GUI User Manual	This manual introduces the configuration for R3DC feature of MacroSAN MS series storage devices.

1.3 Manual Conventions

Some eye-catching signs are used in the manual to draw your attention. Please be careful during operation.

1.3.1 Conventions of Description

ⓘNOTE

A NOTE is a prompt, which is a supplementary explanation for operation.

⚠CAUTION

- A CAUTION indicates some important information. It explains the precautions to be taken during operation and the potential impact of improper operations.
- Please pay special attention to this part.

⚠WARNING

- A WARNING indicates some vital information. Improper operation may lead to accidents, such as performance degradation, data loss or devices damage.
- Please pay special attention to this part.

1.3.2 Other Conventions

In the following descriptions, "MacroSAN Technologies Co., Ltd." is also called "MacroSAN".

1.4 Document Acquisition

Please visit www.macrosan.com for the latest document.

ⓘNOTE

This manual may lag behind the latest software version and may be updated irregularly due to software upgrading or other reasons.

1.5 Feedback

MacroSAN Technologies Co., Ltd. sincerely appreciates your choice of our products. If you have any feedback or suggestions on the document, please email us at document@macrosan.com. Thanks for your support.

2 Overview of MS Series Storage Devices

2.1 Introduction to MS Series Storage Devices

MacroSAN ODSP storage devices are designed innovatively with high-performance and high-reliability hardware structure by adapting the latest chip technology. Together with the ODSP series software, these devices provide a 100G-class storage platform with large cache, high bandwidth, and high processing power for the massive concurrent applications in data centers in the era of cloud computing, and at the same time, they can also provide a safe and reliable storage platform with elastic deployment of resources for small and medium-sized data centers.

MacroSAN ODSP storage devices consist of the following modular components:

- SPU: It includes SPs, power supply modules, fan modules, battery modules, disk modules and other hardware components.
- FSU: It includes FPs, power supply modules, fan modules, battery modules, disk modules and other hardware components.
- SSU: It includes XPs, power supply modules, fan modules, battery modules, disk modules and other hardware components.
- DSU: It includes EPs, power supply modules, fan modules, battery modules, disk modules and other hardware components.

As the core module of the whole storage system, SP is used for data transmission, data processing, and data protection of storage devices. It provides multiple types of front-end business ports for connecting front-end application servers, and multiple types of back-end expansion ports

(e.g. SAS ports, PCIe ports, 25GE/100GE ports, etc.) for connecting either FSUs or SSUs or DSUs for storage expansion.

ⓘNOTE

- Please refer to the installation manual for the hardware features of MacroSAN ODSP storage devices.
- MacroSAN MS series storage device is called ODSP storage device, storage device or device in the following description. FSU, SSU and DSU are collectively called DSU. FP, XP and EP are collectively called EP unless stated otherwise.

2.2 Introduction to Typical Networking of MS Series Storage Devices

Figure 2-1 shows the typical networking of MacroSAN MS series storage devices.

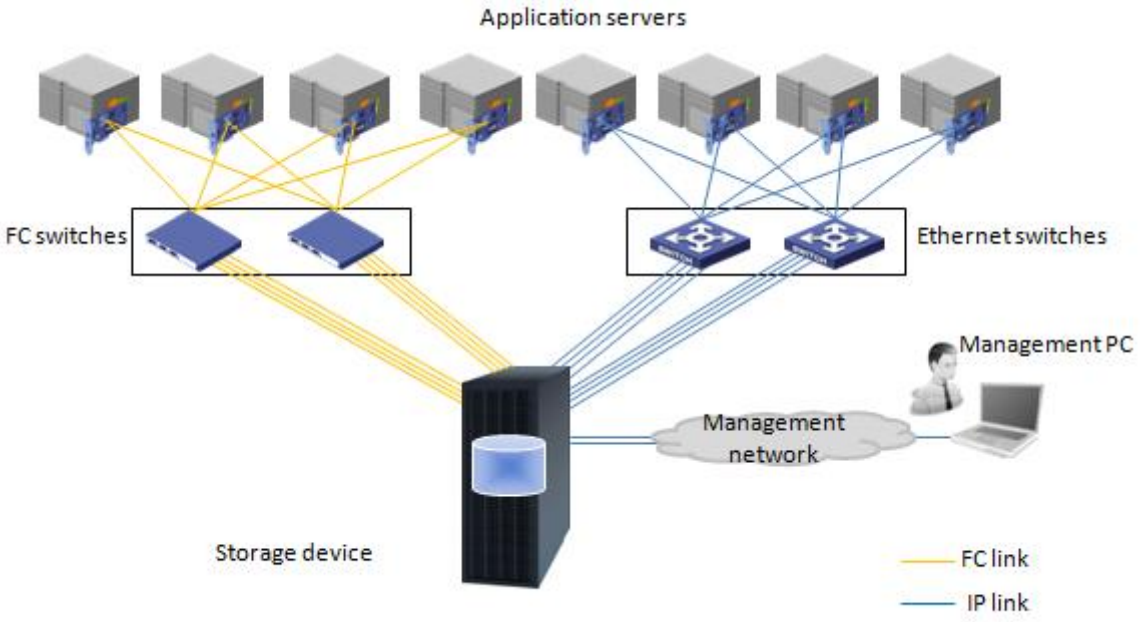

Figure 2-1 Typical networking of MS series storage devices

Networking explanation:

- Each controller of the ODSP storage device provides a dedicated management port, and the management PC can be connected to the management port of the storage device through the management network. The networks between the management PC and all controllers are required to be reachable.
- ODSP storage device can be accessed by the application server through iSCSI, FC, NVMe over RoCE and NVMe over FC. The HBA and driver software are required to be installed on the application server.
- ODSP storage devices support port aggregation in IP networks. You can either use the front-end business ports separately or bundle multiple Ethernet ports into one aggregated port.

⚠CAUTION

- The application server is required to be installed with multipath software correctly so that it can access all controllers in ODSP storage device to ensure redundancy.
- If the client of the ODSP storage device is a multi-server application system and multiple application servers are required to have read and write permissions on the same storage resource, relevant software (such as cluster software, parallel file system software, etc.) must be correctly installed on the corresponding application server, so that multiple application servers can access the same storage area exclusively to ensure data accuracy and consistency.

3 ODSP Scope+ Console

3.1 Introduction to ODSP Scope+

ODSP Scope+ is also called GUI Console (GUI for short), which provides management interface on the base of Web. Enter the IP address of ODSP storage device in the address bar of browser to run ODSP Scope+ and manage ODSP storage device.

The followings are browsers that have passed compatibility testing.

- Chrome55+
- Firefox39.0+
- IE10+ and browsers based on IE kernel
- 360 Browser (Speed Mode)
- QQ Browser (Speed Mode)
- The World Browser (Speed Mode)
- Maxthon (IE10+ kernel)

ⓘNOTE

ODSP Scope+ compatible browser may be updated periodically. Please consult manufacturer's technical supporters to obtain the latest browsers list that have passed compatibility testing.

3.2 Running ODSP Scope+

Open the Web browser of management PC and enter the IP address of the console ETH port (e.g. https://172.17.243.81/) of storage device in the address bar and refresh interface to run ODSP Scope+.

The security certificate risks (as shown in Figure 3-1) may be displayed in some browsers. In this case, please click "Continue to 172.17.243.81 (unsafe)" or the entries with similar meaning to run ODSP Scope+.

ⓘNOTE

The ODSP Scope+ is carried out based on HTTPS protocol for security. However, all security certificates are the third-party authentication for the authenticity of domain name and must be issued by certificate authority. The storage devices are on the rear of server with a dedicated private network instead of a public network. Besides, the devices are managed through LAN IP address rather than domain name, so the SSL certificate cannot be applied and it is normal that the security certificate risk message is displayed on the browser. Please ignore the prompt.

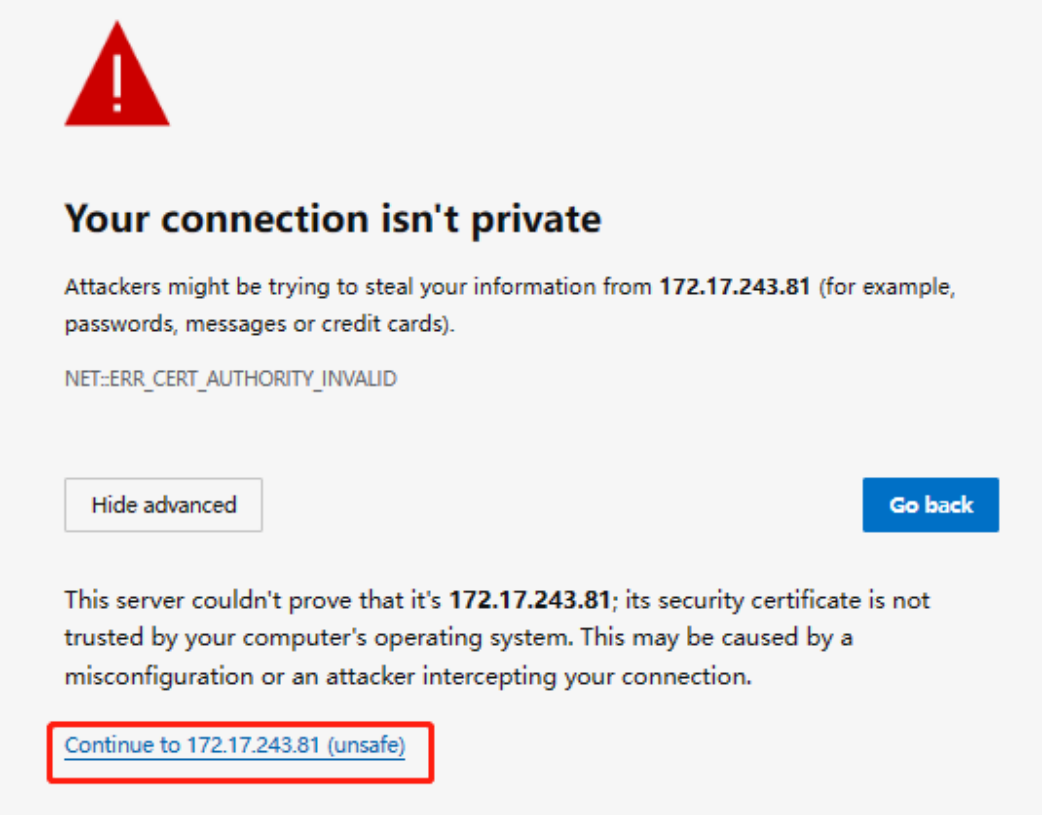

Figure 3-1 Example for prompt of certificate exception

The login interface of ODSP Scope+ is shown in Figure 3-2. Local user is used by default. Click the <Advanced> button for login modes.

- LDAP user login: Enter the username, password and verification code and click the <Login> button to login system view interface.
- Tenant login: Check the "Tenant Login" option, as shown in Figure 3-4, enter the tenant user's username, tenant user password, verification code and tenant name, and click the <Login> button to log in to the tenant view interface.

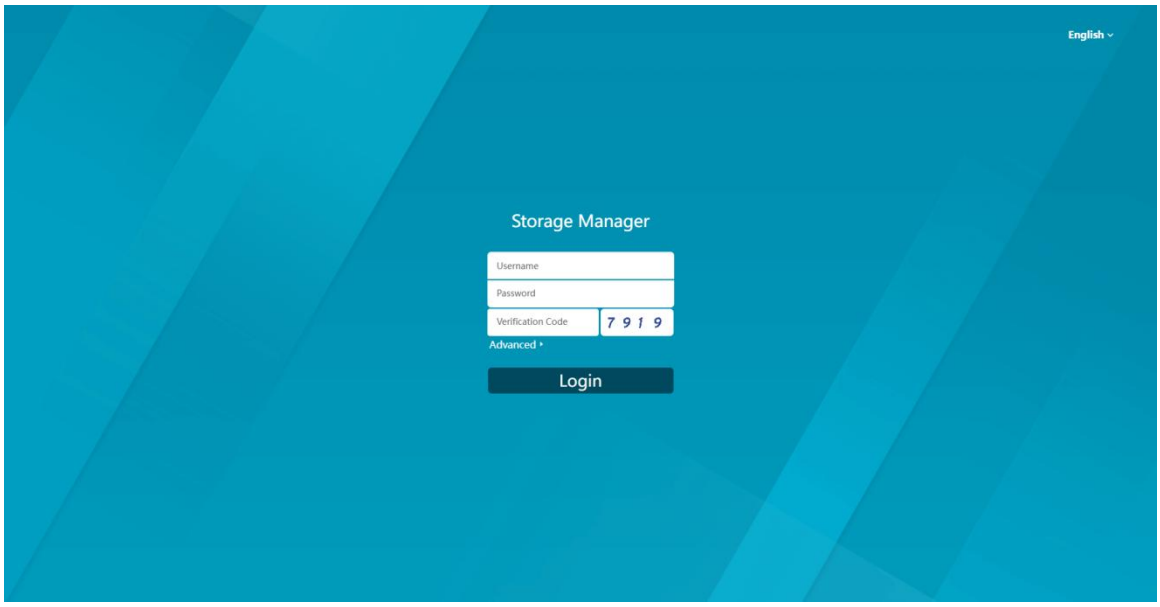

Figure 3-2 ODSP Scope+ login interface

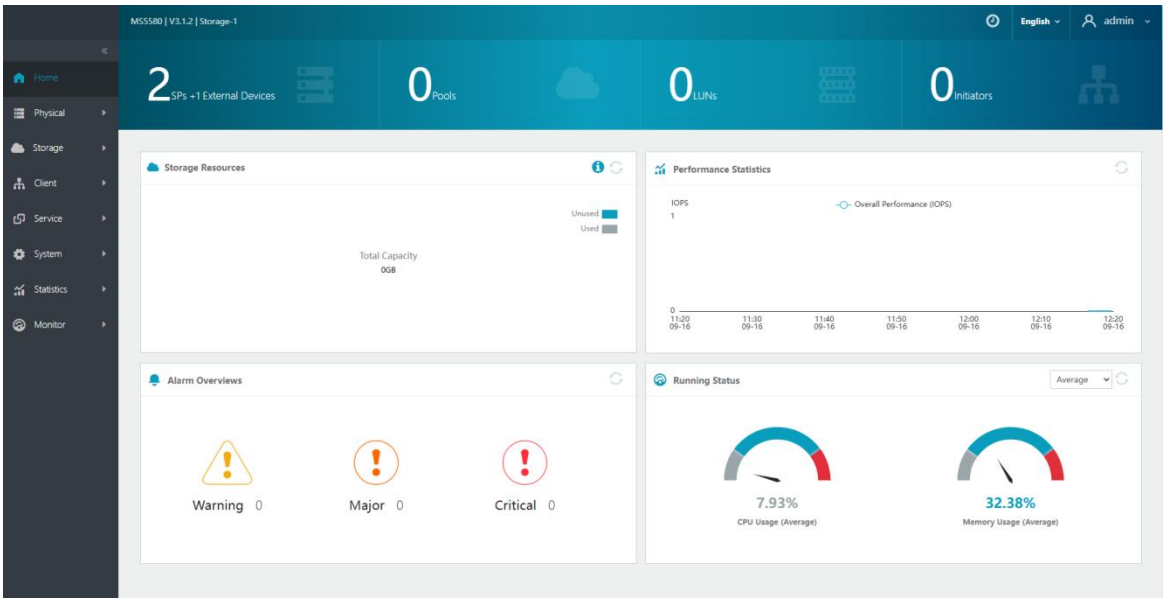

Figure 3-3 Home of ODSP Scope+ system view

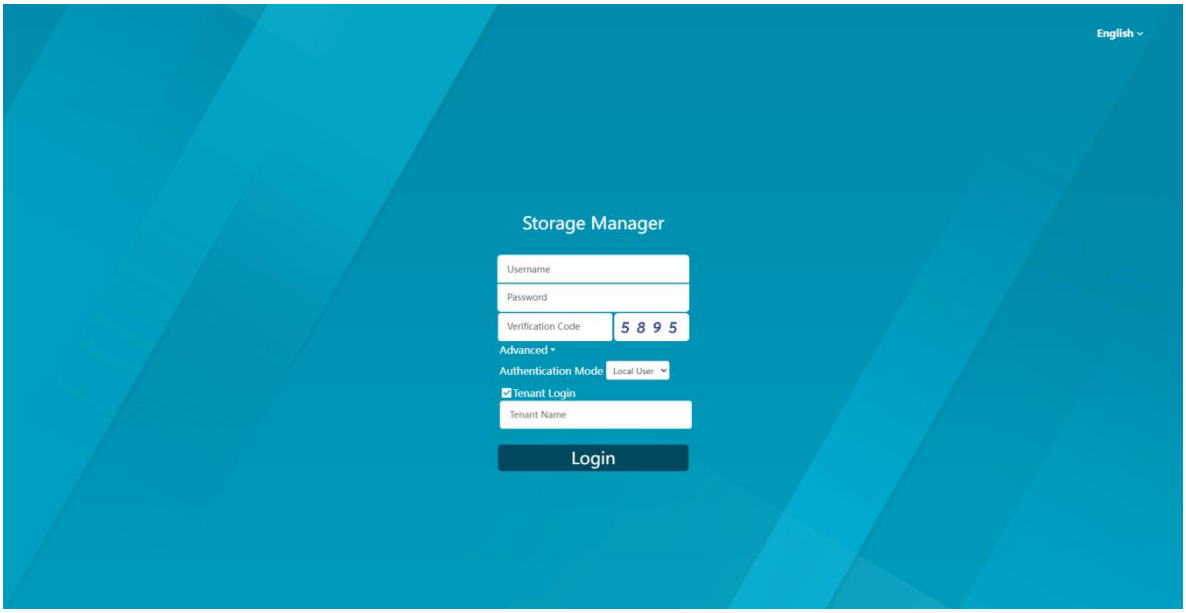

Figure 3-4 ODSP Scope+ tenant login interface

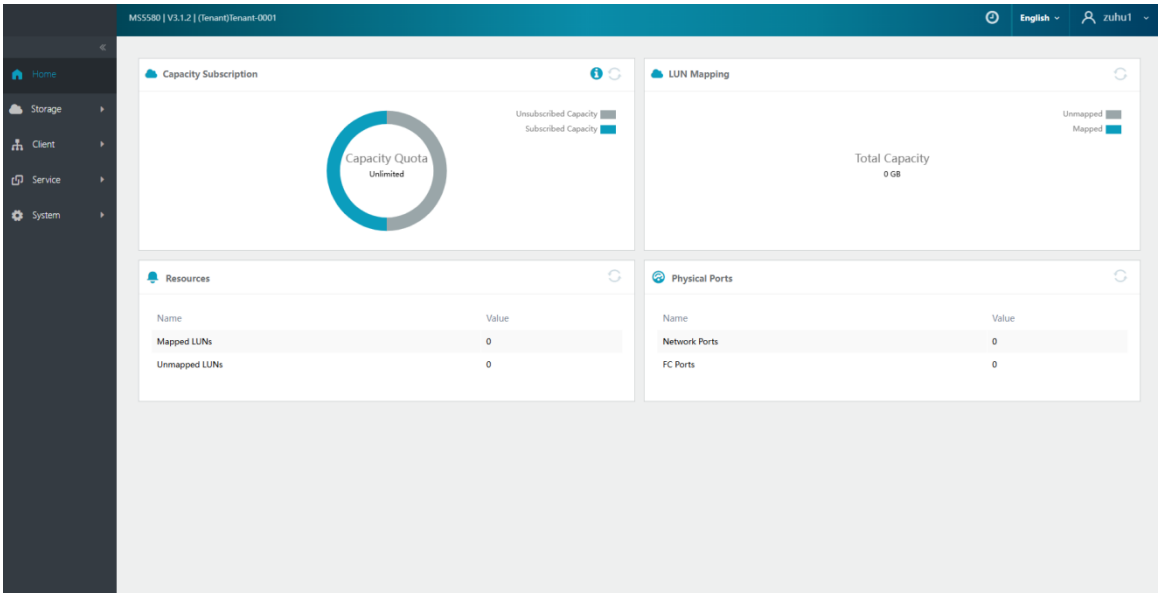

Figure 3-5 Home of ODSP Scope+ tenant view

3.3 Composition of ODSP Scope+ System View Interface

3.3.1 Interface Overview

All the information of the storage device is displayed on the typical interface of ODSP Scope+ system view interface, as shown in Figure 3-6, which can be divided into five parts, including navigation tree, navigation bar, information display area, extended area and copyright display area.

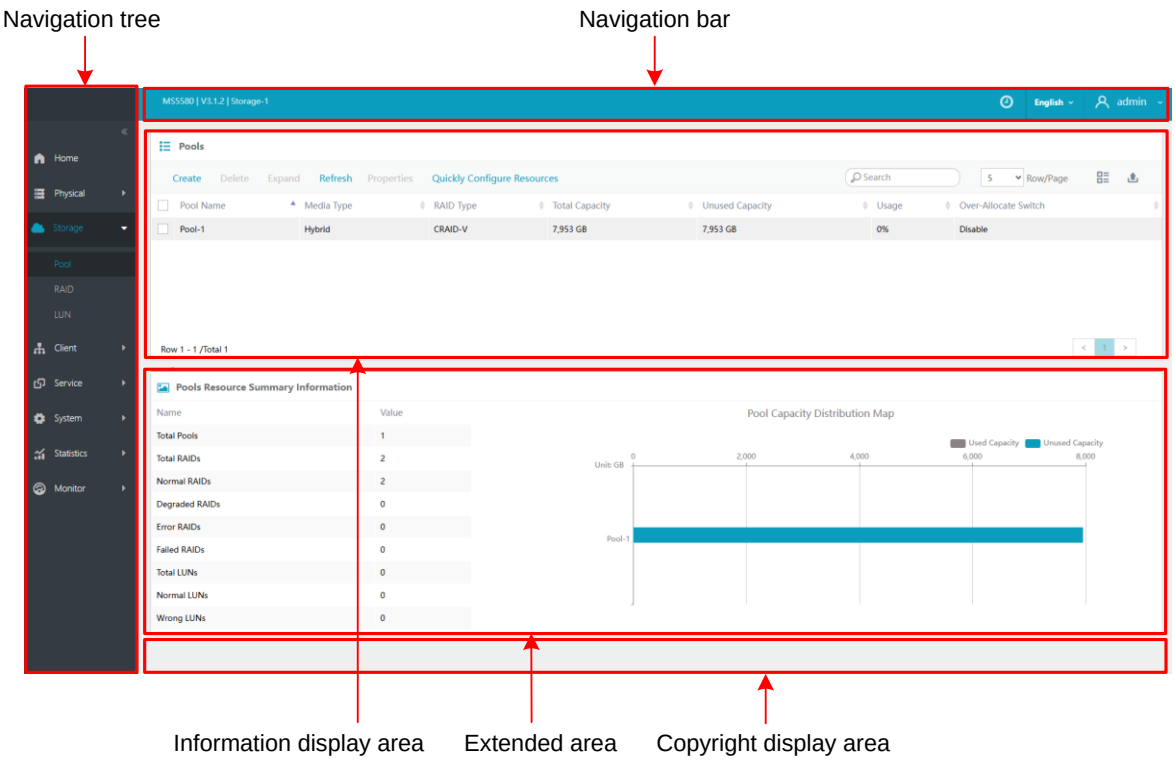

Figure 3-6 Example of ODSP Scope+ typical interface

3.3.2 Navigation Tree

The navigation tree is shown in Figure 3-7, which displays the main nodes of storage devices with a tree view, including home, physical, storage, client, service, system, monitor, etc. Click any node can expand its sub-node, and click any sub-node to manage it.

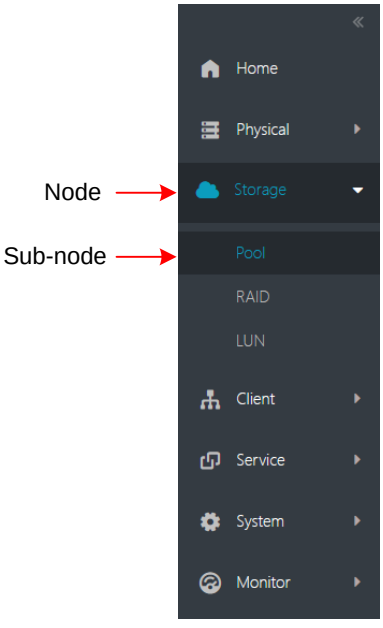

Figure 3-7 Example of ODSP Scope+ navigation tree

3.3.3 Navigation Bar

The navigation bar is shown in Figure 3-8 and it mainly includes the following six parts.

- Device information: It displays the model, version number and name of the device.
- Time information: Click this icon to open the window of modifying device time to modify the device time.
- Concern information: It displays the summary of the concerns. Click this icon to view the concerns in the floating window, as shown in Figure 3-9.
- Alarm information: It displays the summary of the current alarm of the device. Click this icon to expand the floating window to view the specific alarm items, as shown in Figure 3-10.
- Language information: Both simplified Chinese and English are supported currently. Click this icon to switch languages.
- User information: It displays the current login user on the web interface. Click this icon to perform operations such as modifying login timeout, changing password and logging out of the login session.

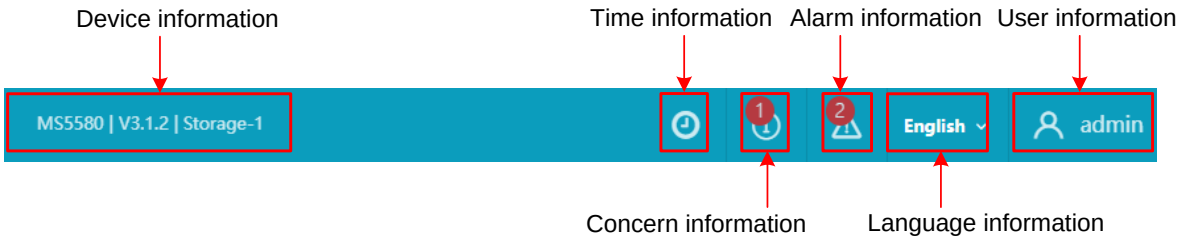

Figure 3-8 Example of ODSP Scope+ navigation bar

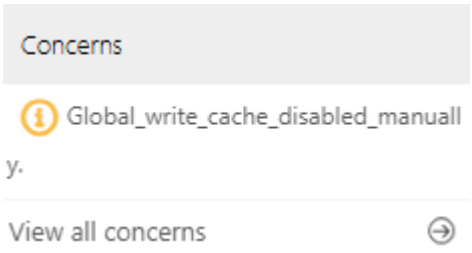

Figure 3-9 Example of ODSP Scope+ concerns

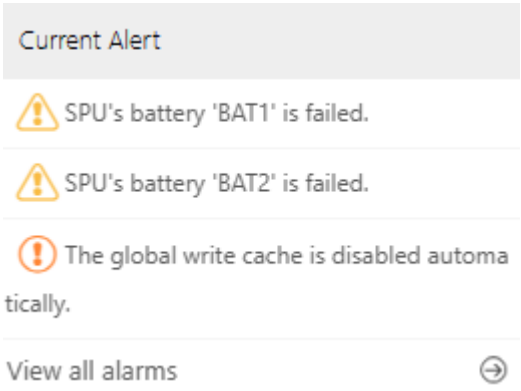

Figure 3-10 Example of ODSP Scope+ alarms

3.3.4 Information Display Area

The information display area is shown in Figure 3-11, which visually displays the detailed information of the current selected navigation tree node through the table.

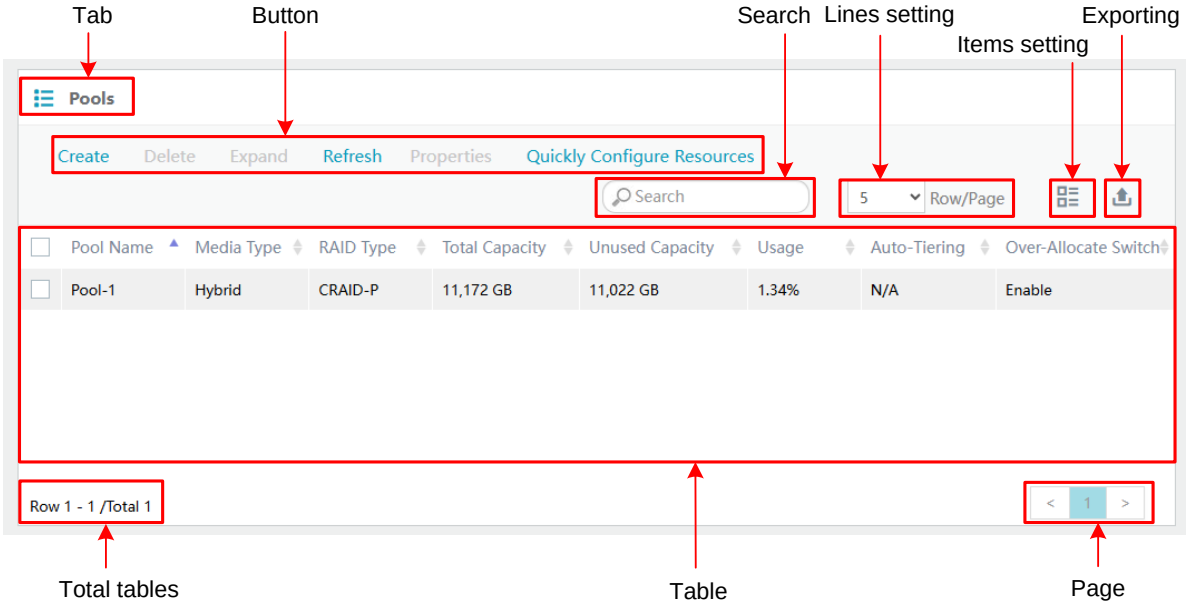

Figure 3-11 Example of ODSP Scope+ information display area

In the ODSP Scope+ information display area:

- You can click different tabs to view different tables in the case of multiple tabs.
- The supported operations will be displayed after selecting a row in the table. You can click the corresponding button to configure the operations as required. If you need to select multiple rows in the table, you can press Shift to select multiple lines at once.
- Resources can be quickly searched through the function of search. Multiple related objects including the members of Host group and consistency group are recommended to be created with the name of the same prefix for quick retrieval and usability improvement during operation.

- The display of the table can be adjusted through settings of lines and items, and the table data can also be directly exported through the export button.

3.3.5 Extended Area

Extended area displays the extension information of the selected node or line on the navigation tree or in the table respectively. The content of the extension area varies according to the selected item.

3.3.6 Copyright Display Area

The copyright display area shows the information of ODSP Scope+ copyrights.

3.4 Composition of ODSP Scope+ Tenant View Interface

3.4.1 Interface Overview

All the information of tenant is displayed on the typical interface of ODSP Scope+ tenant view interface, as shown in Figure 3-12, which can be divided into four parts, including navigation tree, navigation bar, information display area and extended area.

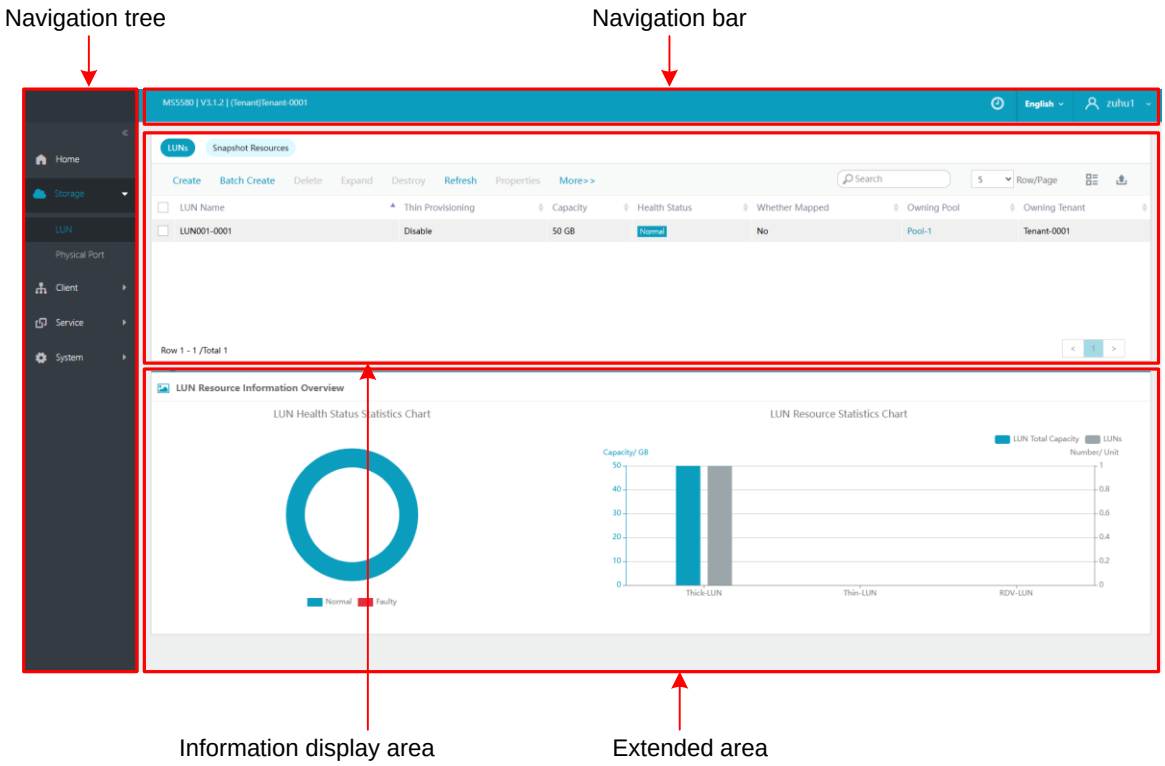

Figure 3-12 Example of ODSP Scope+ typical interface

3.4.2 Navigation Tree

The navigation tree is shown in Figure 3-13, which displays the main nodes of tenant with a tree view, including home, storage, client, service, system, etc. Click any node can expand its sub-node, and click any sub-node to manage it.

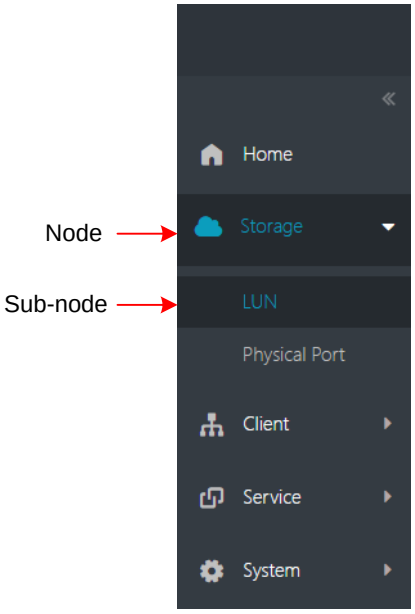

Figure 3-13 Example of ODSP Scope+ navigation tree

3.4.3 Navigation Bar

The navigation bar is shown in Figure 3-14 and it mainly includes the following four parts.

- Device information: It displays the model, version number and name of the tenant.
- Time information: Click this icon to see the device time.
- Language information: Both simplified Chinese and English are supported currently. Click this icon to switch languages.
- User information: It displays the current login user on the web interface. Click this icon to perform operations such as changing password and logging out of the login session.

Figure 3-14 Example of ODSP Scope+ navigation bar

3.4.4 Information Display Area

The information display area is shown in Figure 3-15, which visually displays the detailed information of the current selected navigation tree node through the table.

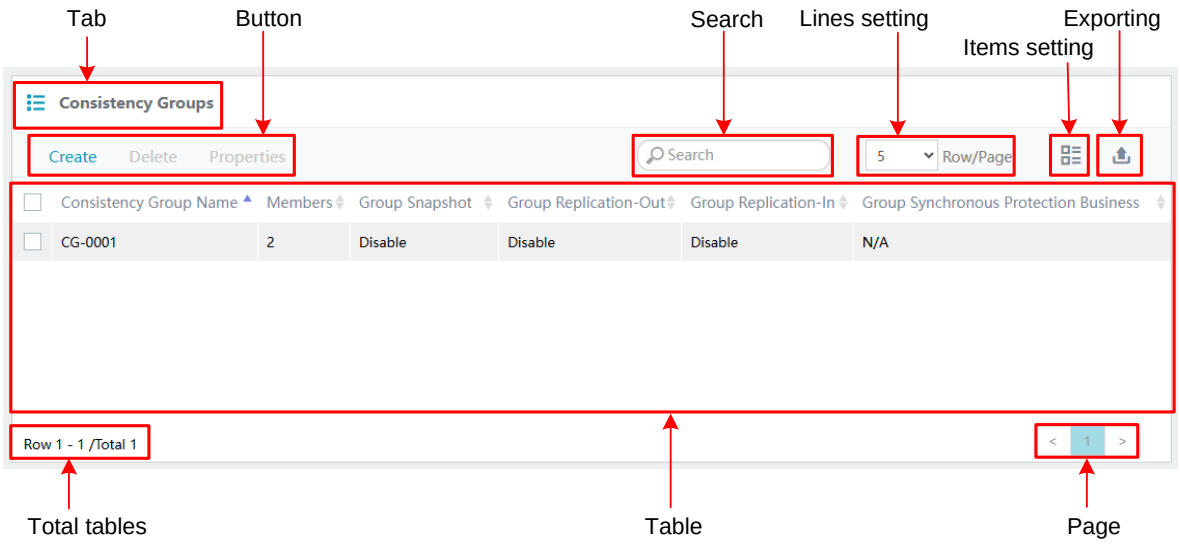

Figure 3-15 Example of ODSP Scope+ information display area

In the ODSP Scope+ information display area:

- You can click different tabs to view different tables in the case of multiple tabs.
- The supported operations will be displayed after selecting a row in the table. You can click the corresponding button to configure the operations as required. If you need to select multiple rows in the table, you can press Shift to select multiple lines at once.
- Resources can be quickly searched through the function of search. Multiple related objects including the members of consistency group are recommended to be created with the name of the same prefix for quick retrieval and usability improvement during operation.
- The display of the table can be adjusted through settings of lines and items, and the table data can also be directly exported through the export button.

3.4.5 Extended Area

Extended area displays the extension information of the selected node or line on the navigation tree or in the table respectively. The content of the extension area varies according to the selected item.

Part 2: ODSP Basic Configuration

4 Introduction to Basic Configuration

The basic configuration part mainly introduces physical resources, storage resources, clients, system management and monitoring center. The details are as follows:

- Physical resources: managements on devices, SPs, DSUs and disks.
- Storage resources: managements on pools, RAIDs and LUNs.
- Clients: managements on Initiators, Targets, I_T_Ls, mapping domains, NVMfs, etc.
- System managements: managements on users, roles and licenses, settings on system and alarm, maintenance center, etc.
- Monitoring center: managements on alarms, events, logs and topologies, viewing recent tasks, etc.

5 Physical Resources

5.1 Physical Resources Naming Rules

5.1.1 FSU Naming Rules

The FSU naming format is FSU-a:b:c, where a, b, and c are decimal numbers, and the specific rules are as follows:

- a indicates the logical number of FSUs, which are numbered sequentially from 100.
- b is fixed at 0.
- c indicates the number of FSU stages, which is fixed at 1.

5.1.2 SSU Naming Rules

The SSU naming format is SSU-a:b:c, where a, b, and c are decimal numbers, and the specific rules are as follows:

- a indicates the IO card slot number of the SP connected to the SSU.
- b indicates the port number on the IO card of the SP connected to the SSU.
- c indicates the number of SSU stages, which is fixed at 1.
- If the SSU is connected to the onboard SAS port of the SP, a will be fixed at 1, and b will be the corresponding number of SAS port on the SP.

5.1.3 DSU Naming Rules

5.1.3.1 DSU Following SPU

The DSU naming format is DSU-a:b:c, where a, b, and c are decimal numbers, and the specific rules are as follows:

- a indicates the IO card slot number of the SP connected to the DSU.
- b indicates the port number on the IO card of the SP connected to the DSU.
- c indicates the number of DSU stages, which is numbered sequentially from 1.
- If the DSU is connected to the onboard SAS port of the SP, a will be fixed at 1, and b will be the corresponding number of SAS port on the SP.
- If the DSU is connected to the onboard PCIe port of the SP, a and b will be fixed at 0 and 1 respectively.

5.1.3.2 DSU Following FSU

The DSU naming format is DSU-a:b:c, where a, b, and c are decimal numbers, and the specific rules are as follows:

- a indicates field a in the name of FSU connected to the DSU.
- b is fixed at 1.
- c indicates the number of DSU stages, which is numbered sequentially from 1.

5.1.3.3 DSU Following SSU

The DSU naming format is DSU-a:bA:c or DSU-a:bB:c, where a, b, and c are decimal numbers, and the specific rules are as follows:

- a and b indicate field a and b in the name of SSU connected to the DSU respectively.
- c indicates the number of DSU stages, which is numbered sequentially from 2.
- A and B indicate the port of DOWN-A and DOWN-B on the XP of SSU connected to the DSU.

5.1.4 Disk Naming Roles

The disk naming format is Disk-a:b:c:d, where a, b, c and d are decimal numbers, and the specific rules are as follows:

- a, b, and c are correspond to a, b, and c in the name of FSU or SSU or DSU respectively.
- d indicates the disk slot number.

5.1.5 Port Naming Rules

5.1.5.1 Ethernet Port Naming Rules

Each SP provides a console ETH port, where:

- SP1 management port: eth-1:0:0.
- SP2 management port: eth-2:0:0.

The business port naming format is eth-a:b:c, where a, b, and c are decimal numbers, and the specific rules are as follows:

- a indicates the SP slot number.
- b indicates the slot number of the IO card, where 0 indicates the mainboard.
- c indicates the port number on the IO card.

5.1.5.2 FC Port Naming Rules

FC port naming format is FC-a:b:c, where a, b, and c are decimal numbers. The specific rules are as follows:

- a indicates the SP slot number.
- b indicates the slot number of the IO card.
- c indicates the port number on the IO card.

5.1.5.3 SAS Port Naming Rules

The naming format of the SAS port on the SP is SAS-a:b:c, where a, b, and c are decimal numbers. The specific rules are as follows:

- a indicates the SP slot number.
- b indicates the SAS controller number. The SAS controller number of onboard SAS port is usually 1, and the SAS controller number of SAS port with the type of IO card is usually the slot number of corresponding IO card.
- c indicates the port number on the SAS controller.

The SAS ports on EP are named according to the upstream port and downstream port, corresponding to UP and DOWN respectively.

5.1.5.4 PCIe Port Naming Rules

The PCIe port naming format on the SP is pcie-a:b:c, where a, b, and c are decimal numbers. The specific rules are as follows:

- a indicates the SP slot number.
- b indicates the slot number of the IO card, where 0 indicates the mainboard.
- c indicates the port number on the IO card.

The PCIe ports on EP are named according to the upstream port and downstream port, corresponding to UP and DOWN respectively.

5.2 Managing Device

5.2.1 Restarting/Powering On/Off SP

⚠WARNING

If you need to reboot or power off SP, please perform related operations on GUI. It is forbidden to power off forcibly by other means to avoid data loose. In addition, the following operating restrictions should be noted:

- Please do not exchange SPs. In other words, do not insert SP1 into SP2's slot, and vice versa.
- Please do not pull out the running SP directly.
- Please do not press the switch button for a long time to forcibly power off the SP.

5.2.1.1 Restarting SP

This section explains how to restart SP.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Click the <Power On/Off> button in the extended area and click the <Restart> button in the drop-down menu to open the **Restart** window, as shown in Figure 5-1. Select SP, click the <OK> button, enter password of the current login user in the pop-up warning window, and click the <OK> button to complete the configuration.

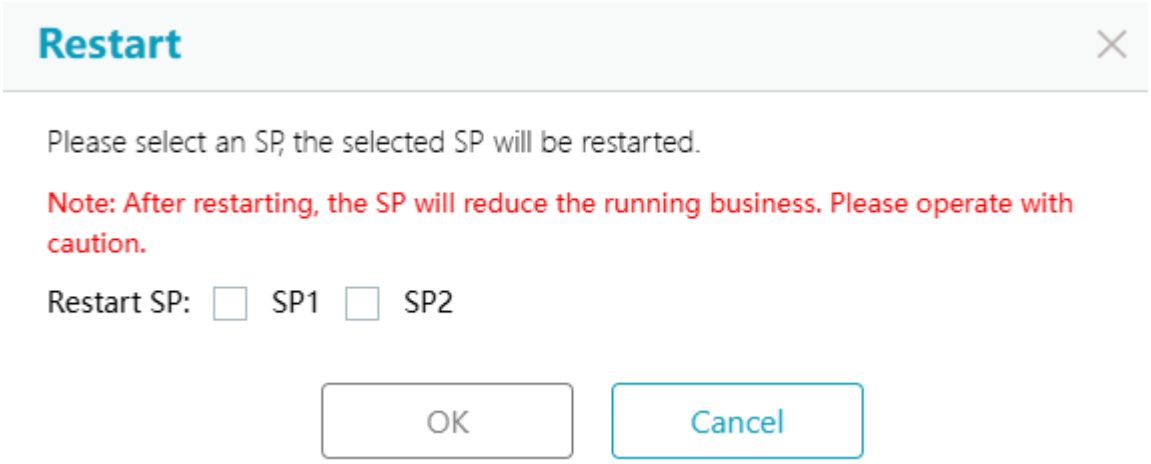

Figure 5-1 Restart interface

5.2.1.2 Powering On SP

This section explains how to power on SP.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Click the <Power On/Off> button in the extended area and click the <Power On> button in the drop-down menu to open the **Power On** window, as shown in Figure 5-2. Select SP, click the <OK> button, enter "yes" in the pop-up warning window, and click the <OK> button to complete the configuration.

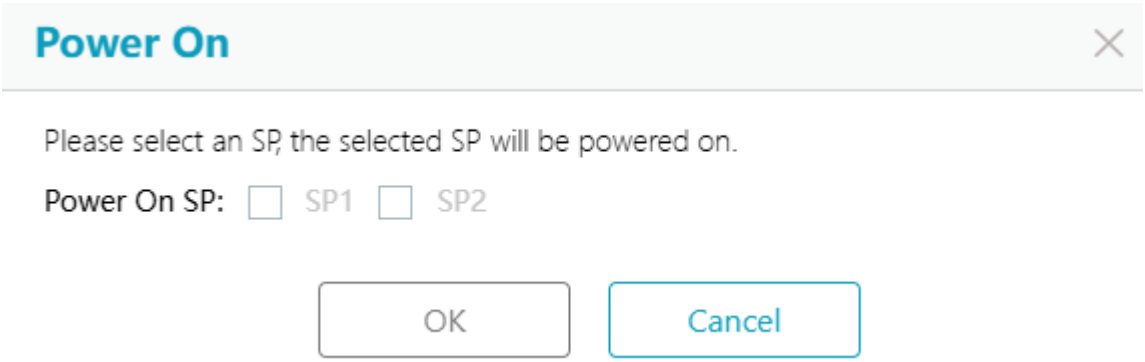

Figure 5-2 Power on interface

5.2.1.3 Powering Off SP

This section explains how to power off SP.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Click the <Power On/Off> button in the extended area and click the <Power Off> button in the drop-down menu to open the **Power Off** window, as shown in Figure 5-3. Select SP, click the <OK> button, enter password of the current login user in the pop-up warning window, and click the <OK> button to complete the configuration.

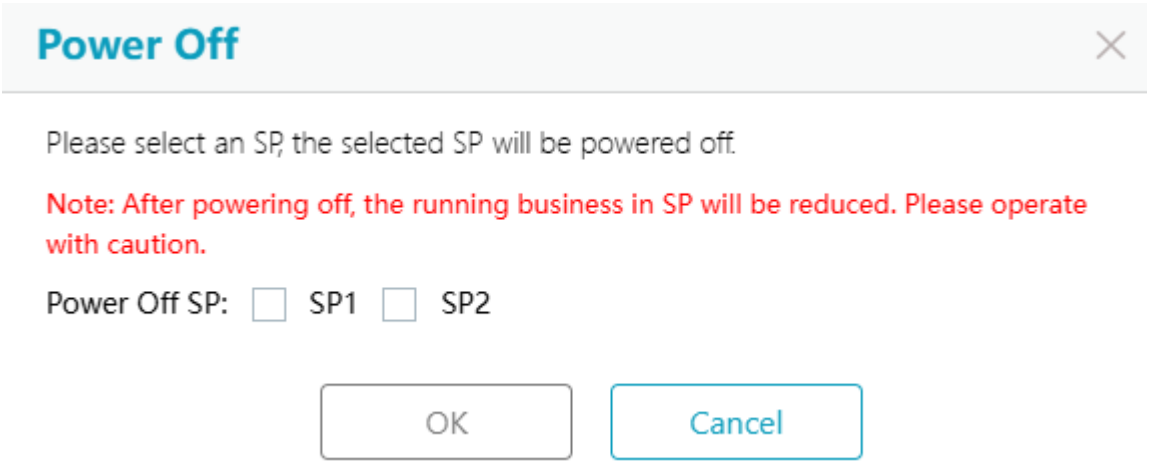

Figure 5-3 Power off interface

5.2.2 Viewing Device Properties

This section explains how to view device's general information, power supply module, fan module and battery module.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Click the <Properties> button in the extended area to open the **Basic Properties** window. You can view the basic properties of the device.

5.2.3 Modifying Device

5.2.3.1 Modifying Device Properties

This section explains how to modify device name and remark.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Click the <Properties> button in the extended area to open the **Basic Properties** window. The **General** tab is shown in Figure 5-4. Modify device properties and click the <Apply> button to complete the configuration.

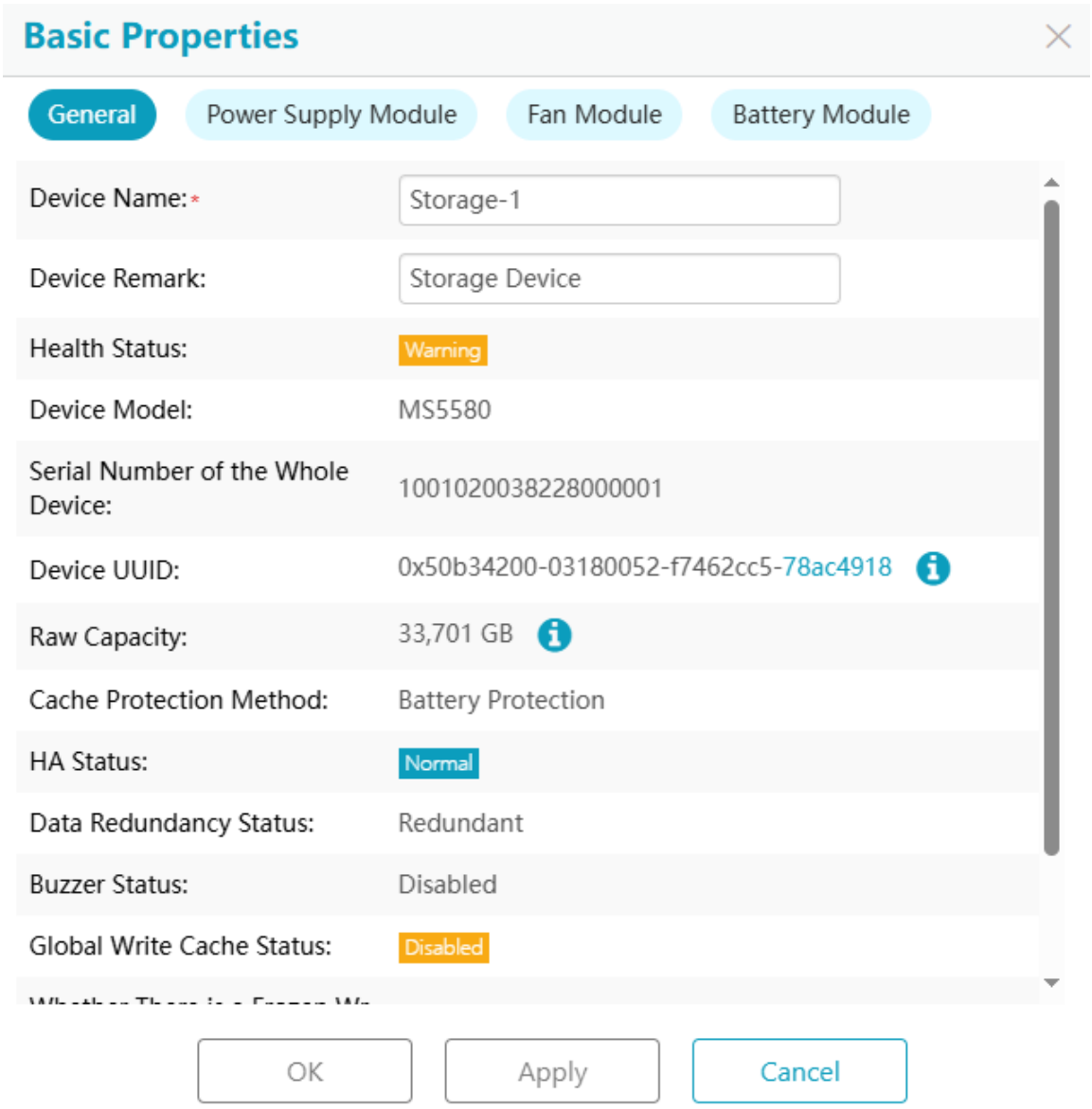

Figure 5-4 Device basic properties interface

5.2.3.2 Modifying Device Time

This section explains how to modify device time.

⚠CAUTION

Inconsistent time between device and actuality may cause the system preset tasks fail to be executed at the expected time. It is recommended to set the NTP automatic synchronization to achieve time consistency between NTP server and device.

Steps

Click the time icon on the navigation bar to open the **Modify Device Time** window, as shown in Figure 5-5. Modify device time (see Table 5-1 for details) and click the <OK> button to complete the configuration.

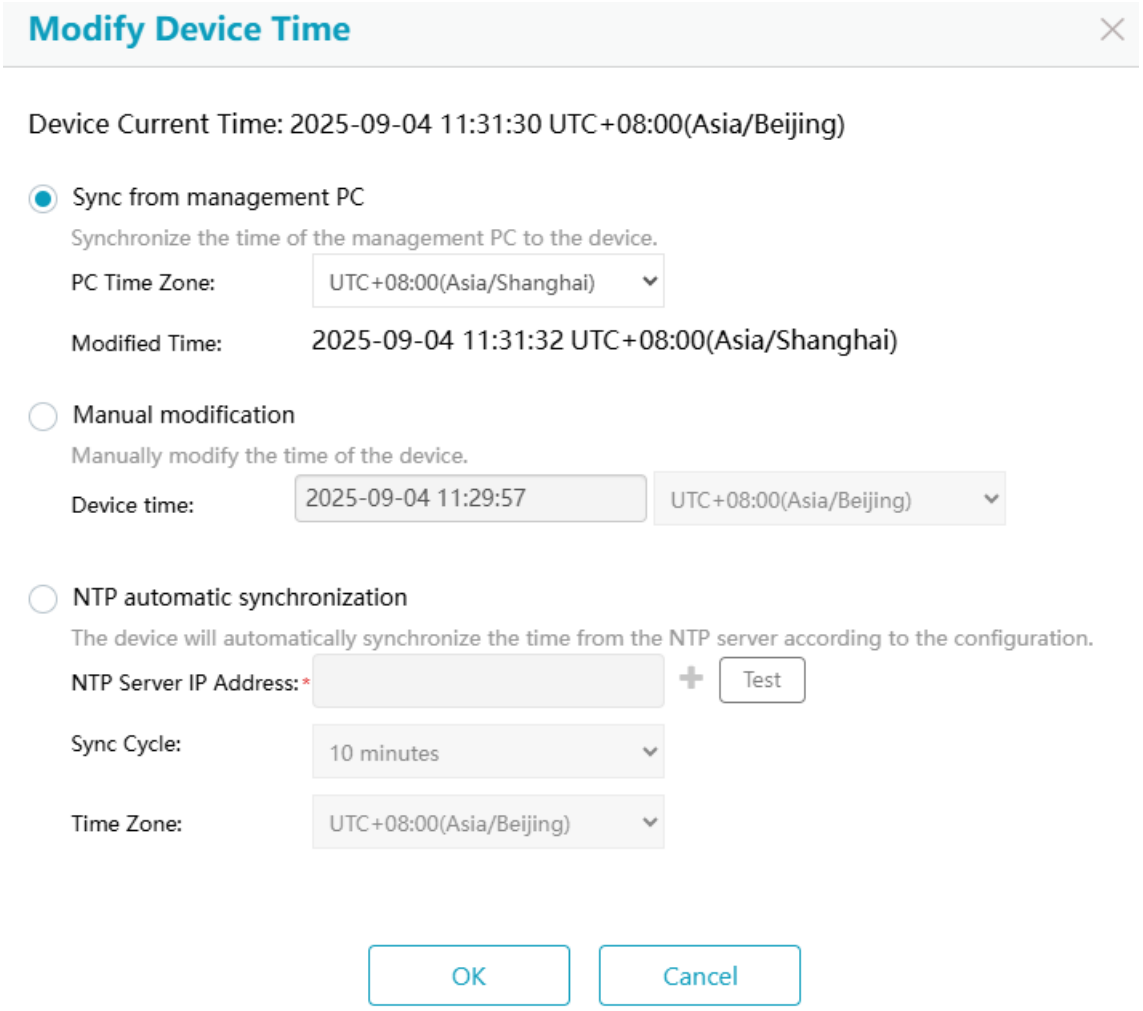

Figure 5-5 Modify device time interface

Table 5-1 Description of the parameters for modifying device time

Parameter	Description
Sync from management PC	It refers to the time synchronization from the management PC to the device.
Manual modification	It refers to manually modifying the device time.
NTP automatic synchronization	It refers to enabling the NTP automatic synchronization function. • NTP Server IP Address: It refers to the IP address of NTP server. Click the <+> button to add a spare NTP server, which will be switched automatically when the main NTP server is inaccessible. • Sync Cycle: It refers to the interval for the device to synchronize the time from NTP server. • Time Zone: It refers to the region where the time on the NTP server belongs.

5.2.3.3 Modifying Login Timeout

This section explains how to modify device login timeout.

Prerequisites

Only the admin user can modify login timeout.

Steps

Click the current login user icon on the navigation bar and click the <Modify Login Timeout> button in the drop-down menu to open the **Modify Login Timeout** window, as shown in Figure 5-6. Modify login timeout (see Table 5-2 for details) and click the <OK> button to complete the configuration.

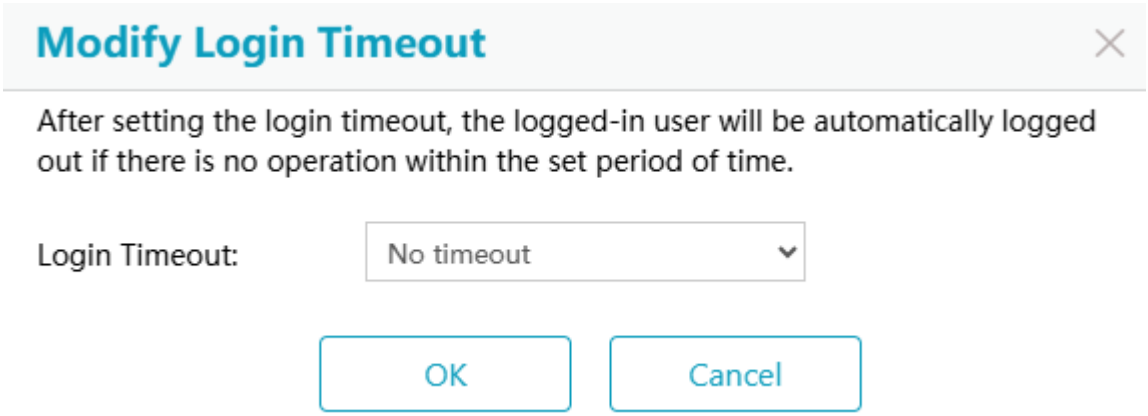

Figure 5-6 Modify login timeout interface

Table 5-2 Description of the parameters for modifying login timeout

Parameter	Description
Login Timeout	After setting the login timeout, the logged-in user will be logged out automatically if there is no operation within the set period. The default value is 30 minutes. The options are as follows: No timeout, 5 minutes, 10 minutes, 15 minutes, 30 minutes, 1 hour, 4 hours, 8 hours, 12 hours, 1 day and 7 days.

5.2.3.4 Modifying User Password

This section explains how to modify current user's password.

Steps

Click the current login user icon on the navigation bar and click the <Change Password> button in the drop-down menu to open the **Change User Password** window, as shown in Figure 5-6. Modify user password (see Table 5-2 for details) and click the <OK> button to complete the configuration.

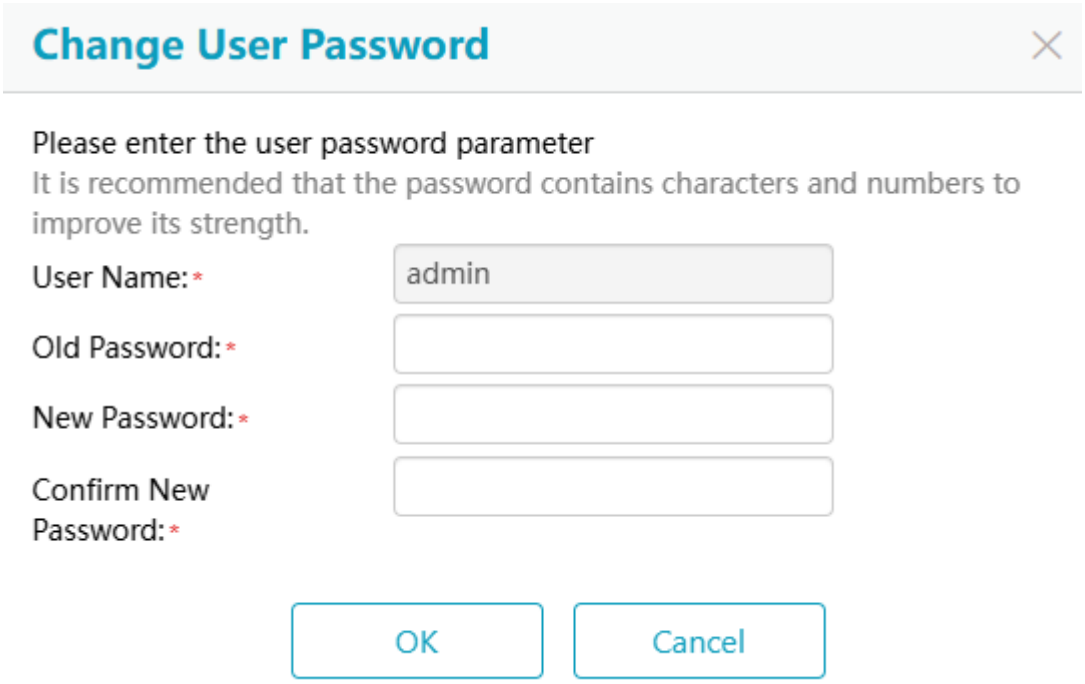

Figure 5-7 Change user password interface

Table 5-3 Description of the parameters for changing user password interface

Parameter	Description
User Name	It refers to the name of current login user.
Old Password	It refers to the old password of current login user.
New Password	It refers to the new password of current login user. • Length: 1-31 characters. • Valid character range: [a-zA-Z0-9.-_:,!@#%&*()] and space is not supported.
Confirm New Password	It refers to the confirmation of current login user's new password, which must be the same as "New Password".

5.2.4 Logging Out User

This section explains how to log out current user.

Steps

Click the current login user icon on the navigation bar, click the <Logout> button in the drop-down menu, and click the <OK>button in the pop-up confirmation box to complete the configuration.

5.2.5 Rescanning Device

This section explains how to retrieve device' status, configuration and other information.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Click the <Rescan> button in the extended area, and click the <OK> button in the pop-up confirmation box to complete the configuration.

5.2.6 Exporting the Third Party

This section explains how to write information of all LUNs into metadata.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Click the <Export Third Party> button in the extended area, and click the <OK> button in the pop-up confirmation box to complete the configuration.

5.2.7 One-Click Destroy

5.2.7.1 Activating Data Destroy License

This section explains how to activate data destroy license.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <License Setting> button to open the **License Setting** window, enter a valid data destroy license, and click the <Activate> button to complete the configuration.

5.2.7.2 One-Click Destroy of Configuration and Data

This section explains how to destroy all configuration and data in the way of one-click.

⚠WARNING

One-click destroy leads to unrecoverable destruction on all configurations and data of the storage device. Please operate with caution.

Prerequisites

Only admin user can perform one-click destruction of configuration and data.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Click the <One-Click Destroy> button in the extended area, enter the password of admin user and "yes" in the pop-up warning box, and click the <OK> button to start destroying configuration and data.

5.3 Managing SPU

5.3.1 Viewing SP Properties

This section explains how to view SP's general information and version.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "SPU" -> "SP" in the information display area, select the desired SP in the extended area, and click the <Properties> button to open the **Basic Properties** window. You can view the basic properties of the SP.

5.3.2 Locating SP

5.3.2.1 Starting Locating SP

This section explains how to start locating SP.

ⓘNOTE

The SP's locate indicator will be always on when the location is started. It is usually a blue indicator on the SP's panel. For the exact position, please refer to corresponding installation manual.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "SPU" -> "SP" in the information display area, select the desired SP in the extended area, click the <Locate> button, click the <Start Locating> button in the drop-down menu, and click the <OK> button in the pop-up confirmation box to start locating the SP.

5.3.2.2 Stopping Locating SP

This section explains how to stop locating SP.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "SPU" -> "SP" in the information display area, select the desired SP in the extended area, click the <Locate> button, click the <Stop Locating> button in the drop-down menu, and click the <OK> button in the pop-up confirmation box to complete the configuration.

5.3.3 Managing Ethernet Port

ⓘNOTE

The Ethernet port is referred to as network port for short.

5.3.3.1 Viewing Network Port Properties

This section explains how to view network port's basic properties.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "SPU" -> "SP" -> "Network Port" in the information display area, select the desired network port in the **Network Port (SPx)** tab of the extended area, and click the <Properties> button to open the **Basic Properties** window. You can view the basic properties of the network port.

5.3.3.2 Viewing Optical Module Diagnosis Information

This section explains how to view network port's optical module diagnosis information.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "SPU" -> "SP" -> "Network Port" in the information display area, select the desired network port in the **Network Port (SPx)** tab of the extended area, click the <More> button, and click the <Optical Module Diagnosis Information> button in the drop-down menu to open the **Optical Module Diagnosis Information** window. You can view the optical module diagnosis information of the network port.

5.3.3.3 Configuring Network

This section explains how to configure network for every port.

ⓘNOTE

- The members in aggregate port cannot be configured individually.
- If the network port has been used by the Target and does not support modifying IP address, please modify other configurations.
- It the network port has been used by XAN, please modify IP address in the window of XAN properties.

⚠CAUTION

- The existing static routes may be affected during the process of network configuration. Please reconfigure the static routes under this circumstance.
- 192.168.110.0/24 is a reserved network segment of the storage device. Please do not configure the IP address of the network segment.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "SPU" -> "SP" -> "Network Port" in the information display area, select the desired network port in the **Network Port (SPx)** tab of the extended area, and click the <Configure Network> button to open the **Configure Network** window, as shown in Figure 5-8. Enter relevant parameters (see Table 5-4 for details) and click the <OK> button to complete the configuration.

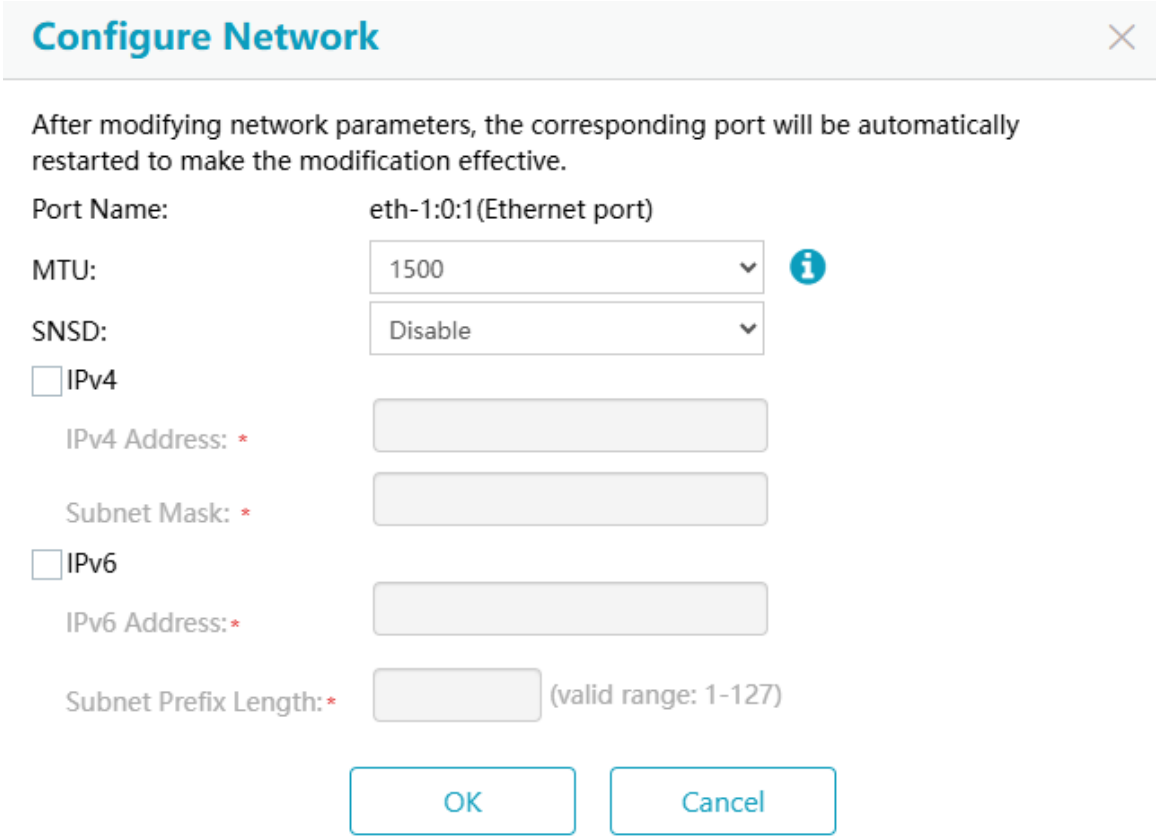

Figure 5-8 Configure network interface

Table 5-4 Description of the parameters for configuring network

Parameter	Description
MTU	It refers to the MTU of the port, which can be set to 1500 and 9000.
SNSD	It refers to whether the SNSD function needs to be enabled on the port. If it needs to be enabled, please select the corresponding specification according to actual needs.

	• Disable: It means that SNSD is not enabled. • Enable ODCC specification: It indicates that SNSD is enabled and ODCC specification is used. • Enable CMCC specification: It indicates that SNSD is enabled and CMCC specification is used.
IPv4 Address	It refers to the IPv4 address of the port.
Subnet Mask	It refers to the subnet mask of the port IPv4 address.
IPv6 Address	It refers to the IPv6 address of the port.
Subnet Prefix Length	It refers to the prefix length of the port IPv6 subnet. Valid range: 1-127.

5.3.3.4 Batch Configuring Networks

This section explains how to batch configure networks for network ports.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "SPU" -> "SP" -> "Network Port" in the information display area, click the <Batch Configure Network> button in the **Network Port (SPx)** tab of the extended area to open the **Batch Configure Network** window, as shown in Figure 5-9. Enter relevant parameters (see Table 5-4 for details) and click the <OK> button to complete the configuration.

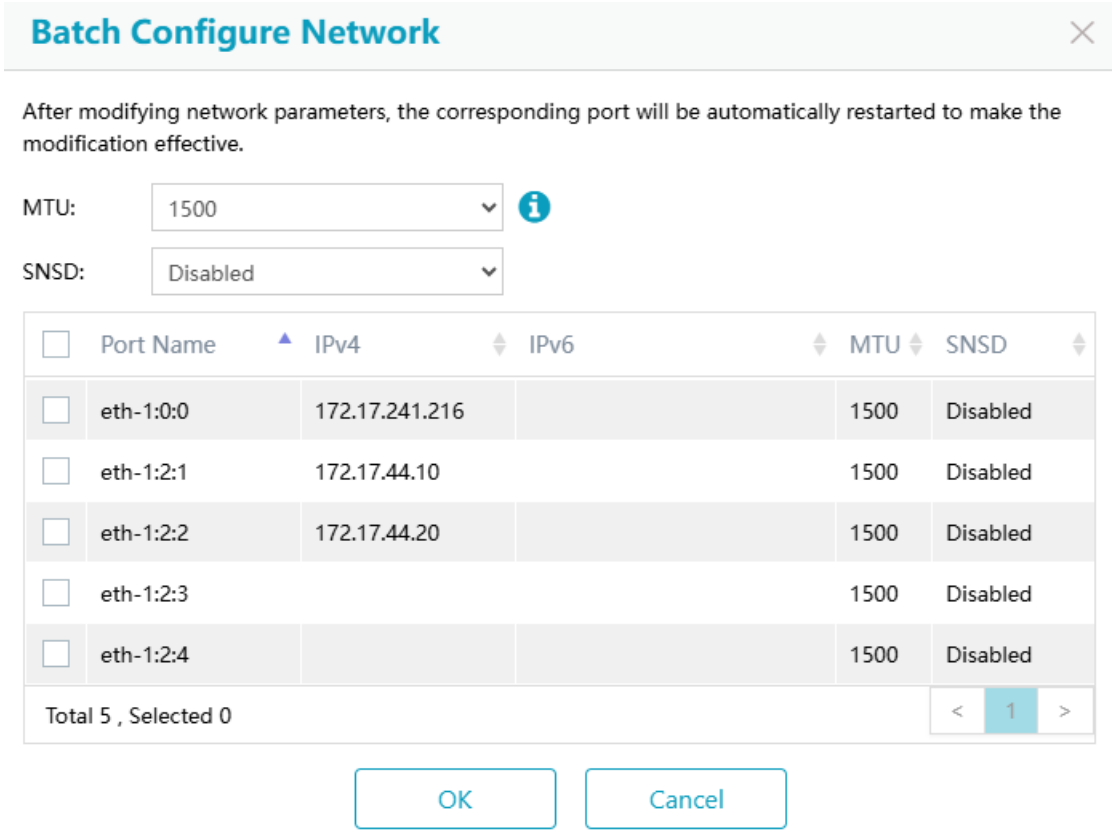

Figure 5-9 Batch configure network interface

5.3.3.5 Configuring Routes

⚠CAUTION

Only Layer 3 network involves routs configuration. A wrong route configuration affects network connectivity and business continuity. If you need to modify the route configuration, please contact to manufacturer's technical supporters for assistance.

5.3.3.6 Creating Aggregate Port

This section explains how to create aggregate port.

ⓘNOTE

- Through port aggregation function, multiple physical ports can be bound into one aggregate port, and multiple physical ports can be used as members of the aggregate port. It is required that the rates of all members in an aggregate port must be the same.
- The members of an aggregate port cannot be used alone, for example, to create a Target.

Prerequisites

Before creating an aggregate port, please ensure that the current aggregation mode meets the requirements. For details, see 8.4.9.2 Configuring Aggregate Port Mode.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "SPU" -> "SP" -> "Network Port" in the information display area, click the <More> button in the **Network Port (SPx)** tab of the extended area, and click the <Create Aggregate Port> button in the drop-down menu to open the **Create Aggregate Port** window, as shown in Figure 5-10. Enter relevant parameters (see Table 5-5 for details) and click the <OK> button to complete the configuration.

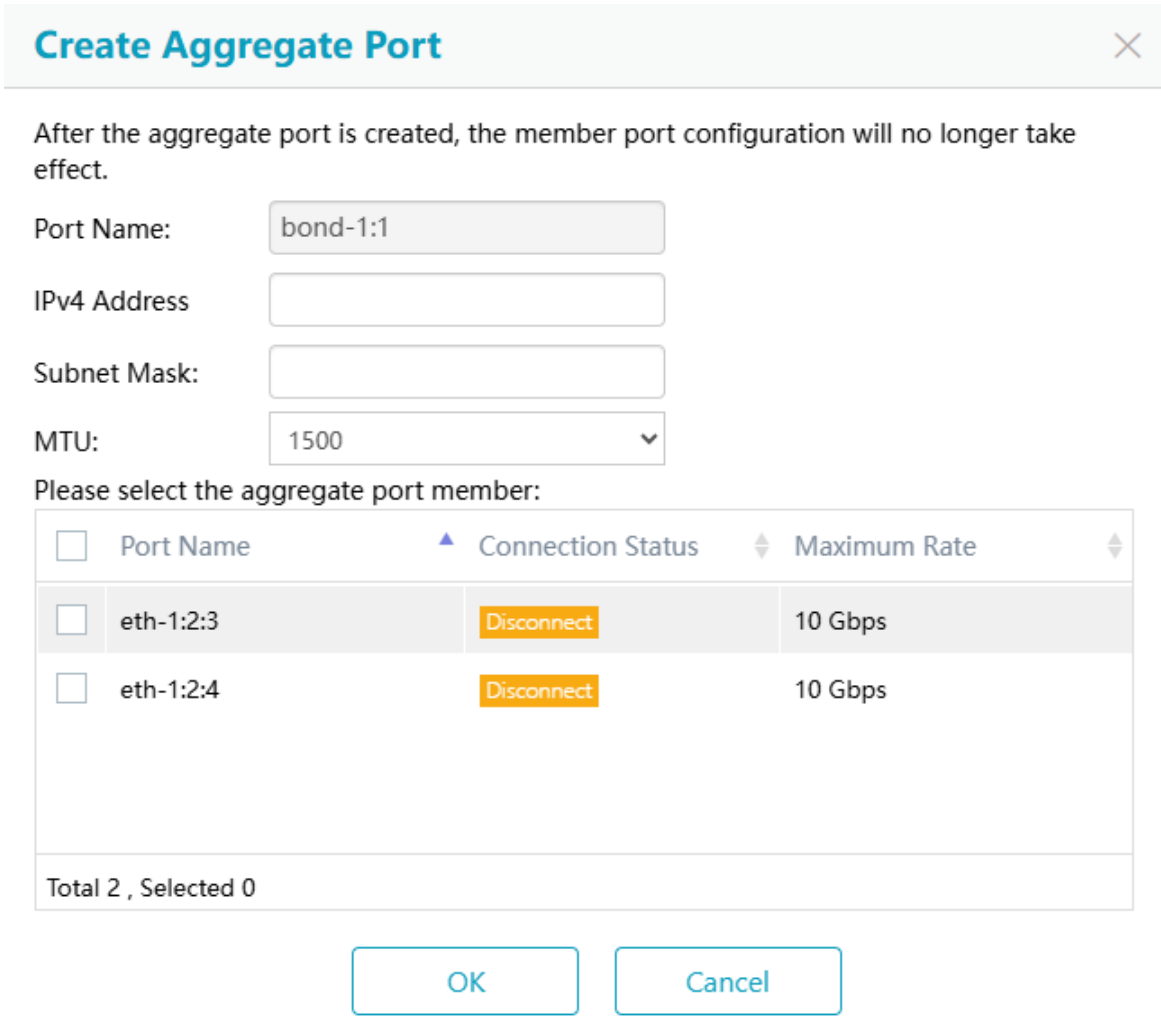

Figure 5-10 Create aggregate port interface

Table 5-5 Description of the parameters for creating aggregate port

Parameter	Description
Port Name	It refers to the name of aggregate port.
IPv4 Address	It refers to the IPv4 address of aggregate port.
Subnet Mask	It refers to the subnet mask of aggregate port IPv4 address.
MTU	It refers to the MTU of aggregate port, which can be set to 1500 and 9000.

5.3.3.7 Deleting Aggregate Port

This section explains how to delete aggregate port.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "SPU" -> "SP" -> "Network Port" in the information display area, select the desired aggregate port in the **Network Port (SPx)** tab of the extended area, click the <More> button, click the <Delete Aggregate Port> button in the drop-down menu, and click the <OK> button in the pop-up confirmation box to complete the configuration.

5.3.3.8 Enabling Network Port

This section explains how to enable network port.

ⓘNOTE

Network will be disabled automatically if it is disconnected frequently due to network instability, and the connection status of the network port will become disabled. Please check network environment and manually enable the network port under this circumstance.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "SPU" -> "SP" -> "Network Port" in the information display area, select the desired network port in the **Network Port (SPx)** tab of the extended area, click the <More> button, click the <Enable Network Port> button in the drop-down menu, and click the <OK> button in the pop-up confirmation box to complete the configuration.

5.3.3.9 Deleting Missing Network Port

This section explains how to delete missing network port.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "SPU" -> "SP" -> "Network Port" in the information display area, select the desired network port in the **Network Port (SPx)** tab of the extended area, click the <More> button, click the <Delete Missing Network Port> button in the drop-down menu, and click the <OK> button in the pop-up confirmation box to complete the configuration.

5.3.4 Managing VLAN

5.3.4.1 Creating VLAN

This section explains how to create VLAN for network port.

Prerequisites

The network has no IP address.

Step

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "SPU" -> "SP" -> "Network Port" in the information display area, select the desired network port in the **Network Port (SPx)** tab of the extended area, and click the <Configure VLAN> button to open the **Configure VLAN** window, as shown in Figure 5-11.

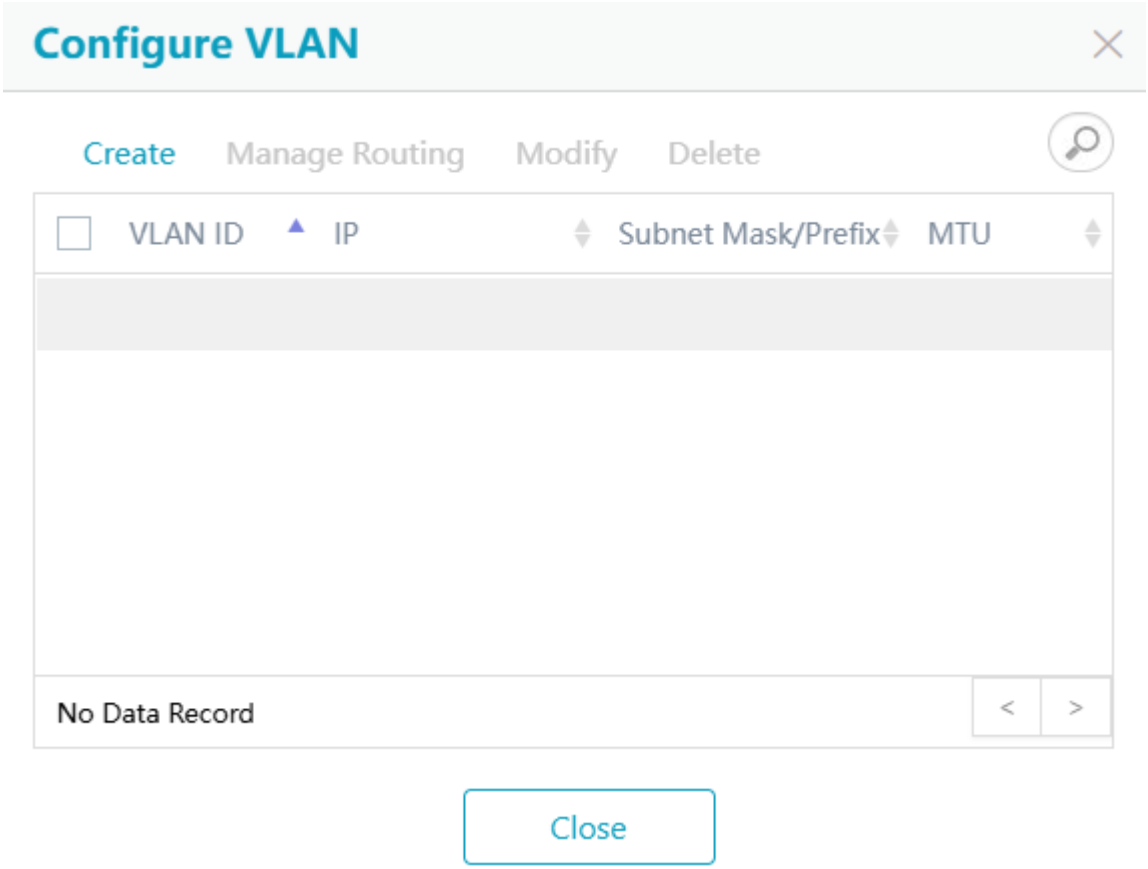

Figure 5-11 Configure VLAN interface

Step 3: Click the <Create> button to open the **Create VLAN** window, as shown in Figure 5-12. Enter relevant parameters (see Table 5-6 for details) and click the <OK> button to complete the configuration.

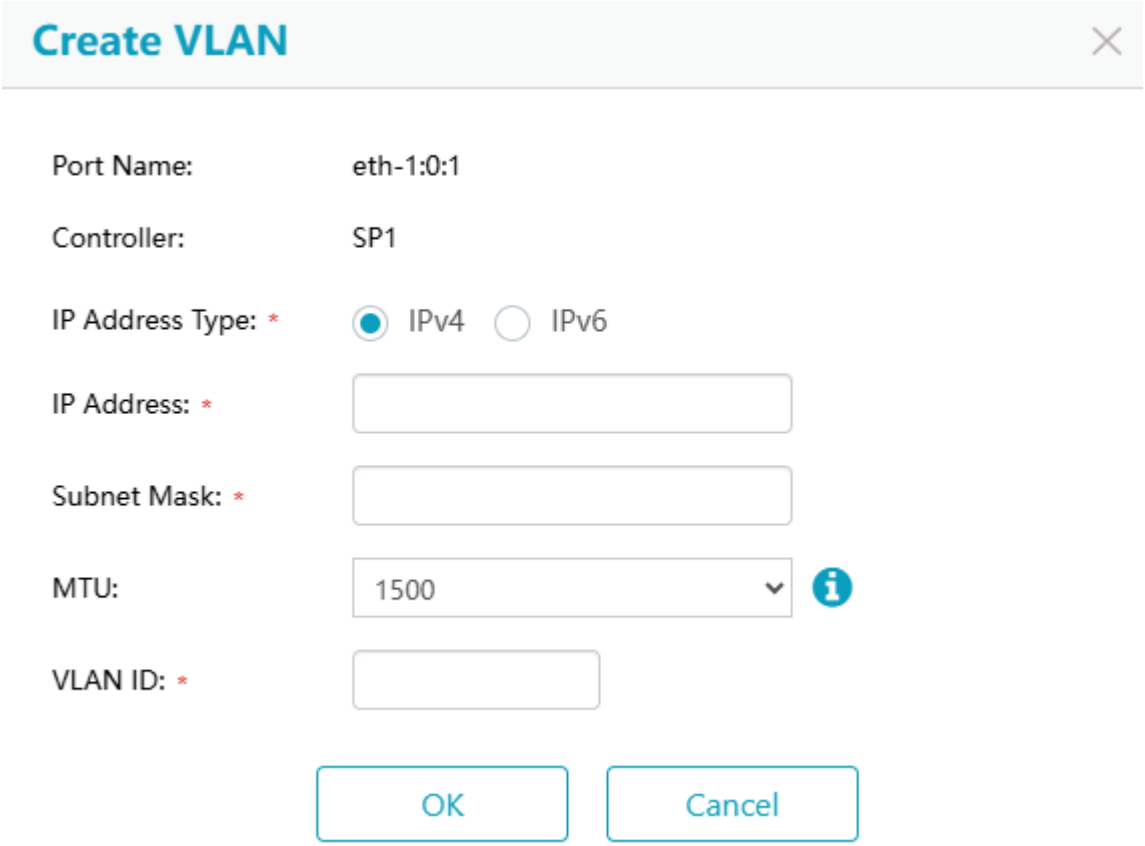

Figure 5-12 Create VLAN interface

Table 5-6 Description of the parameters for creating VLAN interface

Parameter	Description
IP Address Type	It refers to the IP address type of VLAN, including IPv4 and IPv6.
IP Address	It refers to the IP address of VLAN.
Subnet Mask	It refers to the subnet mask of VLAN IPv4 address.
Prefix	It refers to the prefix length of VLAN IPv6 address. Valid range: 1-127.
MTU	It refers to the MTU of VLAN, which can be set to 1500 and 9000.
VLAN ID	It refers to the ID of VLAN. Valid range: 1-4094.

5.3.4.2 Modifying VLAN

This section explains how to modify VLAN's MTU.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "SPU" -> "SP" -> "Network Port" in the information display area, select the desired network port in the **Network Port (SPx)** tab of the extended area, and click the <Configure VLAN> button to open the **Configure VLAN** window, as shown in Figure 5-13.

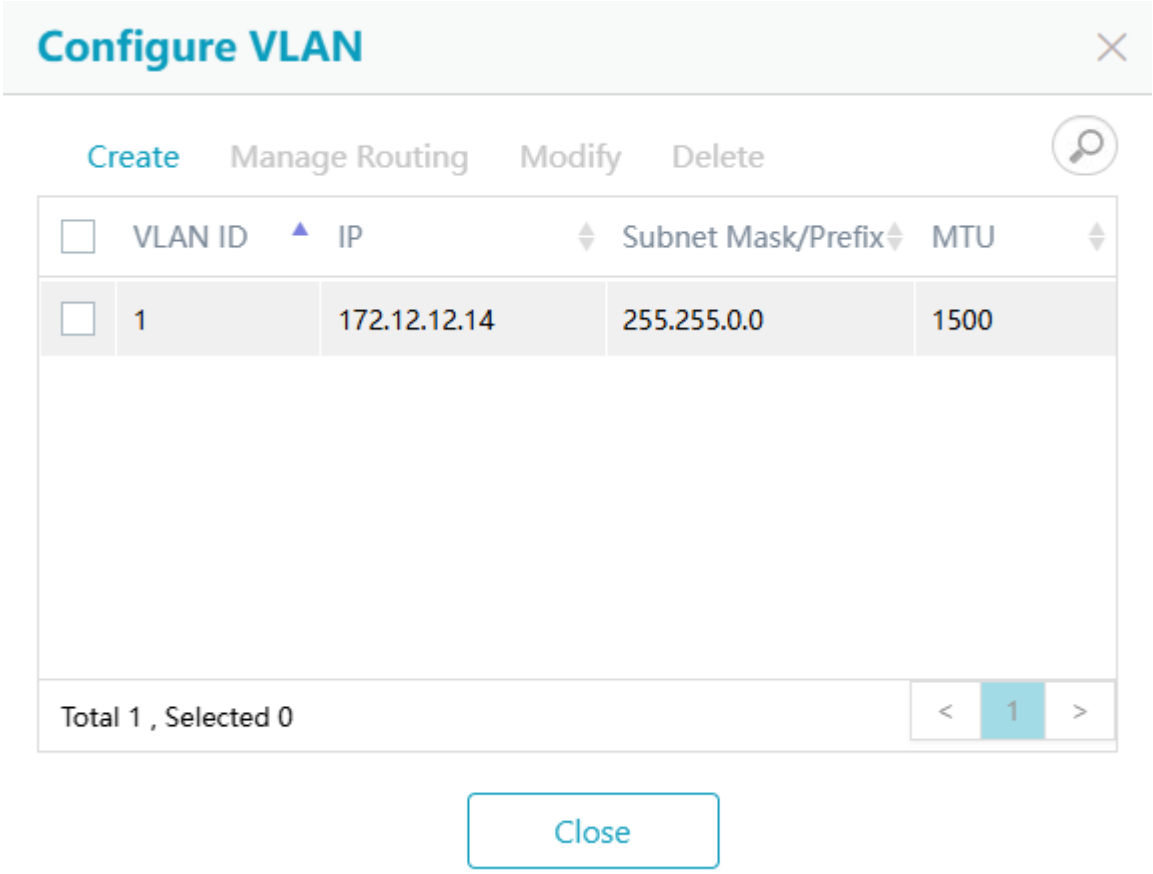

Figure 5-13 Configure VLAN interface

Step 3: Select the desired VLAN, click the <Modify> button, and enter "yes" in the pop-up warning box to open the **Modify VLAN** window, as shown in Figure 5-14. Modify MTU and click the <OK> button to complete the configuration.

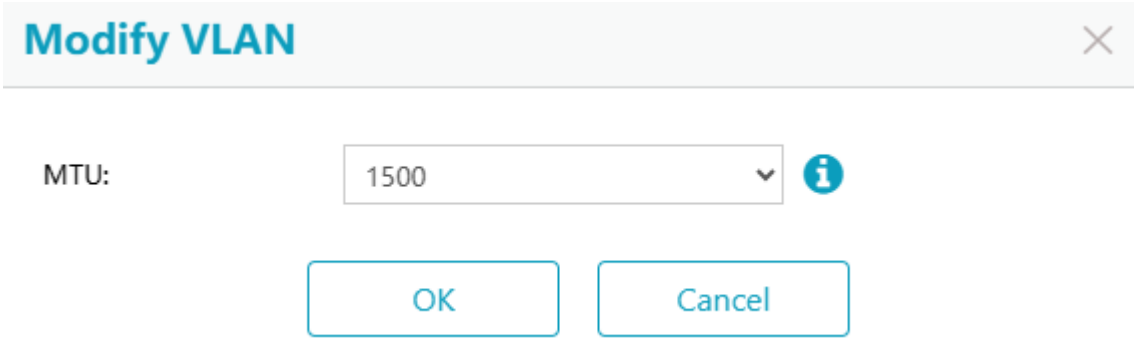

Figure 5-14 Modify VLAN interface

5.3.4.3 Deleting VLAN

This section explains how to delete VLAN.

⚠CAUTION

Deleting a VLAN will interrupt its existing connection, causing loss of port IP addresses and routing configurations. Please operate with caution.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "SPU" -> "SP" -> "Network Port" in the information display area, select the desired network port in the **Network Port (SPx)** tab of the extended area, and click <Configure VLAN> to open the **Configure VLAN** window, as shown in Figure 5-13.

Step 3: Select the desired VLAN, click the <Delete> button, enter "yes" in the pop-up warning box, and click the <OK> button to complete the configuration.

5.3.4.4 Configuring Route

⚠CAUTION

Only Layer 3 network involves rout configuration. A wrong route configuration affects network connectivity and business continuity. If you need to modify the route configuration, please contact to manufacturer's technical supporters for assistance.

5.3.5 Managing FC Port

5.3.5.1 Viewing FC Port Properties

This section explains how to view FC port's basic properties.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "SPU" -> "SP" -> "FC Port" in the information display area, select the desired FC port in the **FC Port (SPx)** tab of the extended area, and click the <Properties> button to open the **Basic Properties** window. You can view the basic properties of the FC port.

5.3.5.2 Viewing Optical Module Diagnosis Information

This section explains how to view FC port's optical module diagnosis information.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "SPU" -> "SP" -> "FC Port" in the information display area, select the desired FC port in the **FC Port (SPx)** tab of the extended area, and click the <Optical Module

Diagnosis Information> button to open the **Optical Module Diagnosis Information** window. You can view the optical module diagnosis information of the FC port.

5.3.5.3 Managing FC Port Error Information

This section explains how to view, clear and refresh FC port's error information.

ⓘNOTE

- The error information of FC port is counted by the underlying hardware, and the operation of FC port can be easily judged by the error information.
- Error information of FC ports on the SP will be re-counted after restarting SP.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "SPU" -> "SP" -> "FC Port" in the information display area, click the <Manage Error Information> button in the **FC Port (SPx)** tab of the extended area to open the **Manage Error Information** window, as shown in Figure 5-15. You can view the error information, and perform cleaning, refreshing and other operations.

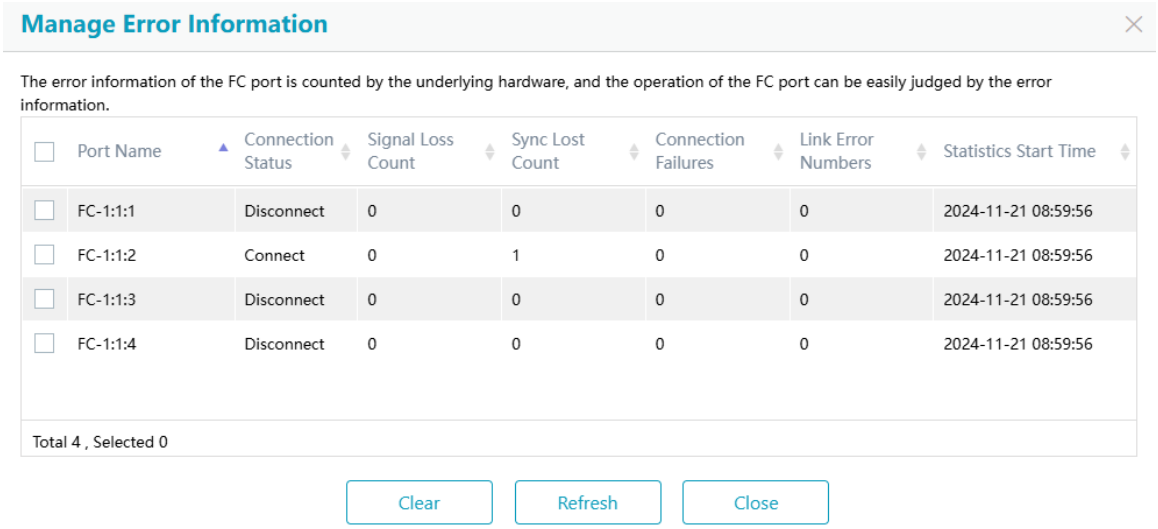

Figure 5-15 Manage FC port error information interface

5.3.5.4 Enabling FC Port

This section explains how to enable FC port.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "SPU" -> "SP" -> "FC Port" in the information display area, select the desired FC port in the **FC Port (SPx)** tab of the extended area, click the <Enable> button, and click the <OK> button in the pop-up confirmation box to complete the configuration.

5.3.6 Viewing SAS Port Properties

This section explains how to view SAS port's basic properties.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "SPU" -> "SP" -> "SAS Port" in the information display area, select the desired SAS port in the **SAS Port (SPx)** tab of the extended area, and click the <Properties> button to open the **Basic Properties** window. You can view the basic properties of the SAS port.

5.3.7 Managing IO Card

5.3.7.1 Viewing IO Card Physical Ports

This section explains how to view IO card's physical ports.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "SPU" -> "SP" -> "IO Card" in the information display area, select the desired IO card in the **IO Card (SPx)** tab of the extended area, and click the <Physical Ports> button to open the **Physical Ports** window. You can view the physical ports of the IO card.

5.3.7.2 Powering On/Off IO Card

⚠CAUTION

Powering on/off an IO card may result in business interruption. If you need to power on/off the IO card, please contact to manufacturer's technical supporters for assistance.

5.3.8 Viewing Fan Speed

This section explains how to view fan speed.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "SPU" -> "SP" -> "Fan" in the information display area, select the desired fan in the extended area, and click the <Fan Speed> button to open the **Fan Speed** window. You can view the speed of the fan.

5.4 Managing DSU

ⓘNOTE

There is an integrated DSU in some SPUs, which is usually called inside DSU. The name of the DSU will be displayed as "(SPU inside)" additionally. The information of power supply module, fan module, and battery module of inside DSU is not displayed. The DSU cannot be located separately.

5.4.1 Viewing DSU Properties

This section explains how to view DSU's general information, power supply module, fan module and battery module.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "DSUs" in the information display area, select the desired DSU in the extended area, and click the <Properties> button to open the **Basic Properties** window. You can view the basic properties of the DSU.

5.4.2 Locating DSU

5.4.2.1 Starting Locating DSU

This section explains how to start locating DSU.

ⓘNOTE

All EP's locate indicators in the DSU will be always on when the location is started. They are usually blue indicators on the EP's panel. For the exact position, please refer to corresponding product installation manual.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "DSUs" in the information display area, select the desired DSU in the extended area, click the <Locate> button, click the <Start Locating> button in the drop-down menu, and click the <OK> button in the pop-up confirmation box to start locating the DSU.

5.4.2.2 Stopping Locating DSU

This section explains how to stop locating DSU.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface,

Step 2: Select "Device" -> "DSUs" in the information display area, select the desired DSU in the extended area, click the <Locate> button, click the <Stop Locating> button in the drop-down menu, and click the <OK> button in the pop-up confirmation box to complete the configuration.

5.4.3 Managing EP

5.4.3.1 Viewing EP Port Status

This section explains how to view EP's port status.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "DSU" -> "DSU-a:b:c" -> "EP" in the information display area, select the desired EP in the extended area, and click the <Port Status> button to open the **Port Status** window. You can view the port status of the EP.

5.4.3.2 Viewing EP Temperature Details

This section explains how to view EP's temperature details.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "DSU" -> "DSU-a:b:c" -> "EP" in the information display area, select the desired EP in the extended area, and click the <Temperature Details> button to open the **Temperature Details** window. You can view the temperature details of the EP.

5.4.4 Viewing Power Details

This section explains how to view power's temperature details.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "DSU" -> "DSU-a:b:c" -> "Power" in the information display area, select the desired PS in the extended area, and click the <Details> button to open the **Power Details** window. You can view the details of the power.

5.4.5 Viewing Fan Speed

This section explains how to view fan speed.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "DSU" -> "DSU-a:b:c" -> "Fan" in the information display area, select the desired fan in the extended area, and click the <Fan Speed> button to open the **Fan Speed** window. You can view the speed of the fan.

5.4.6 Managing Disk

ⓘNOTE

You can also select "Physical" -> "Disk" on the navigation tree to open the disk interface to manage disk. For details, see 5.5 Managing Disk.

5.4.6.1 Viewing Disk Properties

This section explains how to view disk's general information and S.M.A.R.T information.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "DSU" -> "DSU-a:b:c" -> "Disk" in the information display area, select the desired disk in the extended area, and click the <Properties> button to open the **Basic Properties** window. You can view the basic properties of the disk.

5.4.6.2 Starting Locating Disk

This section explains how to start locating disk.

ⓘNOTE

The green indicator of the disk will blink at 1Hz frequency when the location is started.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "DSU" -> "DSU-a:b:c" -> "Disk" in the information display area, select the desired disk in the extended area, click the <Locate> button, click the <Start Locating> button in the drop-down menu, and click the <OK> button in the pop-up confirmation box to start locating the disk.

5.4.6.3 Stopping Locating Disk

This section explains how to stop locating disk.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "DSU" -> "DSU-a:b:c" -> "Disk" in the information display area, select the desired disk in the extended area, click the <Locate> button, click the <Stop Locating> button in the drop-down menu, and click the <OK> button in the pop-up confirmation box to complete the configuration.

5.4.6.4 Powering Off Disk Safely

This section explains how to power off disk safely.

Steps

Step 1: Select "Physical" -> "Device" on the navigation tree to open the device interface.

Step 2: Select "Device" -> "DSU" -> "DSU-a:b:c" -> "Disk" in the information display area, select the desired disk in the extended area, click the <Power Off Safely> button, confirm the object in the pop-up confirmation box, and click the <OK> button to complete the configuration.

5.5 Managing Disk

5.5.1 Viewing Disk Properties

This section explains how to view disk's general information and S.M.A.R.T information.

Steps

Step 1: Select "Physical" -> "Disk" on the navigation tree to open the disk interface.

Step 2: Select the desired disk in the **Disks** tab of the information display area and click the <Properties> button to open the **Basic Properties** window of the disk. You can view the basic properties of the disk.

5.5.2 Locating Disk

5.5.2.1 Starting Locating Disk

This section explains how to start locating disk.

ⓘNOTE

The green indicator of the disk will blink at 1Hz frequency when the location is started.

Steps

Step 1: Select "Physical" -> "Disk" on the navigation tree to open the disk interface.

Step 2: Select the desired disk in the **Disks** tab of the information display area, click the <Locate> button, click <Start Locating> button in the drop-down menu, and click the <OK> button in the pop-up confirmation box to start locating the disk.

5.5.2.2 Stopping Locating Disk

This section explains how to stop locating disk.

Steps

Step 1: Select "Physical" -> "Disk" on the navigation tree to open the disk interface.

Step 2: Select the desired disk in the **Disks** tab of the information display area, click the <Locate> button, click the <Stop Locating> button in the drop-down menu, and click the <OK> button in the pop-up confirmation box to complete the configuration.

5.5.3 Powering Off Disk Safely

5.5.3.1 Powering Off Selected Disk Safely

This section explains how to power off all selected disk safely.

Steps

Step 1: Select "Physical" -> "Disk" on the navigation tree to open the disk interface.

Step 2: Select the desired disk in the **Disks** tab of the information display area, and click the <Power Off Safely> button, enter "yes" in the pop-up warning box, and click the <OK> button to complete the configuration.

5.5.3.2 Powering Off Specified Slot Safely

This section explains how to power off disk in specified slot safely.

Steps

Step 1: Select "Physical" -> "Disk" on the navigation tree to open the disk interface.

Step 2: Click the <More> button in the **Disks** tab of the information display area and click the <Power Off the Specified Slot Safely> button in the drop-down menu to open the **Power Off the Specified Slot Safely** window, as shown in Figure 5-16. Enter the disk slot and click the <OK> button to complete the configuration.

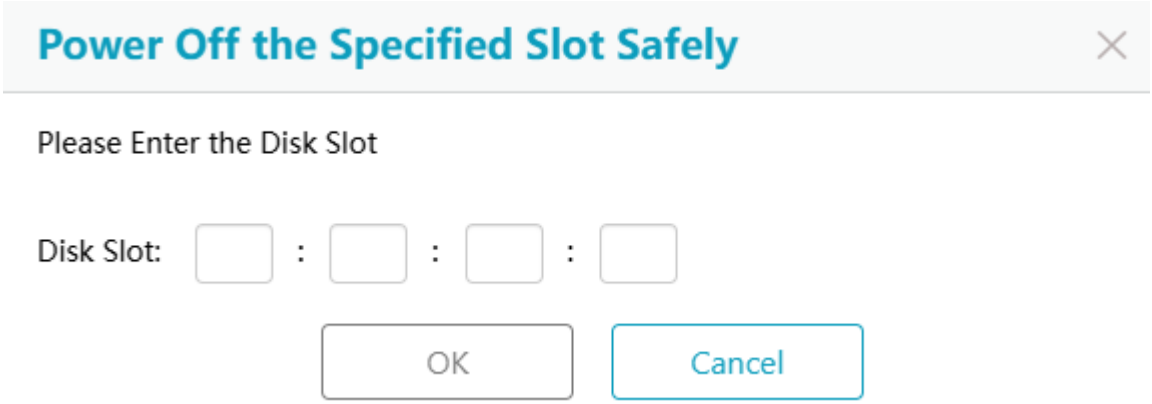

Figure 5-16 Power off the specified slot safely interface

5.5.4 Configuring Global Hot Spare Disk

This section explains how to add/remove global hot spare disk.

Steps

Step 1: Select "Physical" -> "Disk" on the navigation tree to open the disk interface.

Step 2: Click the <Configure Global Hot Spare> button in the **Disks** tab of the information display area to open the **Configure Global Hot Spare** window, as shown in Figure 5-17. Add/Remove the global hot spare disk through the ">>" button or "<<" button and click the <OK> button to complete the configuration.

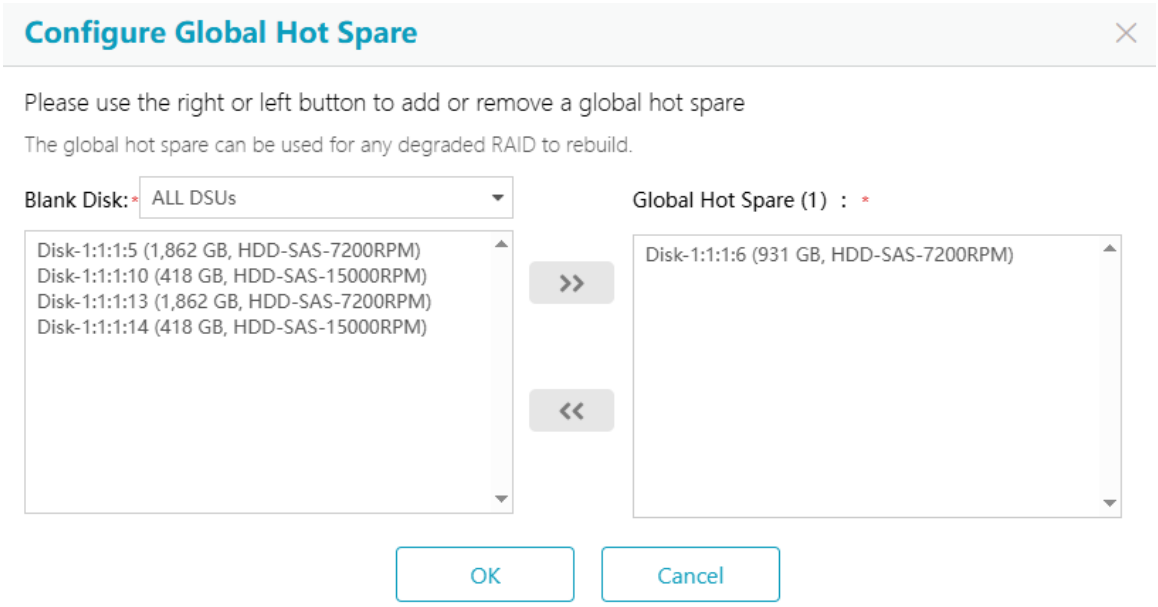

Figure 5-17 Configure global hot spare interface

5.5.5 Managing Disk Monitoring Center

5.5.5.1 Viewing Disk S.M.A.R.T Information

This section explains how to view disk's S.M.A.R.T information.

Steps

Step 1: Select "Physical" -> "Disk" on the navigation tree to open the disk interface.

Step 2: Select the desired disk in the **Disk Monitoring Center** tab of the information display area, click the <More> button, and click <Disk S.M.A.R.T Information> button in the drop-down menu to open the **Basic Properties** window. You can view the S.M.A.R.T information of the disk.

5.5.5.2 Adding Disk to Disk Pre-detection Center

This section explains how to add disk to disk pre-detection center.

Steps

Step 1: Select "Physical" -> "Disk" on the navigation tree to open the disk interface.

Step 2: Select the desired disk in the **Disk Monitoring Center** tab of the information display area, click the <Add to Disk Pre-detection Center> button, and click the <OK> button in the pop-up confirmation box to complete the configuration.

5.5.5.3 Migrating Disk

This section explains how to migrating data in data disk.

ⓘNOTE

- If the data disk belongs to CRAID-P, its data will be migrated to target disk.
- If the data disk belongs to CRAID-V, its data will be migrated to hot spare space.

Steps (CRAID-P data disk)

Step 1: Select "Physical" -> "Disk" on the navigation tree to open the disk interface.

Step 2: Select the desired disk in the **Disk Monitoring Center** tab of the information display area and click the <Migrate Disk> button to open the **Migrate Disk** window, as shown in Figure 5-18. Select target disk, click the <OK> button, and click the <OK> button in the pop-up confirmation box to complete the configuration.

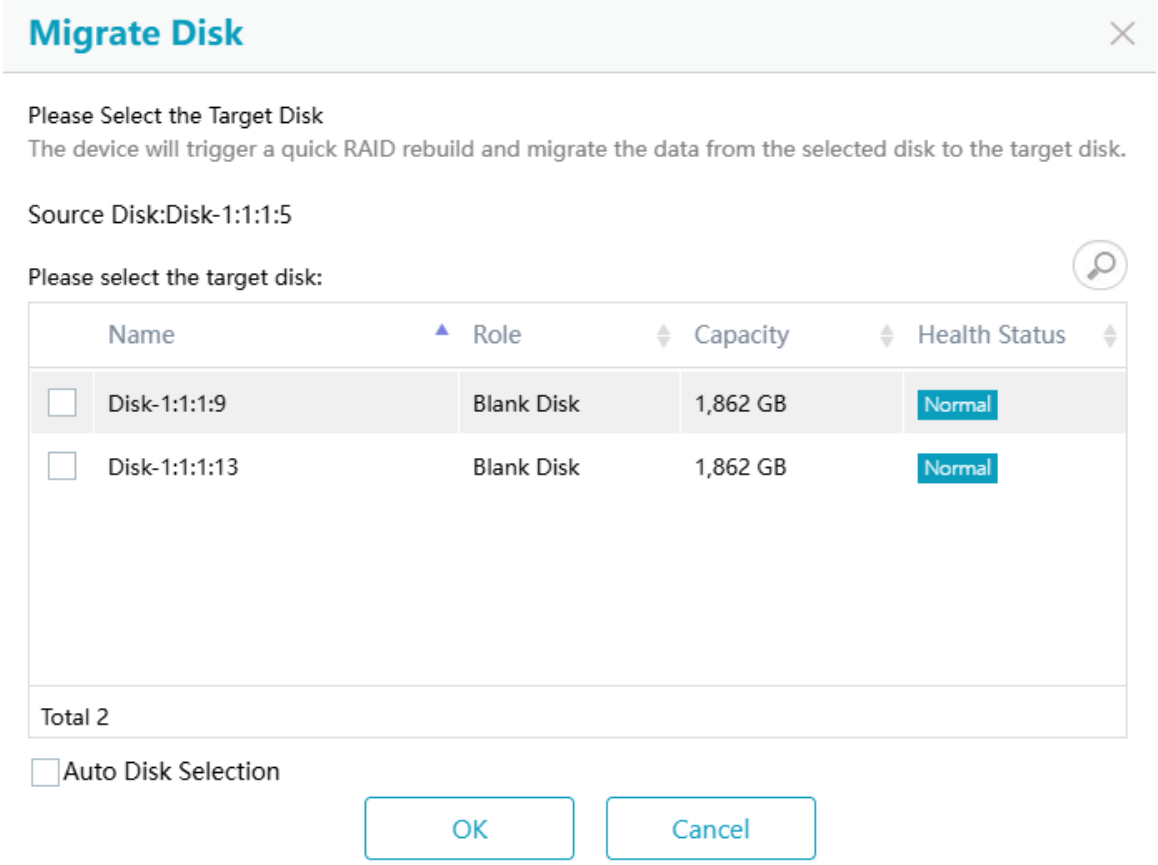

Figure 5-18 Migrate disk interface

Steps (CRAID-V data disk)

Step 1: Select "Physical" -> "Disk" on the navigation tree to open the disk interface.

Step 2: Select the desired disk in the **Disk Monitoring Center** tab of the information display area, click the <Migrate Disk> button, and click the <OK> button in the pop-up confirmation box to complete the configuration.

5.5.5.4 Removing Global Hot Spare Disk

This section explains how to remove global hot spare disk.

Steps

Step 1: Select "Physical" -> "Disk" on the navigation tree to open the disk interface.

Step 2: Select the desired global hot spare disk in the **Disk Monitoring Center** tab of the information display area, click the <Remove Hot Spare> button, check "Start diagnosis immediately after removal" option as needed in the pop-up confirmation box, and click the <OK> button to complete the configuration.

5.5.5.5 Performing Original Factory Inspection

This section explains how to perform original factory inspection for disk.

Prerequisites

Disk's vendor is HGST, HITACHI or TOSHIBA.

ⓘNOTE

Disk's vendor information can be obtained on the surface of properties. For details, see 5.5.1 Viewing Disk Properties.

Steps

Step 1: Select "Physical" -> "Disk" on the navigation tree to open the disk interface.

Step 2: Select the desired disk in the **Disk Monitoring Center** tab of the information display area, click the <More> button, click the <Original Factory Inspection> button in the drop-down menu, and click the <OK> button in the pop-up confirmation box to complete the configuration.

5.5.5.6 Powering Off Selected Disks Safely

This section explains how to power off all selected disks safely.

Steps

Step 1: Select "Physical" -> "Disk" on the navigation tree to open the disk interface.

Step 2: Select the desired disk in the **Disk Monitoring Center** tab of the information display area, click the <More> button, click the <Power Off Safely> button in the drop-down menu, confirm the object in the pop-up confirmation box, and click the <OK> button to complete the configuration.

5.5.5.7 Configuring Disk Power-On Time Alarm

This section explains how to configure disk power-on time alarm threshold.

Steps

Step 1: Select "Physical" -> "Disk" on the navigation tree to open the disk interface.

Step 2: Click the <More> button in the **Disk Monitoring Center** tab of the information display area and click the <Configuration> button in the drop-down menu to open the **Configure Monitoring Center** window, as shown in Figure 5-19. Set disk power-on time alarm threshold (see Table 5-7 for details) and click the <OK> button to complete the configuration.

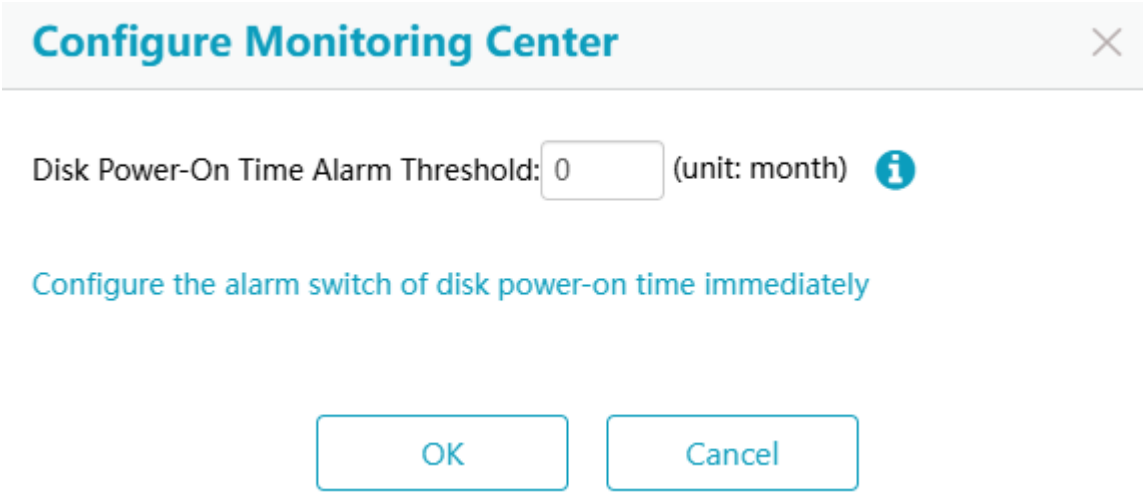

Figure 5-19 Configure monitoring center interface

Table 5-7 Description of the parameters for configuring monitoring center interface

Parameter	Description
Disk Power-On Time Alarm Threshold	The alarm is triggered according to the disk power-on time alarm switch when the accumulated power-on time reaches the threshold. Valid range: 0-60. Unit: month. 0 indicates that the disk power-on time alarm is disabled.

5.5.6 Managing Disk Pre-detection Center

5.5.6.1 Viewing Pre-detection History Record

This section explains how to view all disks' pre-detection history record.

Steps

Step 1: Select "Physical" -> "Disk" on the navigation tree to open the disk interface.

Step 2: Click the <More> button in the **Disk Pre-detection Center** tab of the information display area and click the <Historical Records> button in the drop-down menu to open the **Historical Records** window. You can view the pre-detection history of all disks.

5.5.6.2 Adding Disk

This section explains how to add disk to disk pre-detection center.

Steps

Step 1: Select "Physical" -> "Disk" on the navigation tree to open the disk interface.

Step 2: Click the <Add> button in the **Disk Pre-detection Center** tab of the information display area to open the **Add Disk** window, as shown in Figure 5-20. You can select to automatically add

all disks in the pre-detection range or manually add specified disks and click the <OK> button to complete the configuration.

ⓘNOTE

You can also set the option of "Only perform pre-detection during the pre-detection period" if you choose to add the specific disk manually.

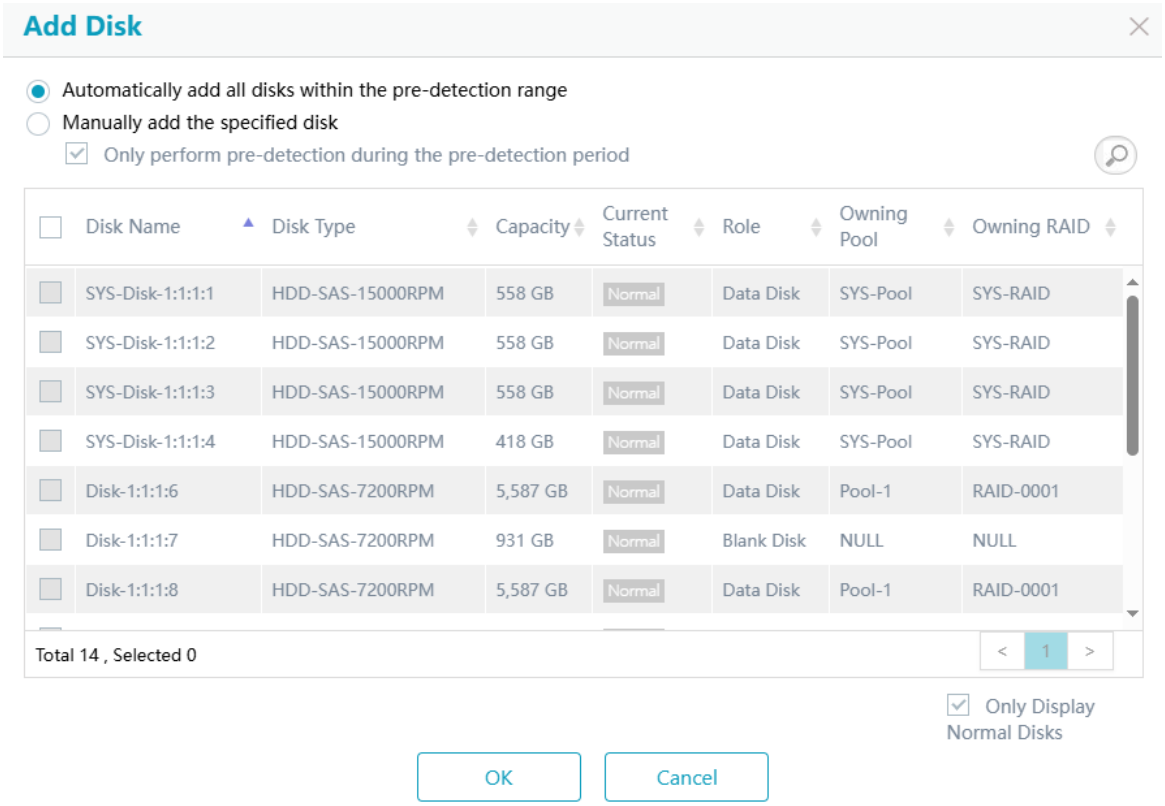

Figure 5-20 Add disk interface

5.5.6.3 Removing Disk

This section explains how to remove disk from disk pre-detection center.

Steps

Step 1: Select "Physical" -> "Disk" on the navigation tree to open the disk interface.

Step 2: Select the desired disk in the **Disk Pre-detection Center** tab of the information display area, click the <Remove> button, and click the <OK> button in the pop-up confirmation box to complete the configuration.

5.5.6.4 Configuring Pre-detection Center

This section explains how to configure pre-detection center status, pre-detection auto-start policy, pre-dection range and pre-detecion period.

Steps

Step 1: Select "Physical" -> "Disk" on the navigation tree to open the disk interface.

Step 2: Click the <More> button in the **Disk Pre-detection Center** tab of the information display area and click the <Configuration> button in the drop-down menu to open the **Configure Pre-detection Center** window, as shown in Figure 5-21. Enter relevant parameters (see Table 5-8 for details) and click the <Apply> button to complete the configuration.

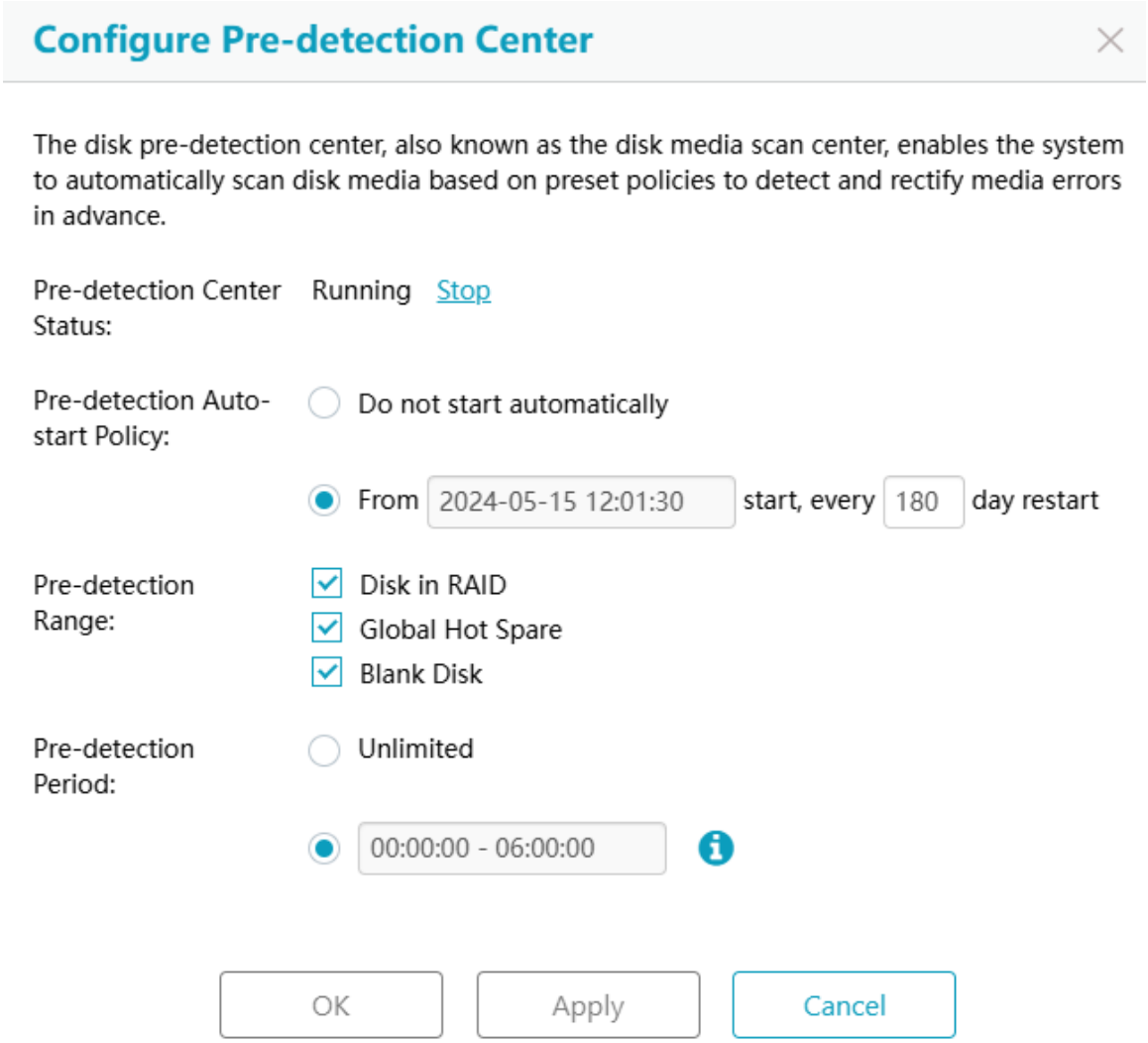

Figure 5-21 Configure pre-detection center interface

Table 5-8 Description of the parameters for configuring pre-detection center interface

Parameter	Description
Pre-detection Center Status	It refers to the current running status of the disk pre-detection center, which supports manual operation or manual stop of the pre-detection center.
Pre-detection Auto-start Policy	Set the pre-detection auto start policy according to actual needs. When the policy is met, the system will automatically trigger the pre-detection task.
Pre-detection Range	When the pre-detection task is triggered, all disks within the specified range will be added to the pre-detection center.

Pre-detection Period	When the pre-detection task is triggered, the disk pre-detection is only performed within the specified period.

5.5.7 Managing Disk Diagnosis Center

ⓘNOTE

Disks need to be diagnosed are determined by system and are added to diagnosis center automatically according to their running status.

5.5.7.1 Pausing Disk Diagnosis

This section explains how to pause diagnosing disk.

Steps

Step 1: Select "Physical" -> "Disk" on the navigation tree to open the disk interface.

Step 2: Select the desired disk in the **Disk Diagnosis Center** tab of the information display area, click the <Pause> button, and click the <OK> button in the pop-up confirmation box to complete the configuration.

5.5.7.2 Resuming Disk Diagnosis

This section explains how to resume diagnosing disk.

Steps

Step 1: Select "Physical" -> "Disk" on the navigation tree to open the disk interface.

Step 2: Select the desired disk in the **Disk Diagnosis Center** tab of the information display area, click the <Resume> button, and click the <OK> button in the pop-up confirmation box to complete the configuration.

6 Storage Resources

6.1 Introduction to Storage Resources

6.1.1 Introduction to Pool

A pool is a resource partition. It includes a set of disks, a set of RAIDs and a set of LUNs. Data can flow within the pool in units of Cells to achieve dynamic allocation and management of storage resources.

⚠CAUTION

If auto-tiering feature is not planned to be enabled in the pool, please ensure that the performance of the RAID in the pool is equivalent, such as using the same type of disks and creating the same type of RAID to avoid performance fluctuations during LUNs crossing RAIDs.

Pools can be divided into two types according to media type:

- All-flash pool contains only SSD disks.
- Hybrid pool contains SSD disks, HDD disks, etc., and the auto-tiering function can be used in the hybrid pool.

DDSR (Data Duplicate Shared Resource) can also be enabled for all-flash pools. DDSR is a shared resource pool of a pool and manages storage space in units of pool granularity. After DDSR is enabled, all newly created Thin-LUNs in the pool will use DDSR to store data according to the granularity of the pool, which optimizes overall resource usage and pool performance.

6.1.2 Introduction to RAID

6.1.2.1 Introduction to CRAID

CRAID is an innovative optimization of traditional RAID based on Cell. ODSP storage device implements innovative CRAID technology to manage RAID health status based on Cell, minimizing the impact of disk media errors on RAID and greatly improving its availability and robustness.

ODSP storage devices support the following two types of CRAID:

- CRAID-P: CRAID based on physical disks.
- CRAID-V: CRAID based on virtual disks.

6.1.2.2 Introduction to CRAID Level

CRAID-P and CRAID-V support multiple levels of RAID algorithms, including the follows:

- RAID0: It supports 1 to 25 data disks/virtual disks with no data redundancy protection.
- RAID1: It supports 2 data disks/virtual disks, and a media error on one disk in the same cell does not affect RAID availability.
- RAID10: It supports 4 to 24 data disks/virtual disks, and the number must be an even number. Data disks/virtual disks are divided into multiple mirror pairs, and the RAID availability is not affected by a media error on a disk in a cell within the same mirror pair.
- RAID5: It supports 3 to 25 data disks/virtual disks, and the RAID availability is not affected by a media error on one disk in the same Cell.
- RAID6: It supports 4 to 25 data disks/virtual disks, and the RAID availability is not affected by media errors on two disks in the same Cell.
- RAIDX: It supports 6 to 25 data disks/virtual disks, and the RAID availability is not affected by media errors on three disks in the same Cell.

- Others: If you need to use other RAID levels, please contact to manufacturer's technical supporters for assistance.

6.1.2.3 Introduction to CRAID Hot Spare Disk/Hot Spare Space

On the base of physical disks, each CRAID-P can be configured with a dedicated hot spare disk.

CRAID-V is based on virtual disks, and its hot spare space is scattered on all physical disks in the CRAID-V. The size of the hot spare space is determined by the number of physical disks in CRAID-V and hot spare policy. Hot spare policy includes high, medium, low, none (no hot spare space is provided).

For easy understanding, the size of hot spare space is converted into the number of disks for description, as shown in Table 6-1.

Table 6-1 CRAID-V hot spare space specifications

Physical disks (blocks)	Disks (blocks) occupied by the hot spare space under the high hot spare policy	Disks (blocks) occupied by the hot spare space under the medium hot spare policy	Disks (blocks) occupied by the hot spare space under the low hot spare policy
(1, 12]	1	1	1
(12, 25]	2	2	
(25, 37]	3	3	2
(37, 50]	4	4	
(50, 75]	5	5	3
(75, 100]	6		
(100, 150]	7	6	4
(150, 200]	8		
(200, 300]	9	7	5
(300, 400]	10	8	
(400, 500]	11	9	6
(500, 600]	12	10	
...			

On this basis, the system also supports functions of global hot spare disk and blank disk hot spare:

- Global hot spare disk: This kind of hot spare disk can be used by all RAIDs in the system, provided that the type and capacity of the global hot spare disk meet the requirements of RAID rebuild.
- Blank disk hot spare: When the RAID needs to be rebuilt in case of blank disk hot spare is enabled, if there is no dedicated hot spare disk or an available global hot spare disk, a blank disk that meets the requirements in the storage device will be used for rebuild, and there is no

need to manually set the disk as a hot spare, which greatly simplifies the operation of the storage administrator.

6.1.2.4 Introduction to CRAID Rebuild

Rebuild is one of the important functions of CRAID. After CRAID is downgraded, the system will automatically use hot spare disk/hot spare space to restore RAID data redundancy through rebuild algorithm.

CRAID supports multiple rebuild features, including partial rebuild, fast rebuild, common rebuild, multiple rebuild, etc., which improves rebuild efficiency and maintenance flexibility.

6.1.2.5 Introduction to CRAID Synchronization

RAID5, RAID6, and RAIDX-3 support CRAID synchronization, which means calculating and writing parity data in advance to improve the overall performance in small block random write scenarios.

6.1.3 Introduction to LUN

6.1.3.1 Introduction to LUN

A LUN is a storage space accessible to client servers, and its corresponding physical space is located in one or more RAIDs.

6.1.3.2 LUN Destruction

Sensitive data or critical data stored in the LUN can be destroyed through LUN destruction when the LUN is no longer needed, and then the LUN can be deleted to release storage space.

6.2 Managing Pool

6.2.1 Creating Pool (Including Creating RAID)

⚠CAUTION

- If auto-tiering feature is not planned to be enabled in hybrid pool, please ensure that the performance of the RAID in the pool is equivalent, such as using the same type of disks and creating the same type of RAID to avoid performance fluctuations during LUNs crossing RAIDs.
- DDSR is automatically enabled when creating all-flash pool. Pool granularity modification is not supported after enabling DDSR. The pool granularity is the unit of deduplication and compression of IO processing, which has influence on resource management and further

affects performance. It is recommended to keep pool granularity the default value. If you need to use other values, select the appropriate granularity in the **Create Pool** wizard.

6.2.1.1 Creating CRAID-P Pool

This section explains how to create CRAID-P pool.

Steps

Step 1: Select "Storage" -> "Pool" on the navigation tree to open the pool interface.

Step 2: Click the <Create> button in the information display area to open the **Create Pool** wizard.

Step 3: The first step of the **Create Pool** wizard is shown in Figure 6-1. Set pool parameters (see Table 6-2 for details) and click the <Next> button to enter the next interface.

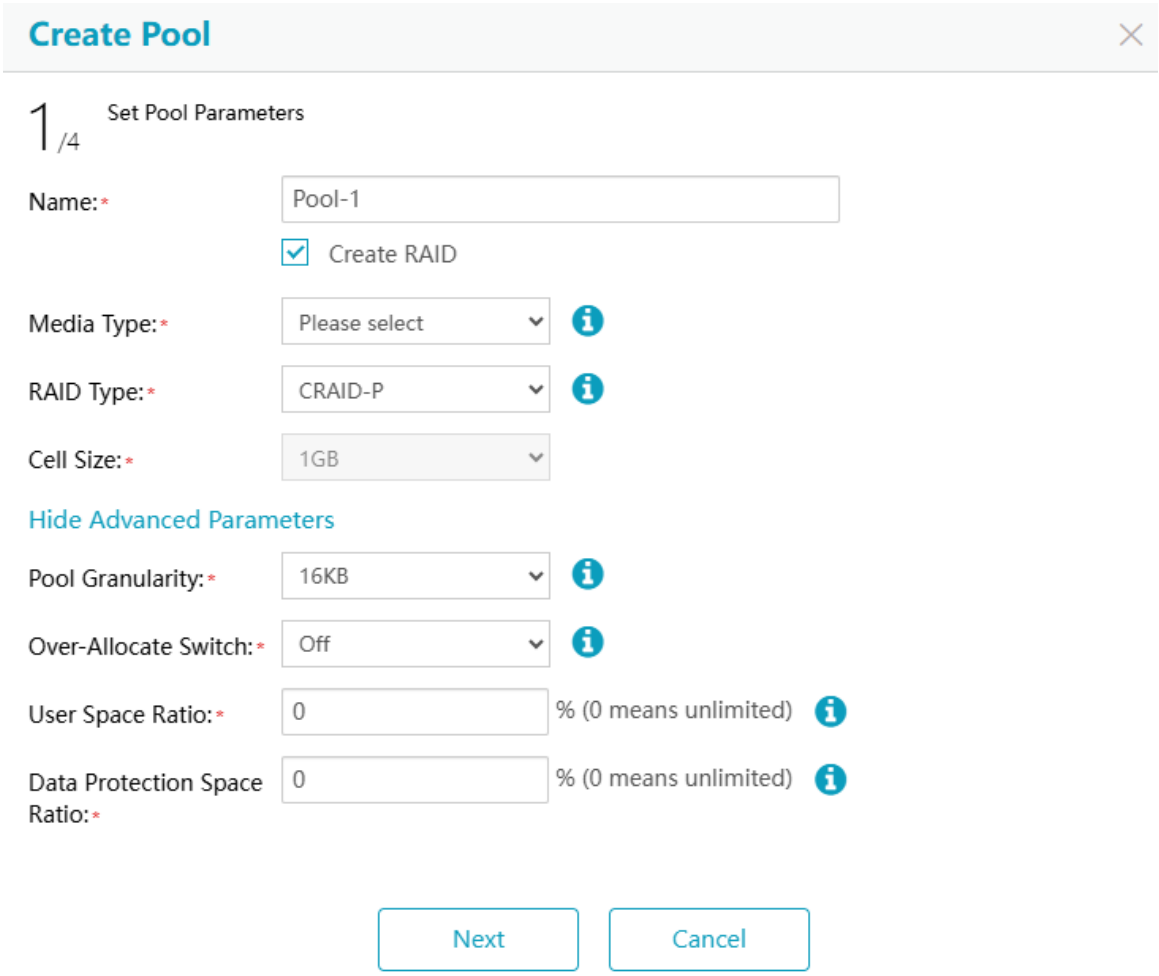

Figure 6-1 Create CRAID-P pool wizard interface (1)

Table 6-2 Description of the parameters for creating CRAID-P pool wizard interface (1)

Parameter	Description
Name	It refers to the name of pool. • Length: 1-31 characters.

	• Valid character range: [a-zA-Z0-9.-_:]. • It is recommended that the prefix of pool name is "Pool".
Media Type	There are two types of media: • All-Flash: Only SSD RAID can be created. • Hybrid: SSD RAID and HDD RAID can be created on demand.
RAID Type	It refers to the type of RAID. Please select CRAID-P in this scenario. • CRAID-P: CRAID based on physical disks. • CRAID-V: CRAID based on virtual disks.
Cell Size	It refers to the size of sell. The cell size is 1 GB by default in this scenario and there is no need to specify it.
DDSR	DDSR (Data Duplicate Shared Resource) is a shared resource pool, which manages storage space in units of pool granularity. After DDSR is enabled, a sharing mode Thin-LUN will be automatically created after creating a Thin-LUN in the pool. All sharing mode Thin-LUNs will use DDSR to store data according to the granularity of the pool to optimize the overall resource usage and performance of the pool. **ⓘNOTE** • DDSR can be set in all-flash pool only. • The unallocated capacity of the pool for the devices of both dual-controller and four-controller is required to be no less than 5TB and 10TB respectively when enabling DDSR. • Please set appropriate granularity when enabling DDSR.
Pool Granularity	Pool granularity is not only the basic unit of DDSR space management, but also the unit of IO processing on deduplication and compression. It can be set to 8KB or 16KB, and the default value is 16KB. **⚠CAUTION** Granularity affects overall performance. It is recommended to use the default value. If you need to adjust the granularity, please contact to manufacturer's technical supporters for confirmation.
Over-Allocate Switch	It refers to enabling or disabling over-allocate. Over-allocate is set mainly for Thin-LUNs in pools, which means whether allowing the subscribed capacity to exceed the total capacity in the pool when creating or expanding Thin-LUNs. You can set a specific over-allocate ratio when over-allocate switch is enabled.
User Space Ratio	It refers to the proportion of space that can be occupied by user LUNs (including data copy LUNs) in the subscription space quota of the pool. The sum of user space ratio and data protection space ratio should be no more than 100%. Valid range: 0-99%.
Data Protection Space Ratio	It refers to the proportion of space that can be occupied by snapshot resources in the subscription space quota of the pool. The sum of user

	space ratio and data protection space ratio should be no more than 100%. Valid range: 0-90%.

ⓘNOTE

If "Create RAID" is not selected in this step, a pool without RAID will be created after clicking the <Finish> button. Otherwise, you can continue to create RAID in the following steps.

Step 4: The second step of the **Create Pool** wizard is shown in Figure 6-2. Select the desired storage tiers and click the <Next> button to enter the next interface.

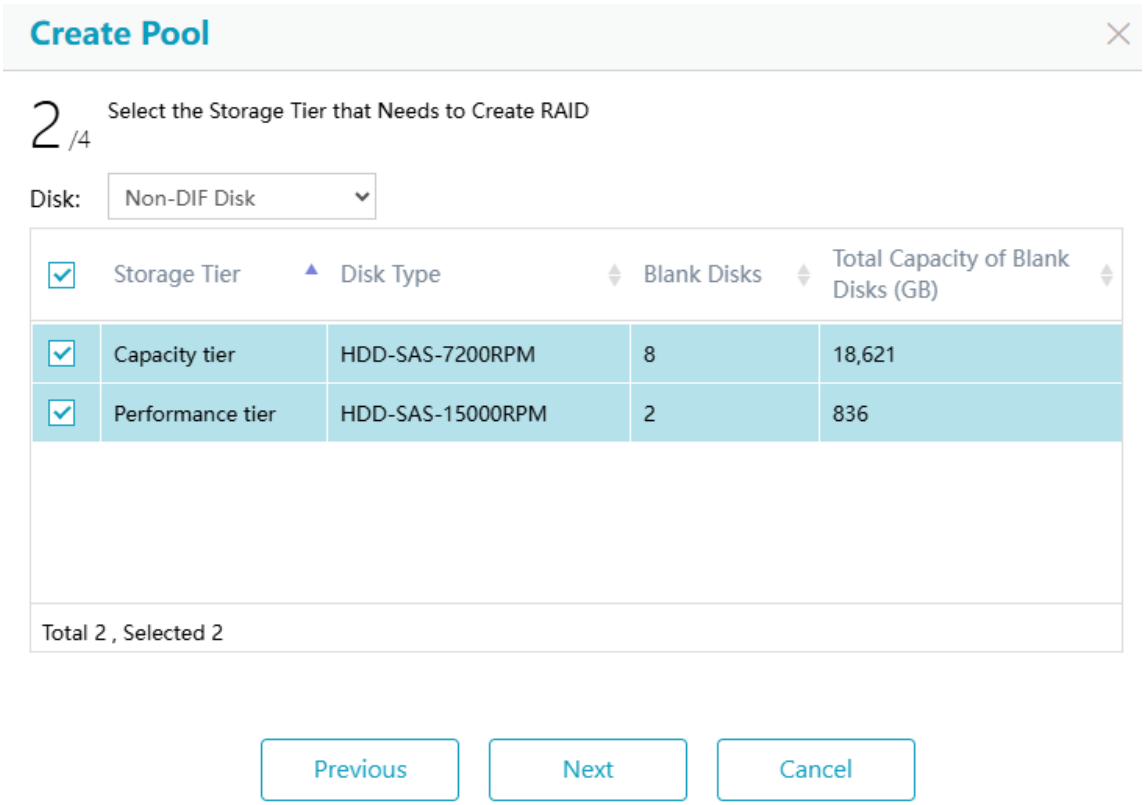

Figure 6-2 Create CRAID-P pool wizard interface (2)

Step 5: The third step of the **Create Pool** wizard is shown in Figure 6-3. Enter relevant RAID parameters (see Table 6-3 for details), select the desired disks, and click the <Next> button to enter the next interface.

ⓘNOTE

If multiple storage tiers are selected in Step 4, the RAID of multiple storage tiers will be created respectively through extended steps in Step 5, sequentially corresponding to steps 3a/4, 3b/4, etc. The RAID configuration methods for different storage tiers are the same. Capacity tier is used as an example for illustration in this document.

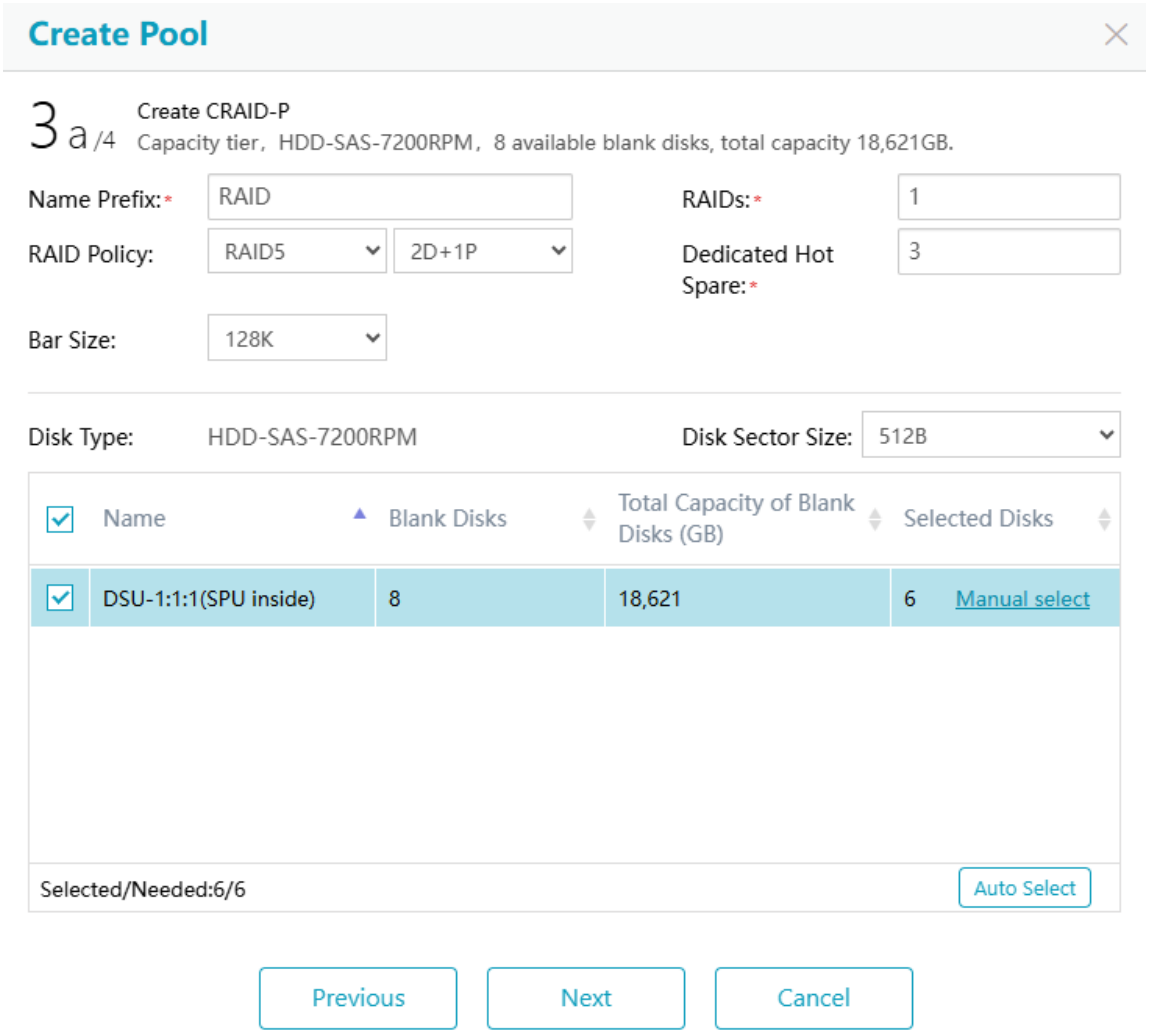

Figure 6-3 Create CRAID-P pool wizard interface (3)

Table 6-3 Description of the parameters for creating CRAID-P pool wizard interface (3)

Parameter	Description
Name Prefix	It refers to the prefix of RAID's name. • Length: 1-26 characters. • Valid character range: [a-zA-Z0-9.-_:]. • It is recommended that the prefix of RAID name is "RAID".
RAIDs	It refers to the number of RAIDs to be created on the storage tier.
RAID Policy	It refers to the level of each RAID and the configuration of the data disk.
Dedicated Hot Spare	It refers to the number of dedicated hot spare disks for each RAID.
Bar Size	It refers to the bar size for each RAID. **⚠CAUTION** Bare size cannot be modified after the RAID is created. Please set an appropriate value based on actual business needs.

Disk Sector Size	It is used to filter disks.

Step 6: In the fourth step of the **Create Pool** wizard, you can check the configuration information and click the <Finish> button to complete the configuration.

6.2.1.2 Creating CRAID-V Pool

This section explains how to create CRAID-V pool.

Steps

Step 1: Select "Storage" -> "Pool" on the navigation tree to open the pool interface.

Step 2: Click the <Create> button in the information display area to open the **Create Pool** wizard.

Step 3: The first step of the **Create Pool** wizard is shown in Figure 6-4. Set pool parameters (see Table 6-4 for details) and click the <Next> button to enter the next interface.

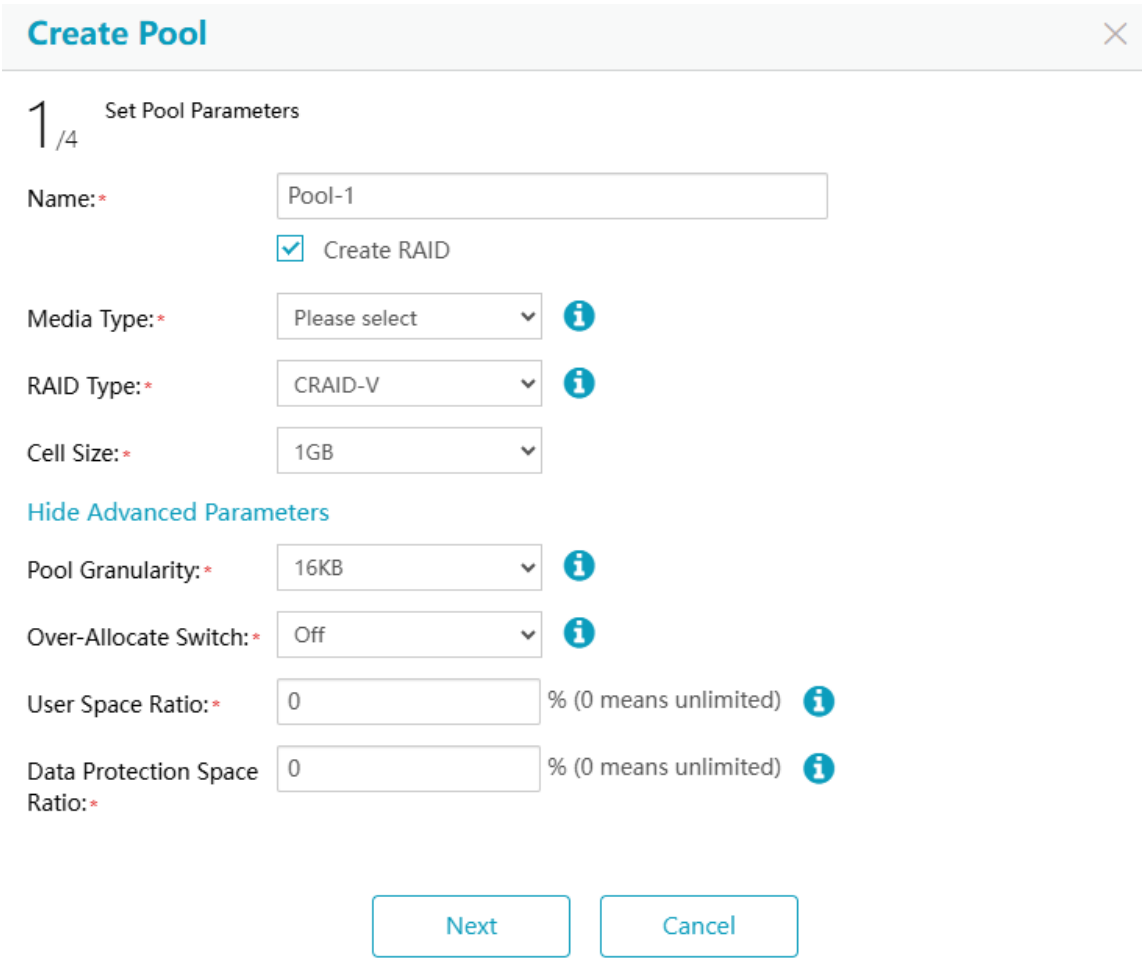

Figure 6-4 Create CRAID-V pool wizard interface (1)

Table 6-4 Description of the parameters for creating CRAID-V pool wizard interface (1)

Parameter	Description
Name	It refers to the name of pool. ● Length: 1-31 characters. ● Valid character range: [a-zA-Z0-9.-_:]. ● It is recommended that the prefix of pool name is "Pool".
Media Type	There are two types of media: ● All-Flash: Only SSD RAID can be created. ● Hybrid: SSD RAID and HDD RAID can be created on demand.
RAID Type	It refers to the type of RAID. Please select CRAID-V in this scenario. ● CRAID-P: CRAID based on physical disks. ● CRAID-V: CRAID based on virtual disks.
Cell Size	It refers to the cell size of cell. **⚠CAUTION** Cell size cannot be modified once the RAID is created. If you need to use auto-tiering function, please set the cell size to 4MB.
DDSR	DDSR (Data Duplicate Shared Resource) is a shared resource pool, which manages storage space in units of pool granularity. After DDSR is enabled, a sharing mode Thin-LUN will be automatically created after creating a Thin-LUN in the pool. All sharing mode Thin-LUNs will use DDSR to store data according to the granularity of the pool to optimize the overall resource usage and performance of the pool. **ⓘNOTE** ● DDSR can be set in all-flash pool only. ● The unallocated capacity of the pool for the devices of both dual-controller and four-controller is required to be no less than 5TB and 10TB respectively when enabling DDSR. ● Please set appropriate granularity when enabling DDSR.
Pool Granularity	Pool granularity is not only the basic unit of DDSR space management, but also the unit of IO processing on deduplication and compression. It can be set to 8KB or 16KB, and the default value is 16KB. **⚠CAUTION** Granularity affects overall performance. It is recommended to use the default value. If you need to adjust the granularity, please contact to manufacturer's technical supporters for confirmation.
Over-Allocate Switch	It refers to enabling or disabling over-allocate. Over-allocate is set mainly for Thin-LUNs in pools, which means whether allowing the subscribed capacity to exceed the total capacity in the pool when creating or expanding Thin-LUNs..

	You can set a specific over-allocate ratio when over-allocate switch is enabled.
User Space Ratio	It refers to the proportion of space that can be occupied by user LUNs (including data copy LUNs) in the subscription space quota of the pool. The sum of user space ratio and data protection space ratio should be no more than 100%. Valid range: 0-99%.
Data Protection Space Ratio	It refers to the proportion of space that can be occupied by snapshot resources in the subscription space quota of the pool. The sum of user space ratio and data protection space ratio should be no more than 100%. Valid range: 0-90%.

ⓘNOTE

If "Create RAID" is not selected in this step, a pool without RAID will be created after clicking the <Finish> button. Otherwise, you can continue to create RAID in following steps.

Step 4: The second step of the **Create Pool** wizard is shown in Figure 6-5. Select the desired storage tiers and click the <Next> button to enter the next interface.

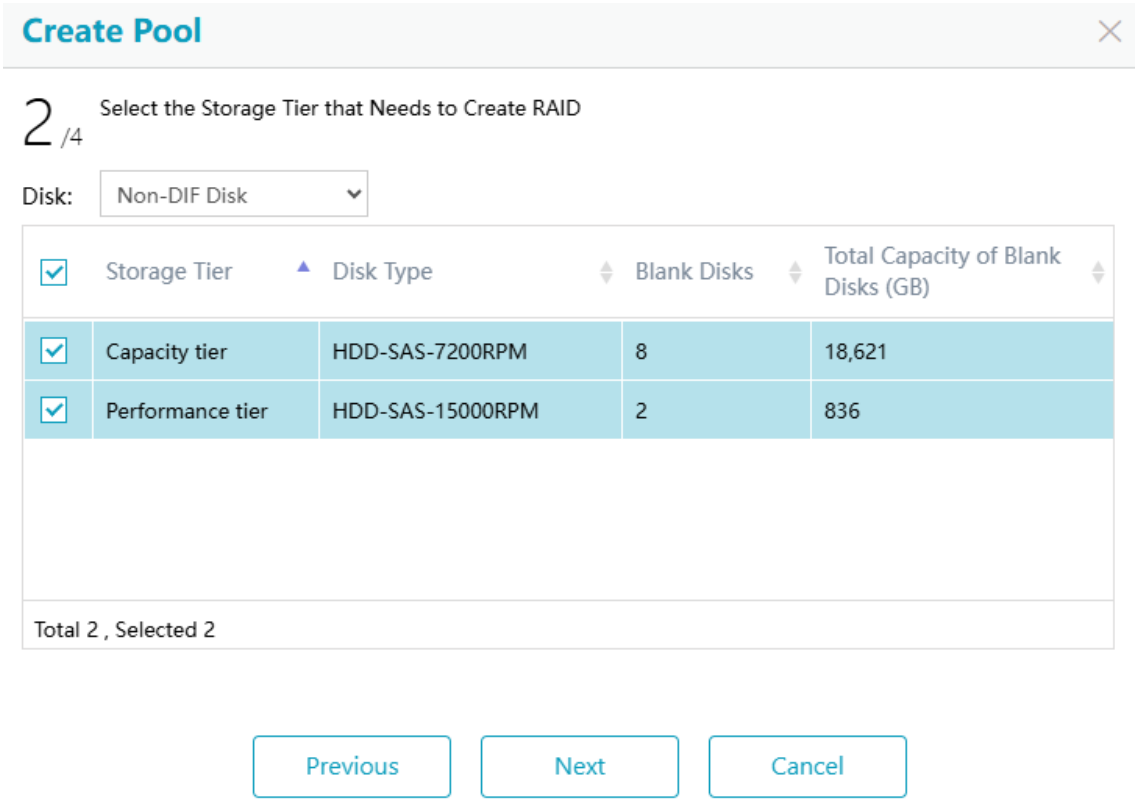

Figure 6-5 Create CRAID-V pool wizard interface (2)

Step 5: The third step of the **Create Pool** wizard is shown in Figure 6-6. Enter relevant RAID parameters (see Table 6-5 for details), select the desired disks, and click the <Next> button to enter the next interface.

ⓘNOTE

If multiple storage tiers are selected in Step 4, the RAID of multiple storage tiers will be created respectively through extended steps in Step 5, sequentially corresponding to steps 3a/4, 3b/4, etc. The RAID configuration methods for different storage tiers are the same. Capacity tier is used as an example for illustration in this document.

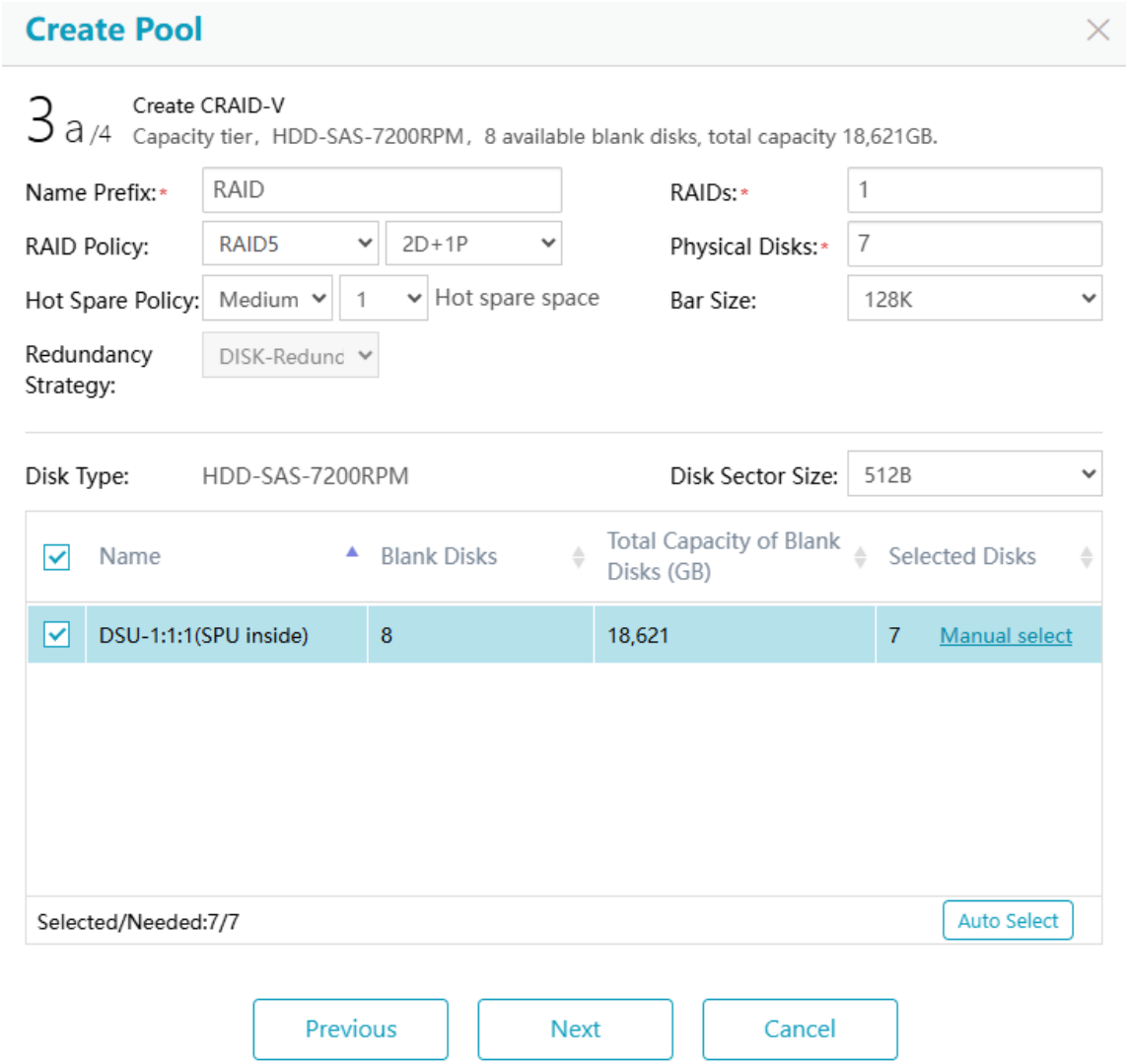

Figure 6-6 Create CRAID-V pool wizard interface (3)

Table 6-5 Description of the parameters for creating CRAID-V pool wizard interface (3)

Parameter	Description
Name Prefix	It refers to the prefix of RAID's name. • Length: 1-26 characters. • Valid character range: [a-zA-Z0-9.-_:]. • It is recommended that the prefix of RAID name is "RAID".
RAIDs	It refers to the number of RAIDs to be created on the storage tier.

RAID Policy	It refers to the level of each RAID and the configuration of the data disk (virtual disk). **ⓘNOTE** For CRAID-V, data disk policy is the number of virtual disks. For example, 2D+1P means the number of virtual disks in the CRAID-V is 3.
Physical Disks	It refers to the number of physical disks for each RAID.
Hot Spare Policy	It refers to the hot spare policy for each RAID, see 6.1.2.3 Introduction to CRAID Hot Spare Disk/Hot Spare Space for details.
Bar Size	It refers to the bar size for each RAID. **⚠CAUTION** Bar size cannot be modified after the RAID is created. Please set an appropriate value based on actual business needs.
Redundancy Strategy	It refers to the redundancy strategy of RAID, including disk-redundancy and DSU-redundancy.
Disk Sector Size	It is used to filter disks.

Step 6: In the fourth step of the **Create Pool** wizard, you can check the configuration information and click the <Finish> button to complete the configuration.

6.2.2 Expanding Pool (Including Creating RAID)

⚠CAUTION

If auto-tiering feature is not planned to be enabled in the pool, please ensure that the performance of the RAID in the pool is equivalent, such as using the same type of disks and creating the same type of RAID to avoid performance fluctuations during LUNs crossing RAIDs.

6.2.2.1 Expanding CRAID-P Pool

This section explains how to expand CRAID-P pool.

Steps

Step 1: Select "Storage" -> "Pool" on the navigation tree to open the pool interface.

Step 2: Select the desired pool in the information display area and click the <Expand> button to open the **Expand Pool** wizard.

Step 3: The first step of the **Expand Pool** wizard is shown in Figure 6-7. Select the desired storage tiers and click the <Next> button to enter the next interface.

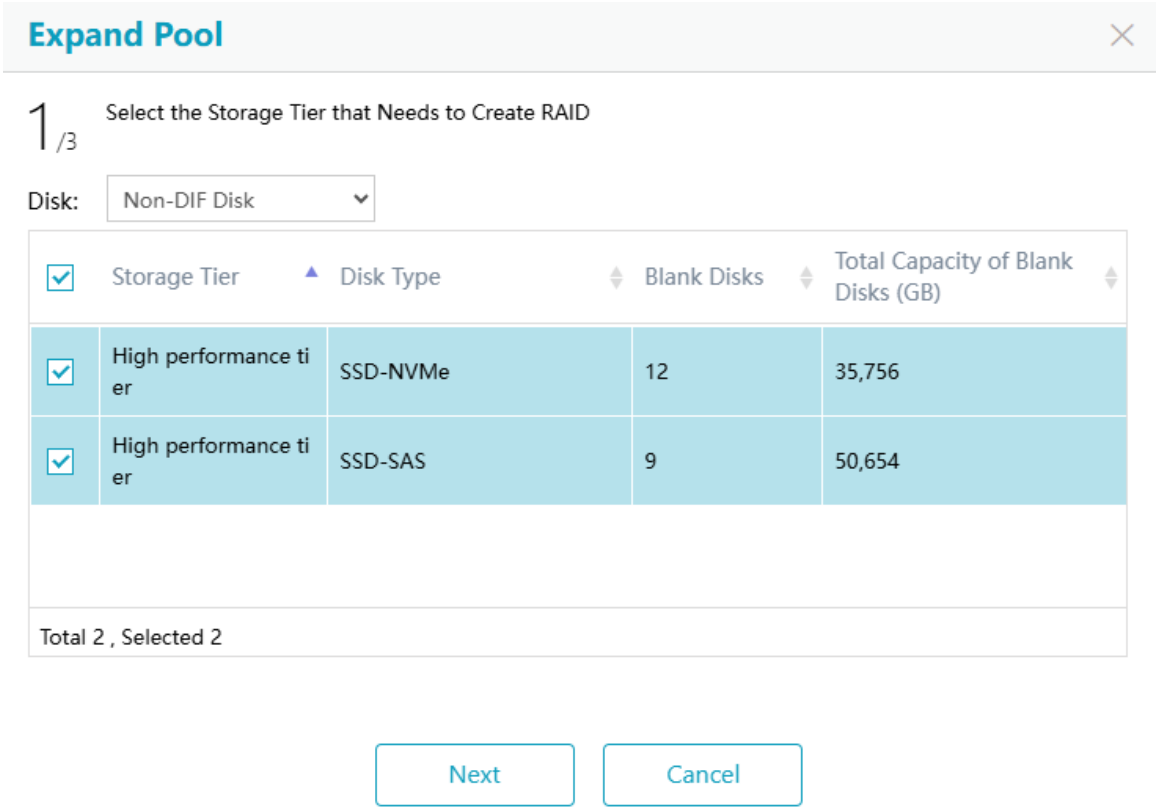

Figure 6-7 Expand CRAID-P pool wizard interface (1)

Step 4: The second step of the **Expand Pool** wizard is shown in Figure 6-8. Enter the relevant RAID parameters (see Table 6-3 for details), select the desired disks, and click the <Next> button to enter the next step interface.

ⓘNOTE

If multiple storage tiers are selected in Step 3, the RAID of multiple storage tiers will be created respectively through extended steps in Step 4, sequentially corresponding to steps 2a/3, 2b/3, etc. The RAID configuration methods for different storage tiers are the same. High performance tier is used as an example for illustration in this document.

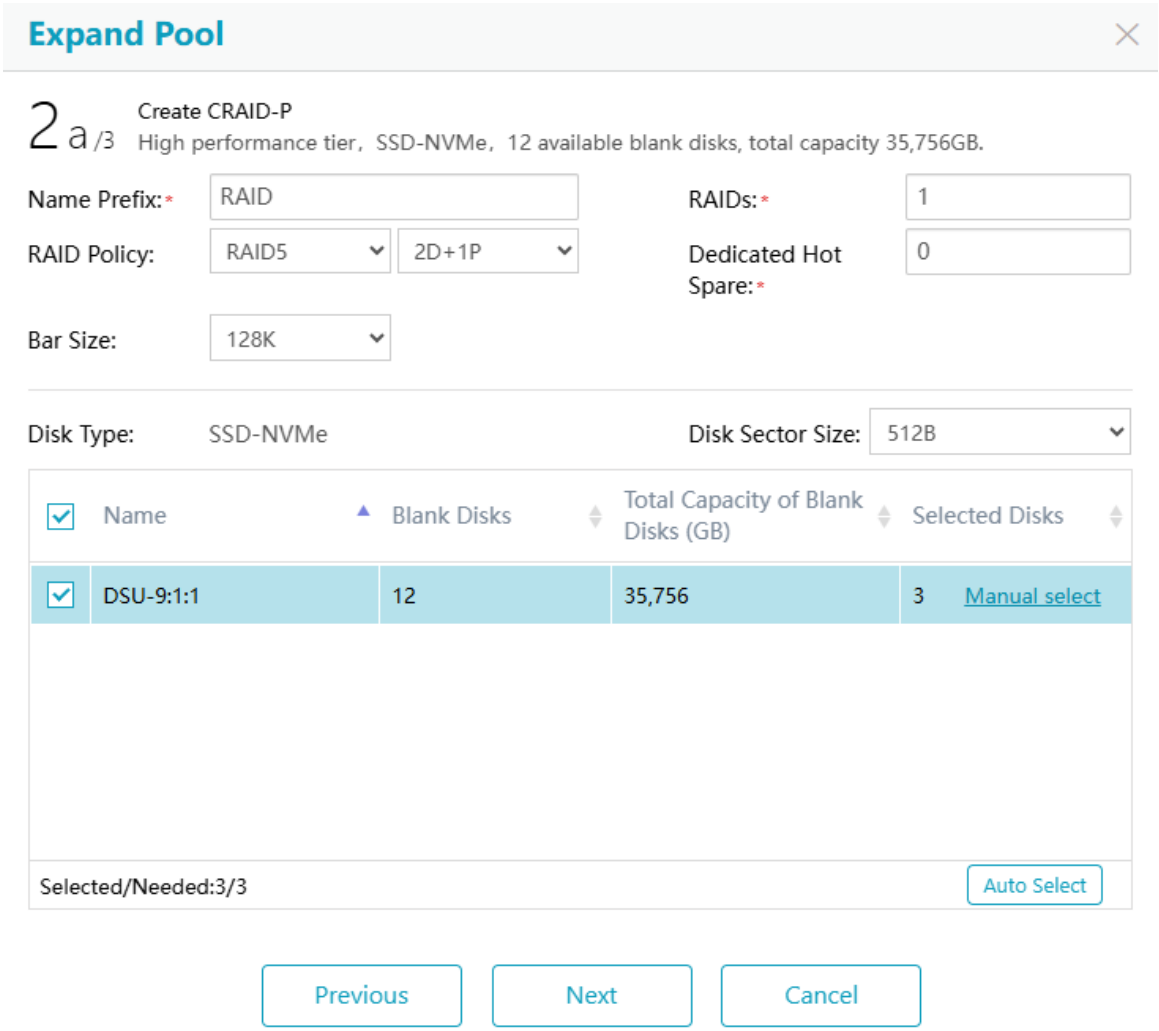

Figure 6-8 Expand CRAID-P pool wizard interface (2)

Step 5: In the third step of the **Expand Pool** wizard, you can check the configuration information and click the <Finish> button to complete the configuration.

6.2.2.2 Expanding CRAID-V Pool

This section explains how to expand CRAID-V pool.

Steps

Step 1: Select "Storage" -> "Pool" on the navigation tree to open the pool interface.

Step 2: Select the desired pool in the information display area and click the <Expand> button to open the **Expand Pool** wizard.

Step 3: The first step of the **Expand Pool** wizard is shown in Figure 6-9. Select the desired storage tiers and click the <Next> button to enter the next interface.

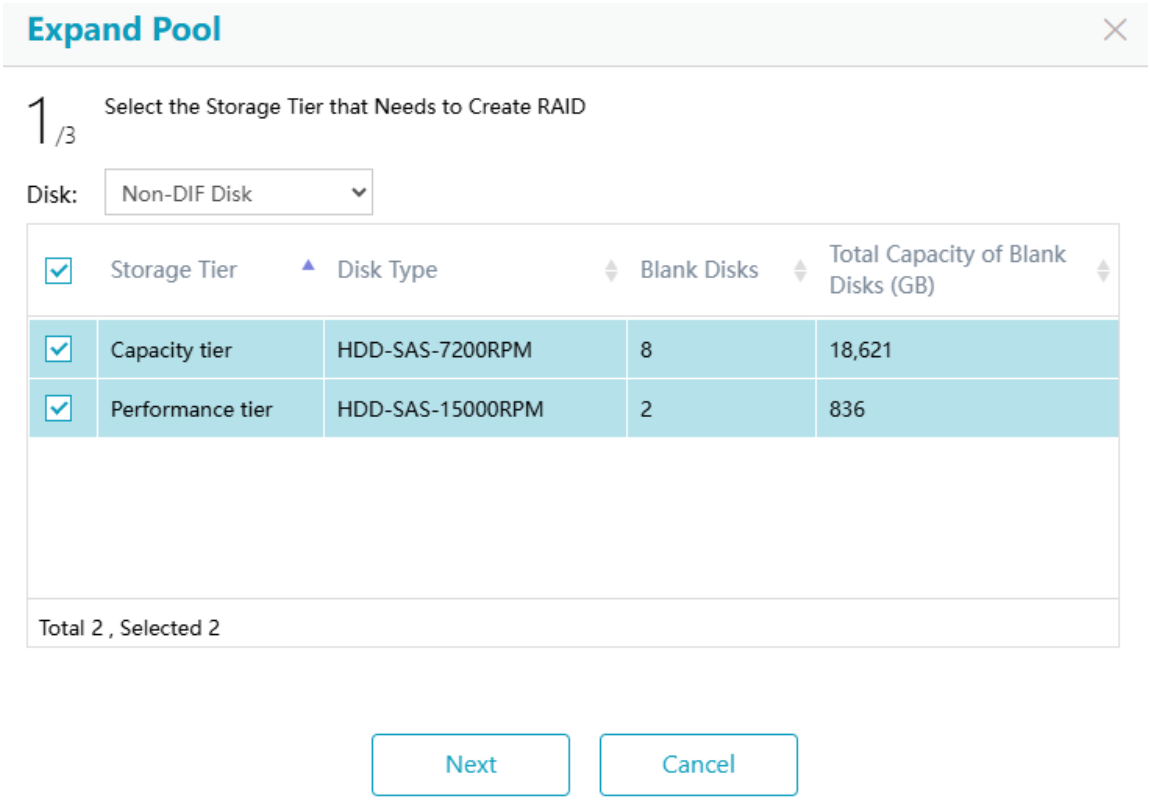

Figure 6-9 Expand CRAID-V pool wizard interface (1)

Step 4: The second step of the **Expand Pool** wizard is shown in Figure 6-10. Enter the relevant RAID parameters (see Table 6-5 for details), select the desired disks, and click the <Next> button to enter the next interface.

ⓘNOTE

If multiple storage tiers are selected in Step 3, the RAID of multiple storage tiers will be created respectively through extended steps in Step 4, sequentially corresponding to steps 2a/3, 2b/3, etc. The RAID configuration methods for different storage tiers are the same. Capacity tier is used as an example for illustration in this document.

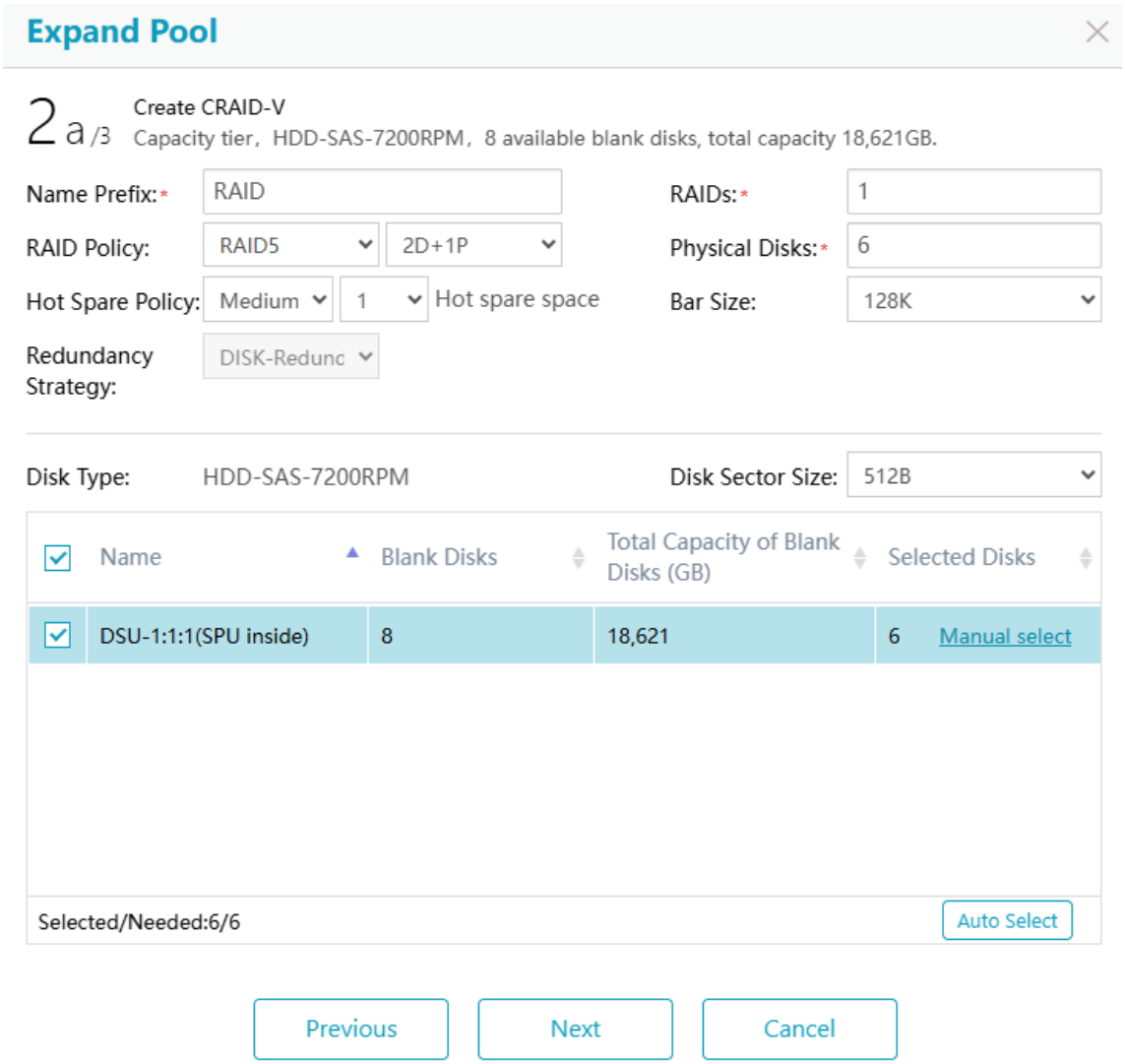

Figure 6-10 Expand CRAID-V pool wizard interface (2)

Step 5: In the third step of the **Expand Pool** wizard, you can check the configuration information and click the <Finish> button to complete the configuration.

6.2.3 Viewing Pool Properties

This section explains how to view pool's general information, storage tier and capacity alarm configuration.

Steps

Step 1: Select "Storage" -> "Pool" on the navigation tree to open the pool interface.

Step 2: Select the desired pool in the information display area and click the <Properties> button to open the **Basic Properties** window. You can view the basic properties of the pool.

6.2.4 Modifying Pool Properties

6.2.4.1 Modifying general information

This section explains how to modify pool's name, media type, DDSR, pool granularity, over-allocate switch, user space ratio and data protection space ratio.

Steps

Step 1: Select "Storage" -> "Pool" on the navigation tree to open the pool interface.

Step 2: Select the desired pool in the information display area and click the <Properties> button to open the **Basic Properties** window. The **General** tab is shown in Figure 6-11. Modify general information (see Table 6-6 for details) and click the <Apply> button to complete the configuration.

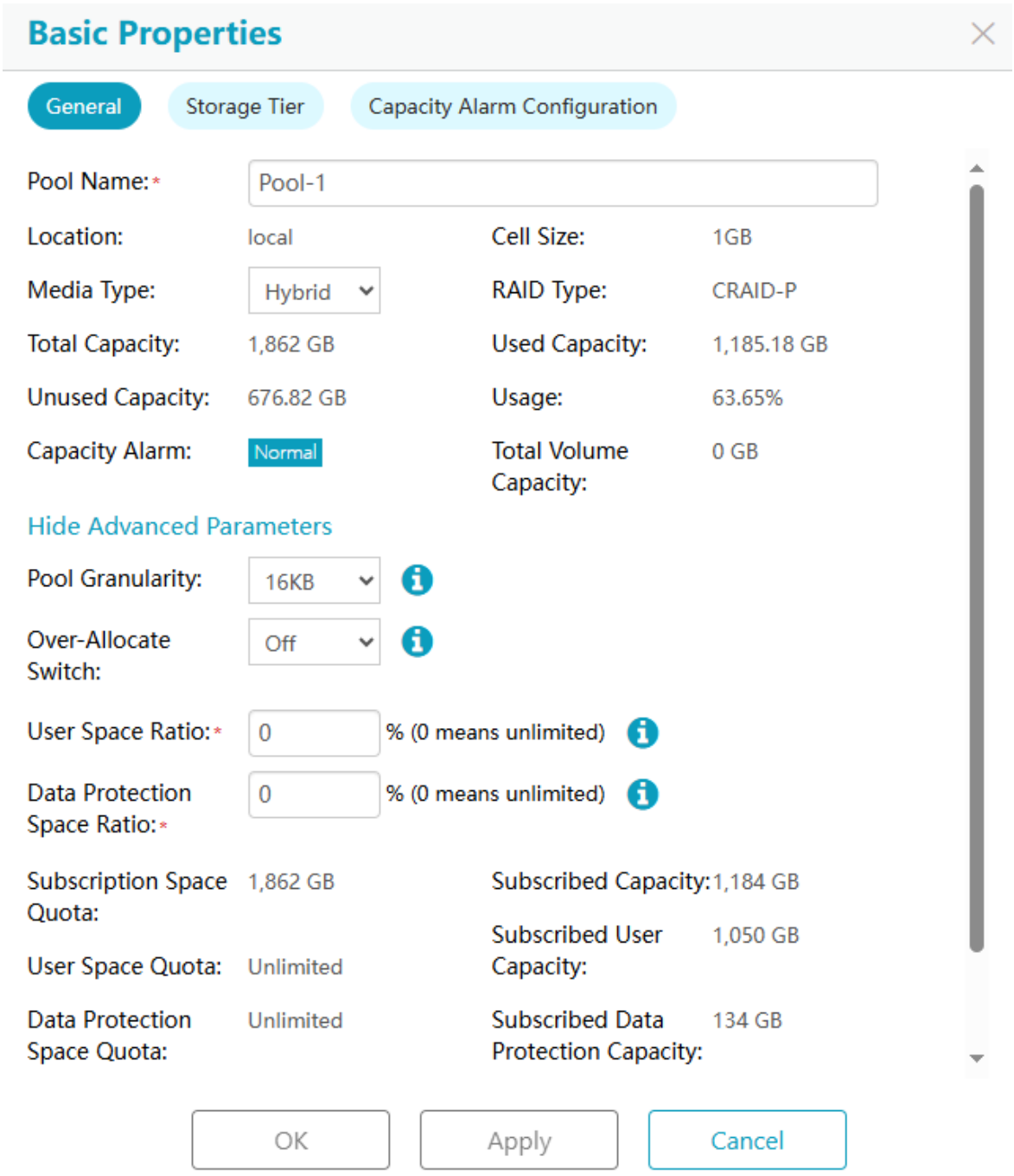

Figure 6-11 Pool basic properties interface

Table 6-6 Description of the parameters for pool basic properties interface

Parameter	Description
Pool Name	It refers to the name of pool. • Length: 1-31 characters. • Valid character range: [a-zA-Z0-9.-_:]. • It is recommended that the prefix of pool name is "Pool".
Media Type	It refers to the media type of pool, including all-flash and hybrid.

	ⓘNOTE ● If you need to change the pool media to all-flash from hybrid, please ensure that the pool does not contain the RAID created with HDD disks and proper pool granularity has been set. ● If you need to change the pool media to hybrid from all-flash, make sure that DDSR is disabled in the pool.
DDSR	DDSR (Data Duplicate Shared Resource) is a shared resource pool, which manages storage space in units of pool granularity. After DDSR is enabled, a sharing mode Thin-LUN will be automatically created after creating a Thin-LUN in the pool. All sharing mode Thin-LUNs will use DDSR to store data according to the granularity of the pool to optimize the overall resource usage and performance of the pool. **ⓘNOTE** ● DDSR can be set in all-flash pool only. ● The unallocated capacity of the pool for the devices of both dual-controller and four-controller is required to be no less than 5TB and 10TB respectively when enabling DDSR. ● Please set appropriate granularity when enabling DDSR.
Pool Granularity	Pool granularity is not only the basic unit of DDSR space management, but also the unit of IO processing on deduplication and compression. It can be set to 8KB or 16KB, the default value is 16KB. **⚠CAUTION** Granularity affects overall performance. It is recommended to use the default value. If you need to adjust the granularity, please contact to manufacturer's technical supporters for confirmation.
Over-Allocate Switch	It refers to enabling or disabling over-allocate. Over-allocate is set mainly for Thin-LUNs in pool, and means whether allowing the subscribed capacity to exceed the total capacity in the pool when creating or expanding Thin-LUNs. You can set a specific over-allocate ratio when over-allocate switch is enabled.
User Space Ratio	It refers to the proportion of space that can be occupied by user LUNs (including data copy LUNs) in the subscription space quota of the pool. The sum of user space ratio and data protection space ratio should be no more than 100%. Valid range: 0-99%.
Data Protection Space Ratio	It refers to the proportion of the space that can be occupied by snapshot resources in the subscription space quota of the pool. The sum of user space ratio and data protection space ratio should be no more than 100%. Valid range: 0-90%.

6.2.4.2 Modifying Capacity Alarm Threshold

This section explains how to modify pool's capacity alarm threshold.

ⓘNOTE

It is recommended to configure pool capacity alarm if the business in the pool involves space dynamic allocation (such as snapshot resources, thin provisioning, deduplication, compression, etc.).

Steps

Step 1: Select "Storage" -> "Pool" on the navigation tree to open the pool interface.

Step 2: Select the desired pool in the information display area and click <Properties> button to open the **Basic Properties** window. The **Capacity Alarm Configuration** tab is shown in Figure 6-12. Enter relevant parameters (see Table 6-7 for details) and click the <Apply> button to complete the configuration.

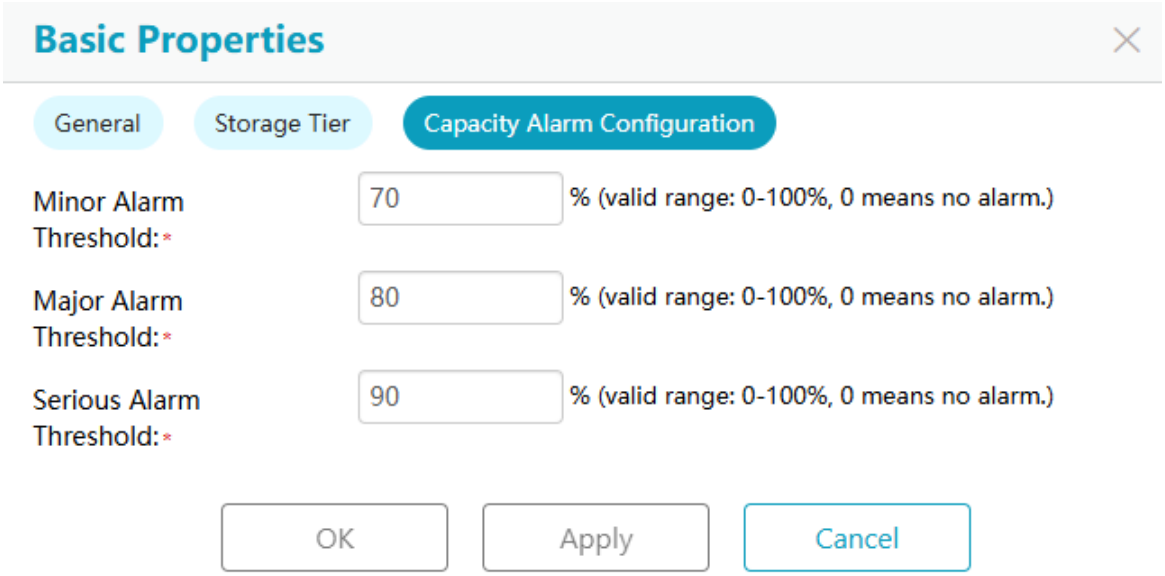

Figure 6-12 Pool capacity alarm configuration interface

Table 6-7 Description of the parameters for pool capacity alarm configuration interface

Parameter	Description
Capacity Alarm Parameters	An alarm will be generated when pool space usage reaches the alarm threshold. • A minor alarm is generated when the pool space usage reaches the minor alarm threshold. • A major alarm is generated when the pool space usage reaches the major alarm threshold. • A serious alarm is generated when the pool space usage reaches the serious alarm threshold.

6.2.5 Refreshing Pool

This section explains how to refresh pools capacity information.

Steps

Step 1: Select "Storage" -> "Pool" on the navigation tree to open the pool interface.

Step 2: Click the <Refresh> button in the information display area and click the <OK> button in the pop-up confirmation box to complete the configuration.

6.2.6 Deleting Pool

This section explains how to delete pool.

Prerequisites

There is no LUN in the pool.

The pool has not been allocated to tenant.

Steps

Step 1: Select "Storage" -> "Pool" on the navigation tree to open the pool interface.

Step 2: Select the desired pool in the information display area, click the <Delete> button, confirm the object and enter "yes" in the pop-up warning box, and click the <OK> button to complete the configuration.

6.2.7 Quickly Configuring Resources

This section explains how to create LUN quickly and allocate LUN to mapping domain.

Steps

Step 1: Select "Storage" -> "Pool" on the navigation tree to open the pool interface.

Step 2: Click the <Quickly Configure Resources> button in the information display area to open the **Quickly Configure Resources** window, as shown in Figure 6-13. Enter relevant parameters (see Table 6-8 for details) and click the <OK> button to complete the configuration.

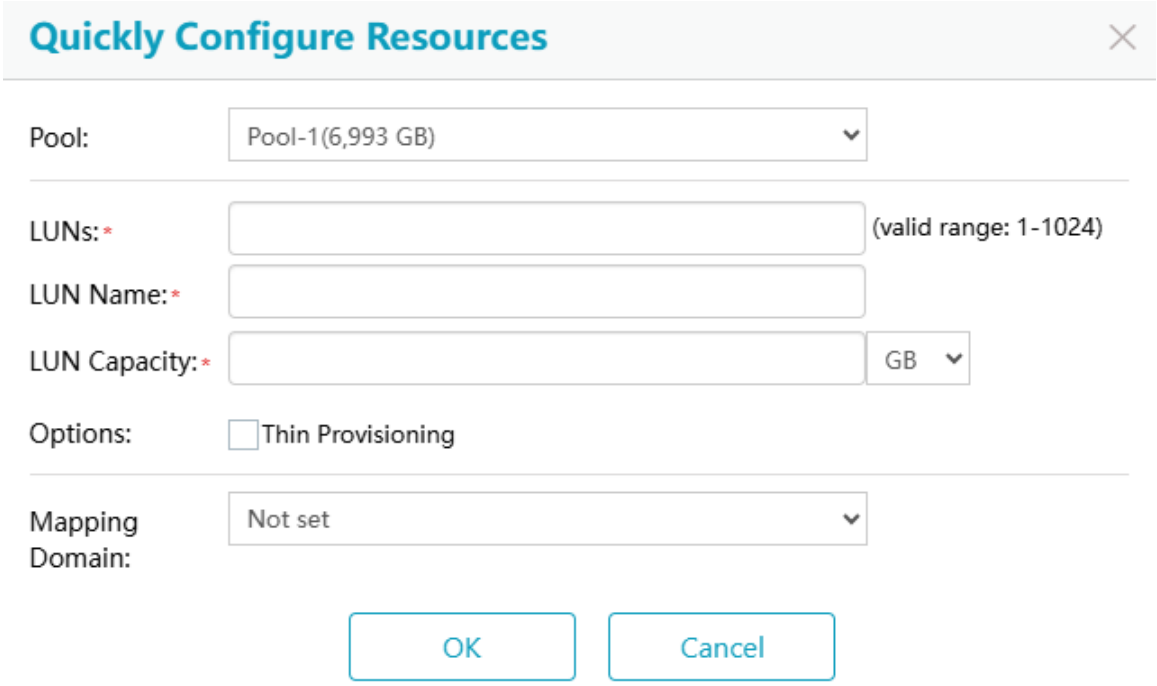

Figure 6-13 Quickly configure resources interface

Table 6-8 Description of the parameters for quickly configuring resources interface

Parameters	Description
Pool	It refers to the pool of LUN.
LUNs	It refers to the number of LUNs to be created.
LUN Name	It refers to the name of LUN. • Length: 1-63 characters. • Valid character range: [a-zA-Z0-9.-_:]. • It is recommended that the prefix of LUN name is "LUN-".
LUN Capacity	It refers to the capacity of LUN.
Options	It refers to enabling or disabling thin provisioning for LUN.
Mapping Domain	It refers to the mapping domain allocated for LUN.

6.3 Managing RAID

6.3.1 Viewing RAID Properties

This section explains how to view RAID's general information and background tasks.

Steps

Step 1: Select "Storage" -> "RAID" on the navigation tree to open the RAID interface.

Step 2: Select the desired RAID in the information display area and click the <Properties> button to open the **Basic Properties** window. You can view the basic properties of the RAID.

6.3.2 Modify RAID Properties

This section explains how to modify RAID's name and rebuild rate.

Steps

Step 1: Select "Storage" -> "RAID" on the navigation tree to open the RAID interface.

Step 2: Select the desired RAID in the information display area and click the <Properties> button to open the **Basic Properties** window, as shown in Figure 6-14. Modify the properties of RAID (see Table 6-9 for details) and click the <Apply> button to complete the configuration.

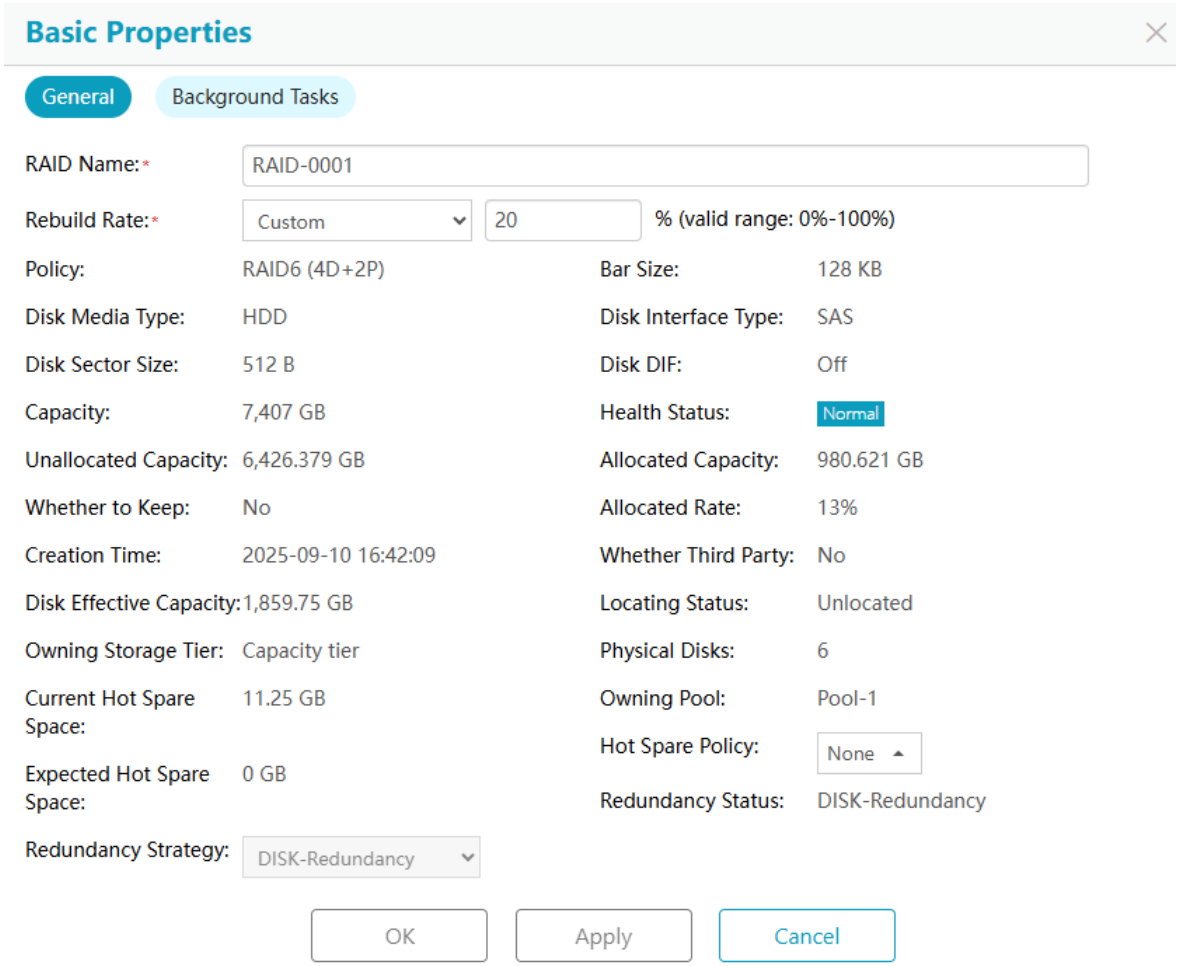

Figure 6-14 RAID basic properties interface

Table 6-9 Description of the parameters for RAID basic properties interface

Parameter	Description
RAID Name	It refers to the name of RAID. • Length: 1-31 characters. • Valid character range: [a-zA-Z0-9.-_:]. • It is recommended that the prefix of pool name is "RAID".

Rebuild Rate	It refers to the rebuild rate of RAID.

6.3.3 Expanding RAID

This section explains how to expand RAID.

Prerequisites

- Only CRAID-V supports capacity expansion.
- The health status of the RAID is normal.

Steps

Step 1: Select "Storage" -> "RAID" on the navigation tree to open the RAID interface.

Step 2: Select the desired RAID in the information display area, click the <More> button, and click the <Expand> button in the drop-down menu to open the **Expand RAID** window, as shown in Figure 6-15. Enter the number of disks that need to be expanded, select disks, and click the <OK> button to complete the configuration.

ⓘNOTE

You can view the expansion status of the RAID in the **Background Tasks** tab of the **Basic Properties** window of the RAID.

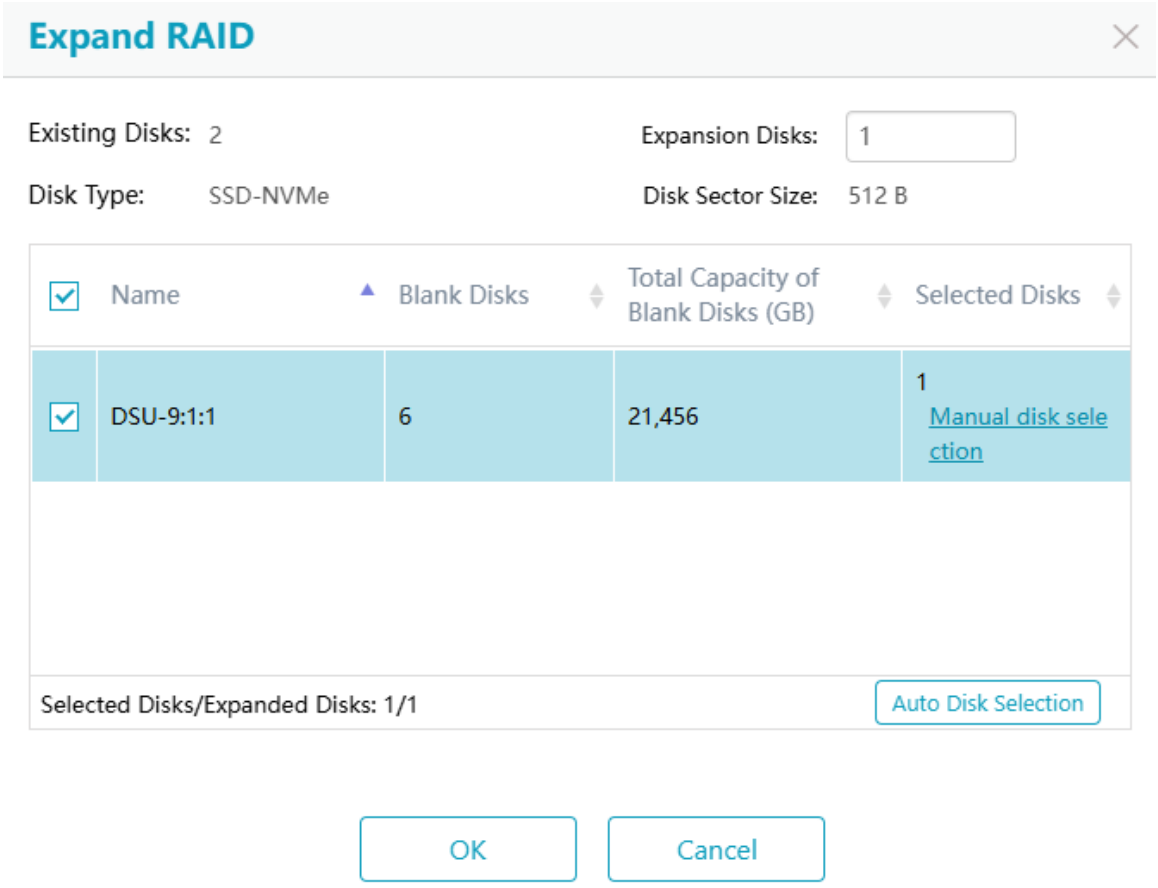

Figure 6-15 Expand RAID interface

6.3.4 Locating RAID

6.3.4.1 Starting Locating RAID

This section explains how to start locating RAID.

ⓘNOTE

The green indicators of all disks will in 1Hz blink when the location is started.

Steps

Step 1: Select "Storage" -> "RAID" on the navigation tree to open the RAID interface.

Step 2: Select the desired RAID in the information display area, click the <Locate> button, click the <Start Locating> button in the drop-down menu, and click the <OK> button in the pop-up confirmation box to start locating the RAID.

6.3.4.2 Stopping Locating RAID

This section explains how to stop locating RAID.

Steps

Step 1: Select "Storage" -> "RAID" on the navigation tree to open the RAID interface.

Step 2: Select the desired RAID in the information display area, click the <Locate> button, click the <Stop Locating> button in the drop-down menu, and click the <OK> button in the pop-up confirmation box to complete the configuration.

6.3.5 Managing Hot Spare Disk/Hot Spare Space

6.3.5.1 Configuring Dedicated Hot Spare Disk for CRAID-P

This section explains how to configure dedicated hot spare disk for CRAID-P RAID.

Steps

Step 1: Select "Storage" -> "RAID" on the navigation tree to open the RAID interface.

Step 2: Select the desired RAID in the information display area, click the <More> button, and click the <Configure Dedicated Hot Spare> button in the drop-down menu to open the **Configure Dedicated Hot Spare** window, as shown in Figure 6-16. Add or remove a dedicated hot spare disk through the button of ">>" or "<<" and click the <OK> button to complete the configuration.

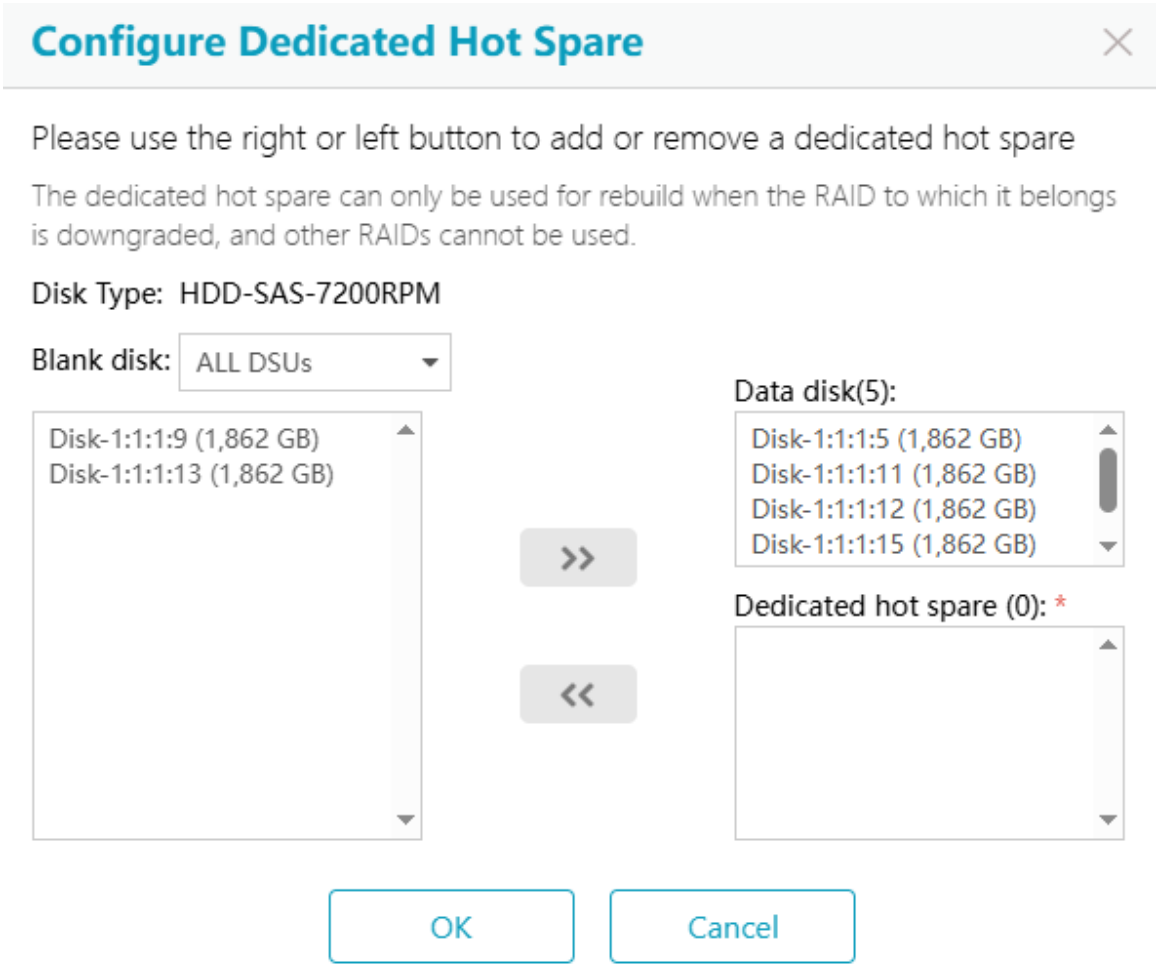

Figure 6-16 Configure dedicated hot spare disk interface

6.3.5.2 Modifying CRAID-V Hot Spare Policy

This section explains how to modify CRAID-V RAID's hot spare policy.

ⓘNOTE

CRAID-V is created on the base of virtual disks, and its hot spare space is scattered on its physical disks. The size of hot spare space is determined by the number of physical disks in CRAID-V and its hot spare policy. See Table 6-1 for details.

Steps

Step 1: Select "Storage" -> "RAID" on the navigation tree to open the RAID interface.

Step 2: Select the desired RAID in the information display area and click the <Properties> button to open the **Basic Properties** window. The **General** tab is shown in Figure 6-14. Modify RAID hot spare policy and click the <Apply> button to complete the configuration.

6.3.6 Exporting RAID

This section explains how to export RAID.

ⓘNOTE

All disks in the RAID will be automatically powered off safely after exporting RAID.

Steps

Step 1: Select "Storage" -> "RAID" on the navigation tree to open the RAID interface.

Step 2: Select the desired RAID in the information display area, click the <More> button, click the <Export RAID> button in the drop-down menu, enter "yes" in the pop-up warning box, and click the <OK> button to complete the configuration.

6.3.7 RAID Rebuild

This section explains how to view RAID's rebuild information.

ⓘNOTE

- Redundancy can be restored through rebuilding after the redundant RAID is downgraded.
- During the process of RAID rebuild, the dedicated hot spare disk is selected first, followed by the global hot spare disk, and finally the blank disk (it is required to enable the blank disk hot spare, see 8.4.5 Setting Global Parameters of Hot Spare Disk for details).

Prerequisites

RAID is being rebuilt.

Steps

Step 1: Select "Storage" -> "RAID" on the navigation tree to open the RAID interface.

Step 2: Select the degraded RAID in the information display area and click the <Properties> button to open the **Basic Properties** window. The **Background Tasks** tab is shown in Figure 6-17. You can view the rebuild task information of the RAID or perform operations such as pausing rebuild and starting rebuild.

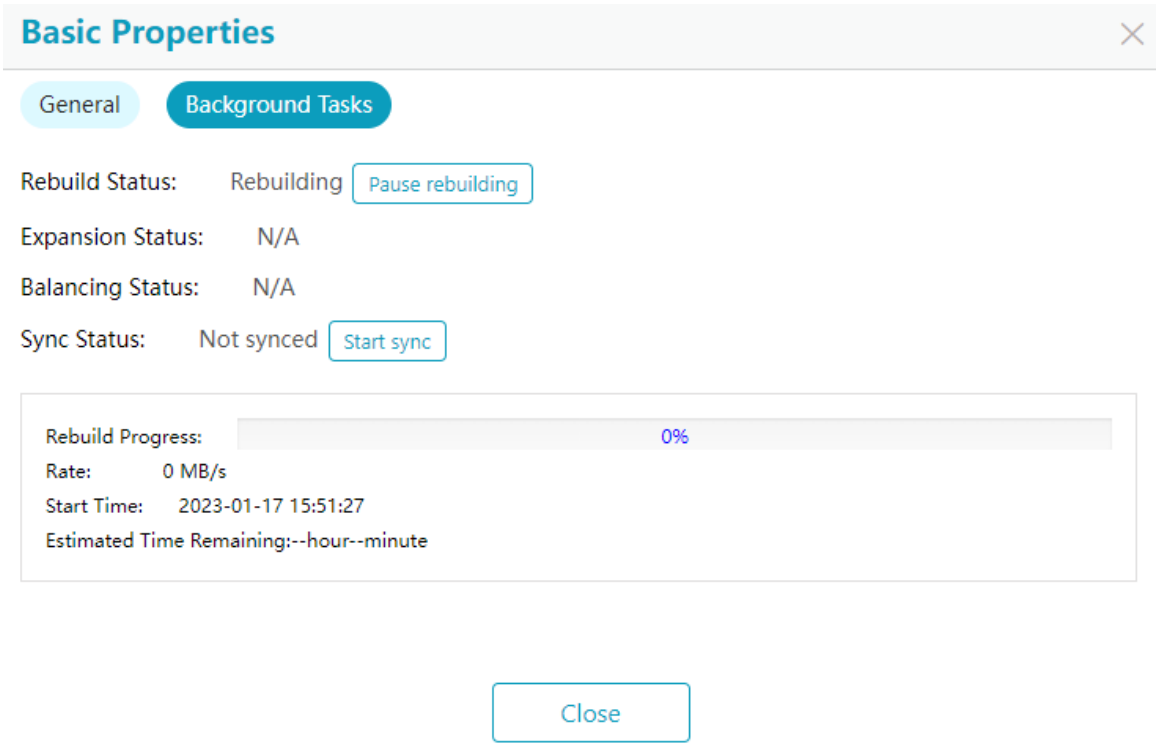

Figure 6-17 RAID rebuild task information interface

6.3.8 RAID Synchronization

This section explains how to view RAID's synchronization information.

Prerequisites

RAID is being synchronized.

Steps

Step 1: Select "Storage" -> "RAID" on the navigation tree to open the RAID interface.

Step 2: Select the desired RAID in the information display area and click the <Properties> button to open the **Basic Properties** window. The **Background Tasks** tab is shown in Figure 6-18. You can view the synchronization task information of the RAID or perform operations such as canceling synchronization and starting synchronization.

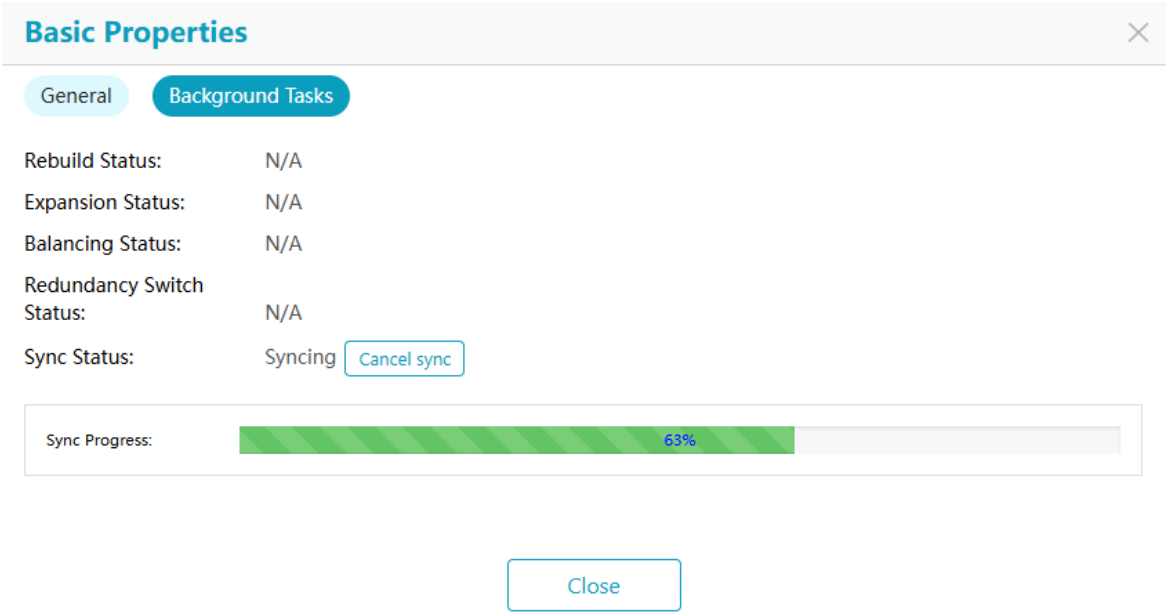

Figure 6-18 RAID synchronization task information interface

6.3.9 Deleting RAID

This section explains how to delete RAID.

Prerequisites

There is no LUN in the RAID.

Steps

Step 1: Select "Storage" -> "RAID" on the navigation tree to open the RAID interface.

Step 2: Select the desired RAID in the information display area, click the <Delete> button, confirm the object and enter "yes" in the pop-up warning box, and click the <OK> button to complete the configuration.

6.4 Managing LUN

6.4.1 Creating LUN

6.4.1.1 Creating a Single LUN

This section explains how to create a single LUN.

Steps

Step 1: Select "Storage" -> "LUN" on the navigation tree to open the LUN interface.

Step 2: Click the <Create> button in the **LUNs** tab of the information display area to open the **Create LUN** wizard.

Step 3: The first step of the **Create LUN** wizard is shown in Figure 6-19. Select the pool and click the <Next> button to enter the next interface.

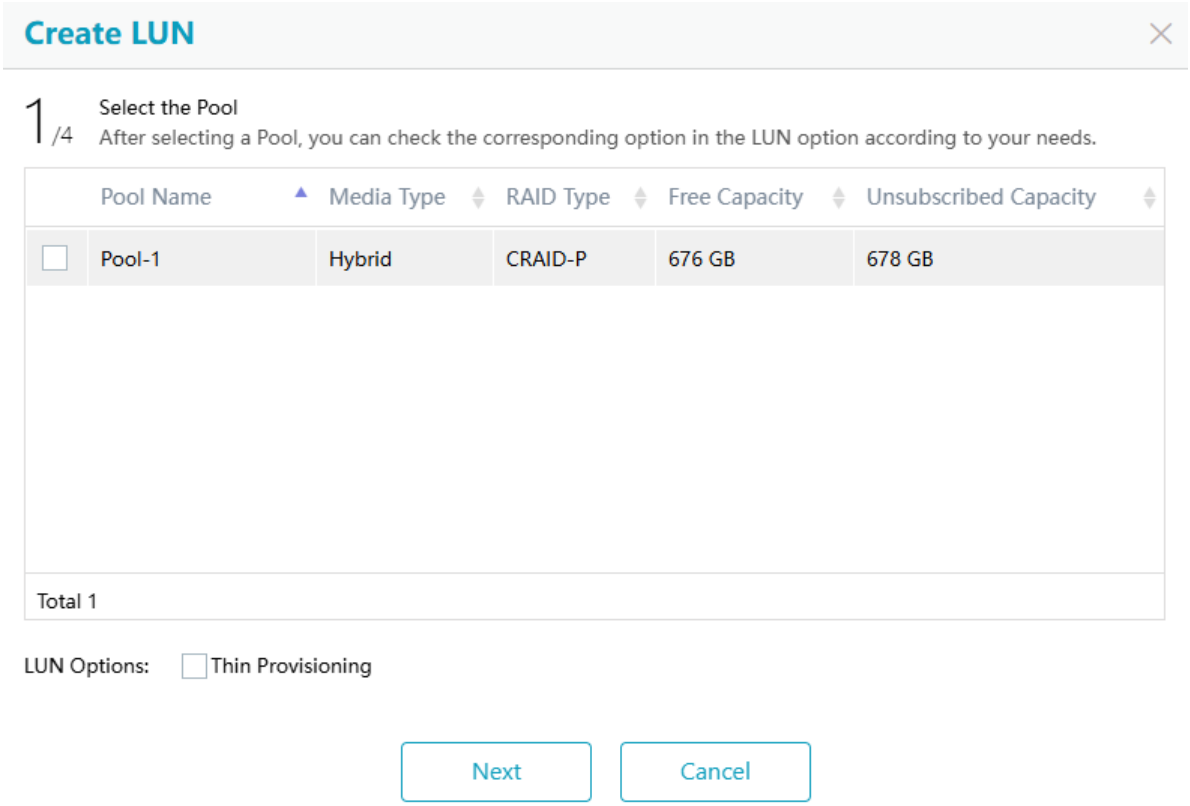

Figure 6-19 Create LUN wizard interface (1)

ⓘNOTE

This document only introduces the steps for creating Thick-LUNs. For details about the steps of creating Thin-LUNs, see *MacroSAN MS Series Storage Devices Thin Provisioning Feature GUI User Manual*.

Step 4: The second step of the **Create LUN** wizard is shown in Figure 6-20. Enter LUN name and capacity (see Table 6-10 for details), select RAID, and click the <Next> button to enter the next interface.

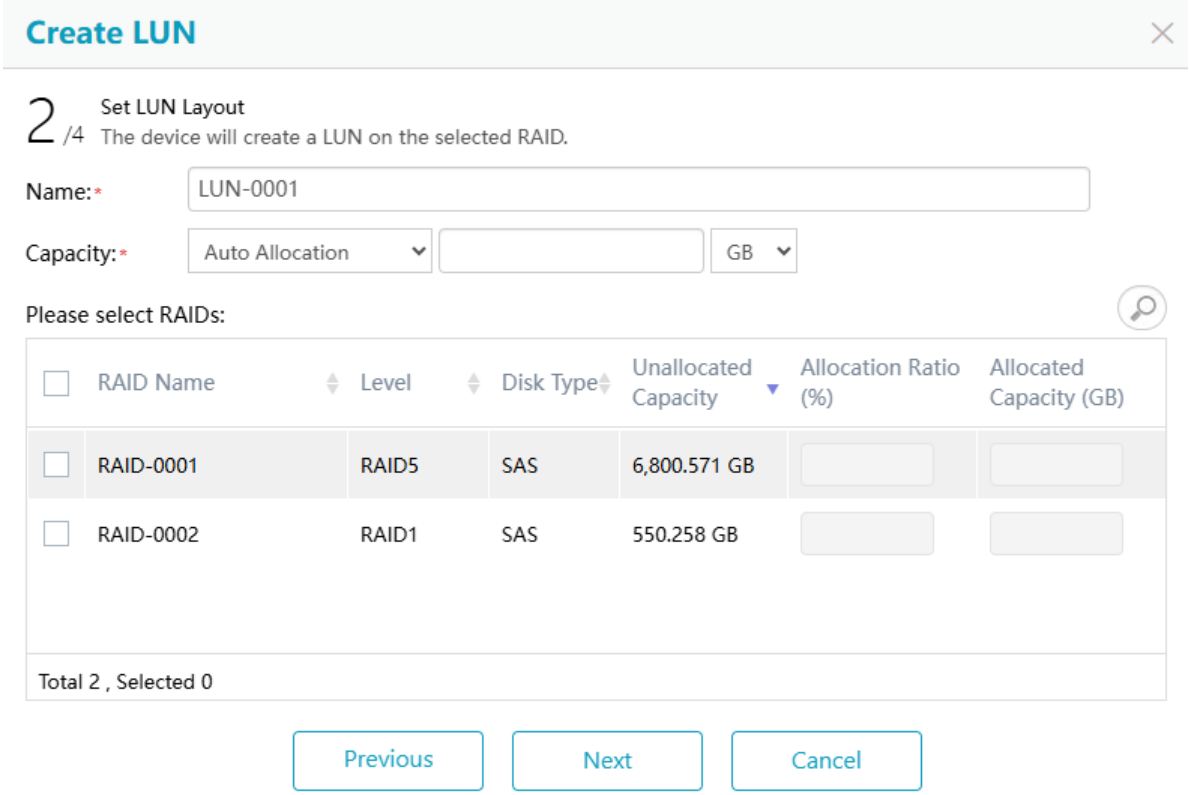

Figure 6-20 Create LUN wizard interface (2)

Table 6-10 Description of the parameters for creating LUN wizard interface (2)

Parameter	Description
Name	It refers to the name of LUN. • Length: 1-63 characters. • Valid character range: [a-zA-Z0-9.-_:]. • It is recommended that the prefix of LUN name is "LUN-".
Capacity	The system provides two capacity allocation methods as follows: • Custom Allocation: You can manually select RAID to create LUN and set the allocated capacity on each RAID. The LUN capacity is equal to the sum of the allocated capacities of the selected RAIDs. • Auto Allocation: LUN capacity can be set. The system will automatically allocate capacity on the selected RAID according to the equal distribution policy.

Step 5: The third step of the **Create LUN** wizard is shown in Figure 6-21. Set LUN advanced parameters (see Table 6-11 for details) and click the <Next> button to enter the next interface.

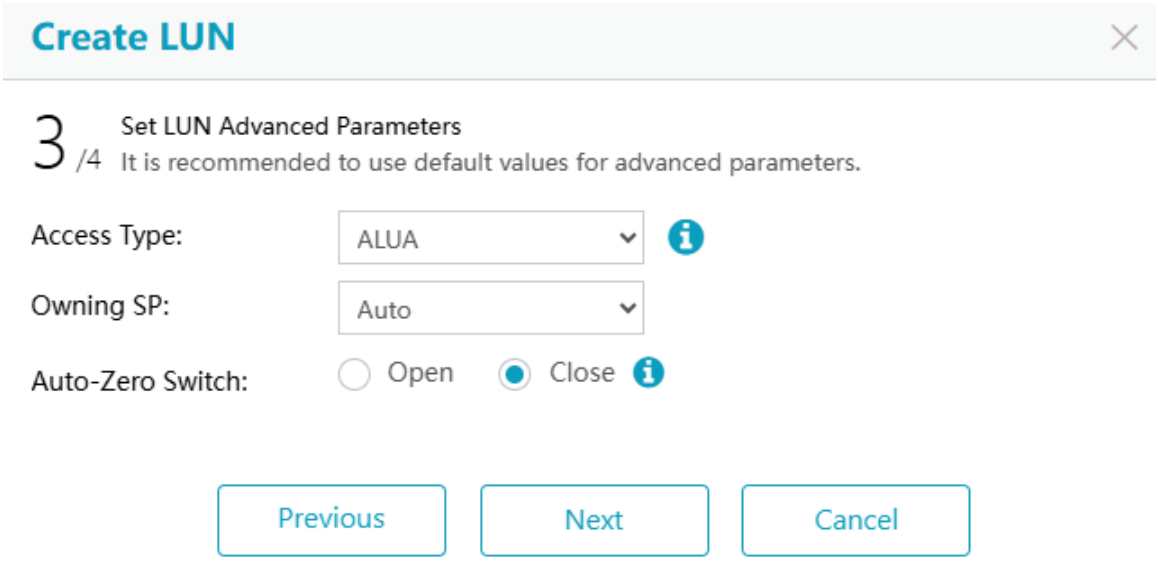

Figure 6-21 Create LUN wizard interface (3)

Table 6-11 Description of the parameters for creating LUN wizard interface (3)

Parameter	Description
Access Type	It refers to the access type of LUN: • ALUA (Asymmetric Logical Unit Access): Only the SP to which the LUN belonging reports optimized path and all other SPs report non-optimized paths. • SLUA (Symmetric Logical Unit Access): All SPs report optimized paths.
Owning SP	The system provides two methods for setting the default controller of LUN: • Auto: The system will automatically select the optimal default controller for the newly created LUN according to the distribution of the default controllers of the existing LUN in the environment. • Manual: You can manually set the default controller of the newly created LUN.
Auto-Zero Switch	It refers to enabling or disabling auto-zero switch of LUN. **ⓘNOTE** • Only Thick-LUNs support setting auto-zero switch. If the unwritten area is required to return to all 0s for front-end business, please turn on auto-zero switch. • If you need to enable auto-zero switch, make sure that there is at least 1 GB of free space left in the pool.

Step 6: In the fourth step of the **Create LUN** wizard, you can check the configuration information and click the <Finish> button to complete the configuration.

6.4.1.2 Batch Creating LUNs

This section explains how to create several LUNs in batches.

Steps

Step 1: Select "Storage" -> "LUN" on the navigation tree to open the LUN interface.

Step 2: Click the <Batch Create> button in the **LUNs** tab of the information display area to open the **Batch Create LUN** wizard.

Step 3: The first step of the **Batch Create LUN** wizard is shown in Figure 6-22. Select the pool and click the <Next> button to enter the next interface.

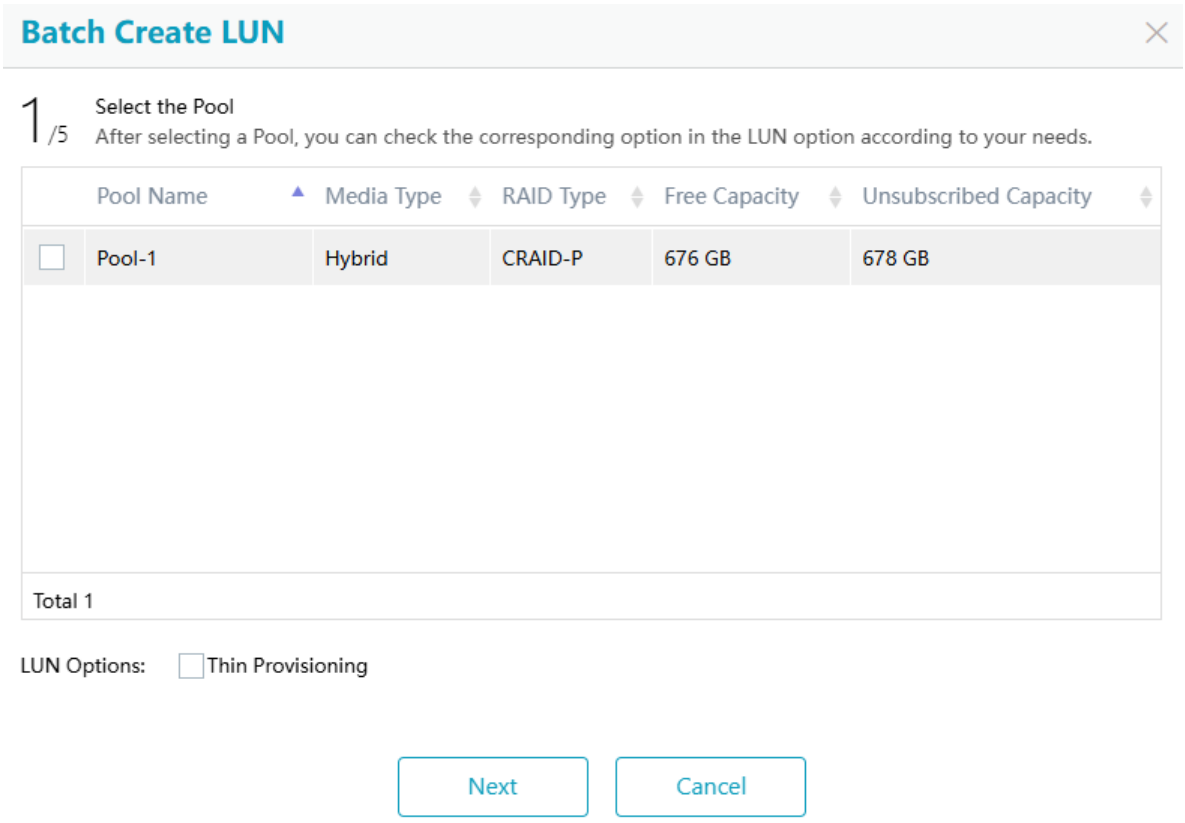

Figure 6-22 Batch create LUN wizard interface (1)

ⓘNOTE

This document only introduces the steps for creating Thick-LUNs. For details about the steps of creating Thin-LUNs, see *MacroSAN MS Series Storage Devices Thin Provisioning Feature GUI User Manual*.

Step 4: The second step of the **Batch Create LUN** wizard is shown in Figure 6-23. Enter relevant parameters (see Table 6-12 for details) and click the <Next> button to enter the next interface.

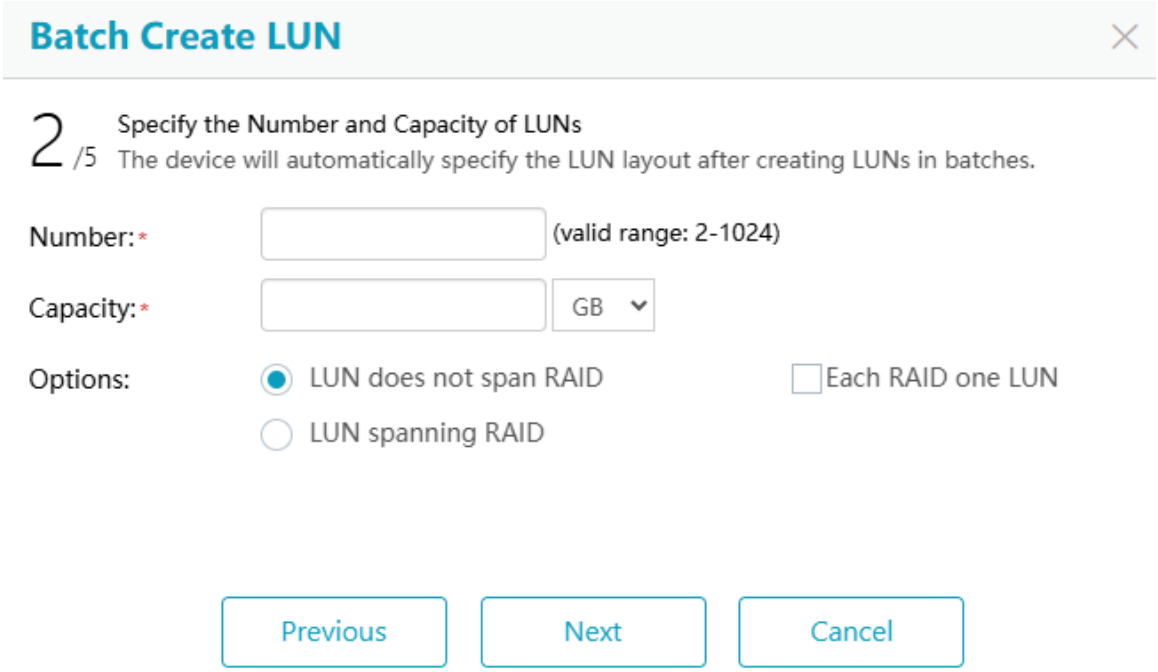

Figure 6-23 Batch create LUN wizard interface (2)

Table 6-12 Description of the parameters for batch creating LUN wizard interface (2)

Parameter	Description
Number	It refers to the number of LUNs to be created.
Capacity	It refers to the capacity of a single LUN.
Options	• LUN does not span RAID: One LUN is only located in one RAID. • LUN spanning RAID: A LUN can be located in multiple RAIDs. • Each RAID one LUN: Only 1 LUN is created in each RAID.

Step 5: The third step of the **Batch Create LUN** wizard is shown in Figure 6-24. Enter relevant parameters (see Table 6-13 for details), select RAID, and click the <Next> button to enter the next interface.

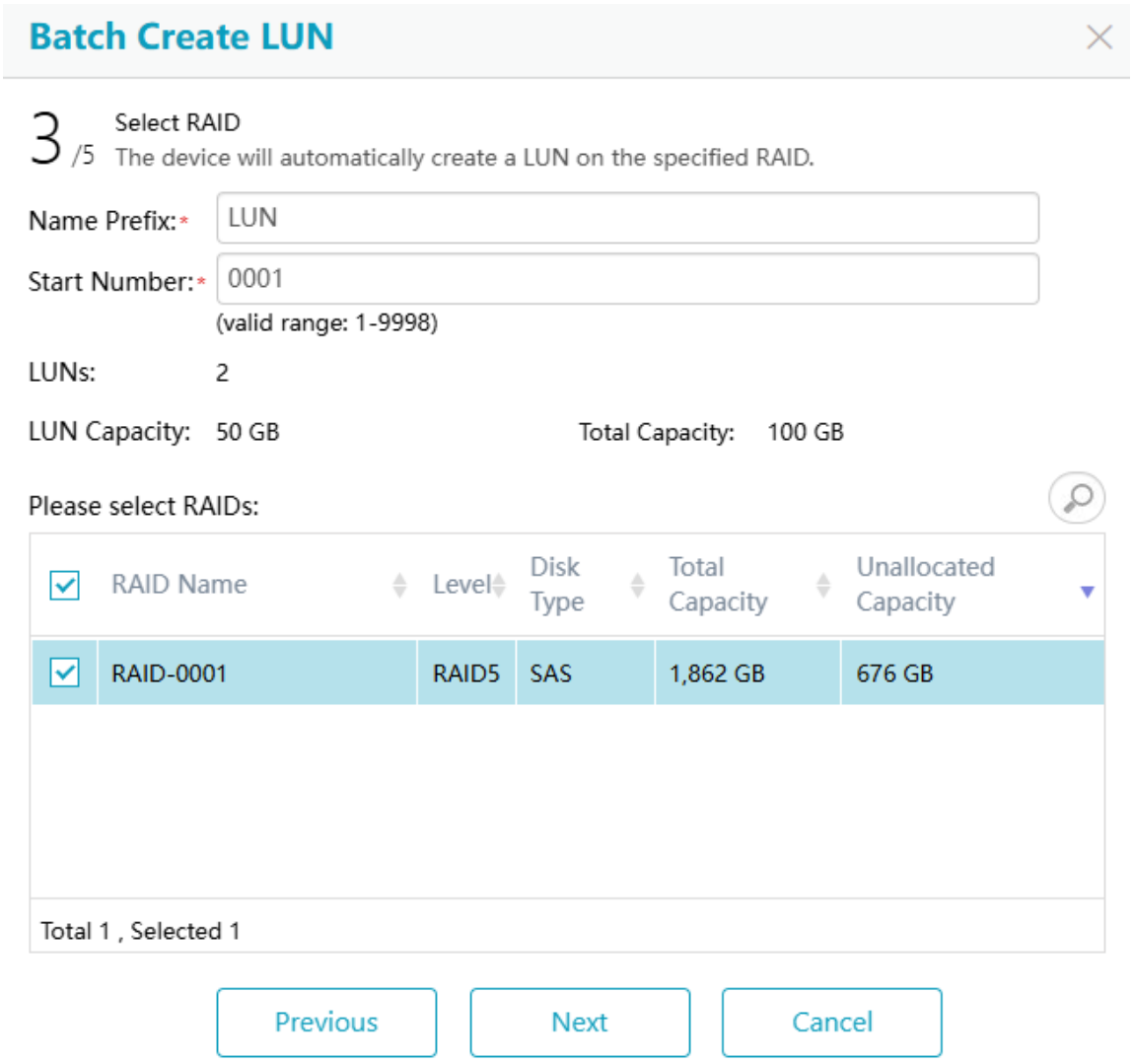

Figure 6-24 Batch create LUN wizard interface (3)

Table 6-13 Description of the parameters for batch creating LUN wizard interface (3)

Parameter	Description
Name Prefix	It refers to the prefix of LUN name. • Length: 1-57 characters. • Valid character range: [a-zA-Z0-9.-_:]. • It is recommended that the prefix of the LUNs' name is "LUN".
Start Number	It refers to the start number of LUN name. The name is formed by "Name Prefix"+"-"+"Start Number".

Step 6: The fourth step of the **Batch Create LUN** wizard is shown in Figure 6-25. Set advanced parameters of LUN (see Table 6-14 for details) and click the <Next> button to enter the next interface.

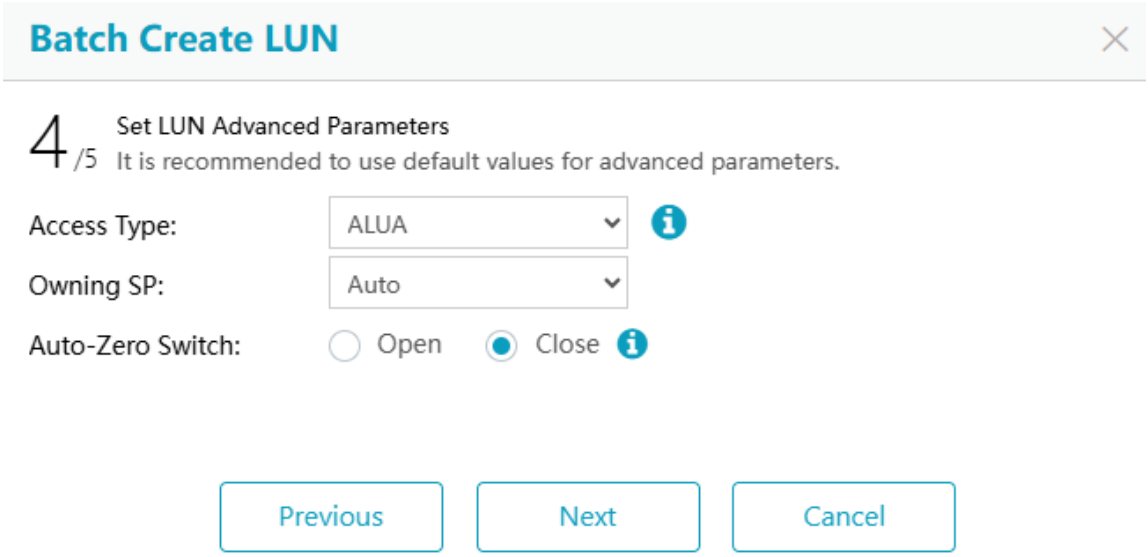

Figure 6-25 Batch create LUN wizard interface (4)

Table 6-14 Description of the parameters for batch creating LUN wizard interface (4)

Parameter	Description
Access Type	It refers to the access type of LUN: • ALUA (Asymmetric logical unit access): Only the SP to which the LUN belonging reports optimized path and all other SPs report non-optimized paths. • SLUA (Symmetric logical unit access): All SPs report optimized paths.
Owing SP	The system provides two methods for setting the default controller of LUN: • Auto: The system will automatically select the optimal default controller for the newly created LUN according to the distribution of the default controllers of the existing LUN in the environment. • Manual: You can manually set the default controller of the newly created LUN.
Auto-Zero Switch	It is refers to enabling or disabling auto-zero switch of LUN. **ⓘNOTE** Only Thick-LUNs support setting auto-zero switch. If the unwritten area is required to return to all 0s for front-end business, please turn on auto-zero switch.

Step 7: In the fifth step of the **Batch Create LUN** wizard, you can check the configuration information and click the <Finish> button to complete the configuration.

6.4.2 Expanding LUN

This section explains how to expand LUN.

ⓘNOTE

It is necessary to manually scan the client server and complete post-expansion processing after LUN expansion.

Steps

Step 1: Select "Storage" -> "LUN" on the navigation tree to open the LUN interface.

Step 2: Select the desired LUN in the **LUNs** tab of the information display area and click the <Expand> button to open the **LUN Expansion** window, as shown in Figure 6-26. Enter extend capacity (see Table 6-15 for details), select RAID, and click the <OK> button to complete the configuration.

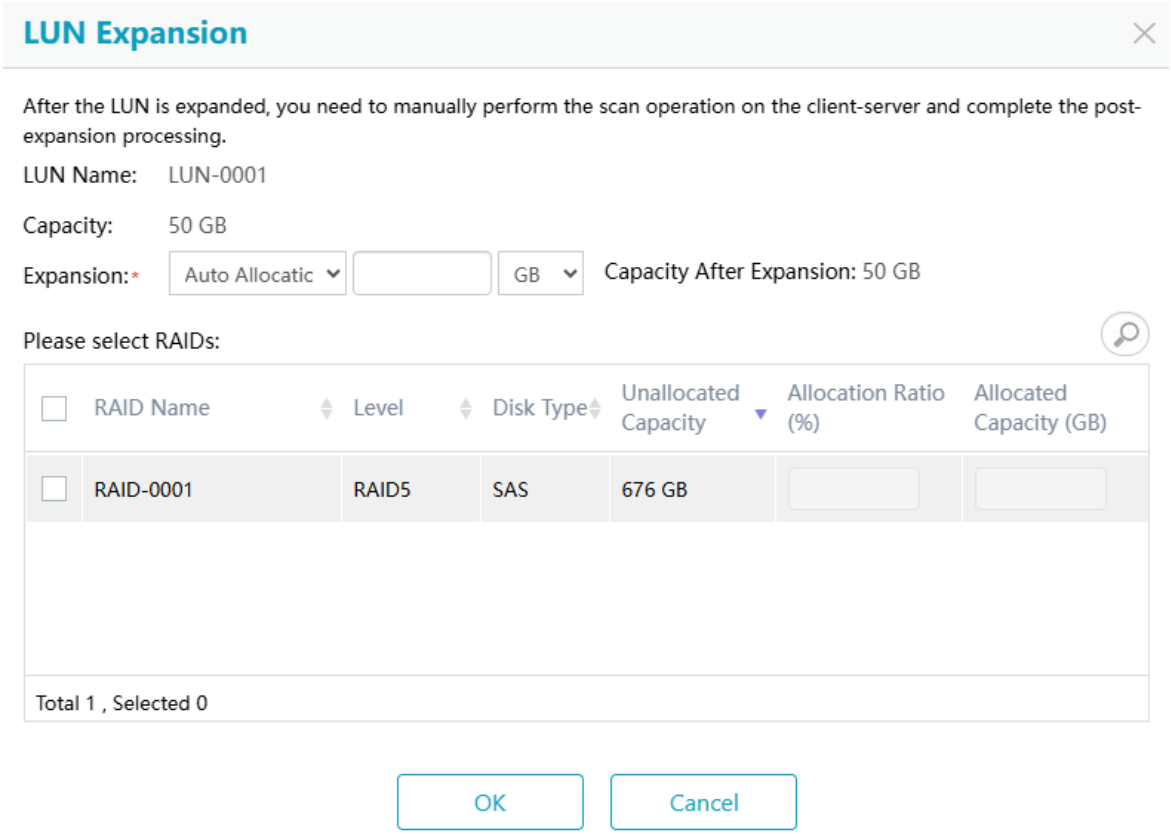

Figure 6-26 LUN expansion interface

Table 6-15 Description of the parameters for LUN expansion interface

Parameter	Description
Expansion	The system provides two ways to allocate LUN expansion capacity: • Custom Allocation: You can manually select RAID to expand LUN and set the allocated capacity on each RAID. The LUN expansion capacity is equal to the sum of the allocated capacity on the selected RAID. • Auto Allocation: LUN expansion capacity can be set. The system will automatically allocate capacity on the selected RAID according to the equal distribution policy.

6.4.3 Viewing LUN Properties

This section explains how to view LUN's general information, cache configuration, storage service, owning LUN group and owning consistency group.

Steps

Step 1: Select "Storage" -> "LUN" on the navigation tree to open the LUN interface.

Step 2: Select the desired LUN in the **LUNs** tab of the information display area and click the <Properties> button to open the **Basic Properties** window. You can view the basic properties of the LUN.

6.4.4 Modifying LUN Properties

6.4.4.1 Modifying General Information

This section explains how to modify LUN's name, access type, default SP and delay alarm threshold.

⚠CAUTION

- LUNs run in the default SP when the device is rebooted. Please try to distribute LUNs equally between two SPs for performance balance.
- Please ensure that reachable networks and I_T_L mappings are configured between application server and all SPs of device to avoid affecting business continuity due to link switching/HA takeover/dual-active switching.

Steps

Step 1: Select "Storage" -> "LUN" on the navigation tree to open the LUN interface.

Step 2: Select the desired LUN in the **LUNs** tab of the information display area and click the <Properties> button to open the **Basic Properties** window. The **General** tab is shown in Figure 6-27. Modify general information (see Table 6-16 for details) and click the <Apply> button to complete the configuration.

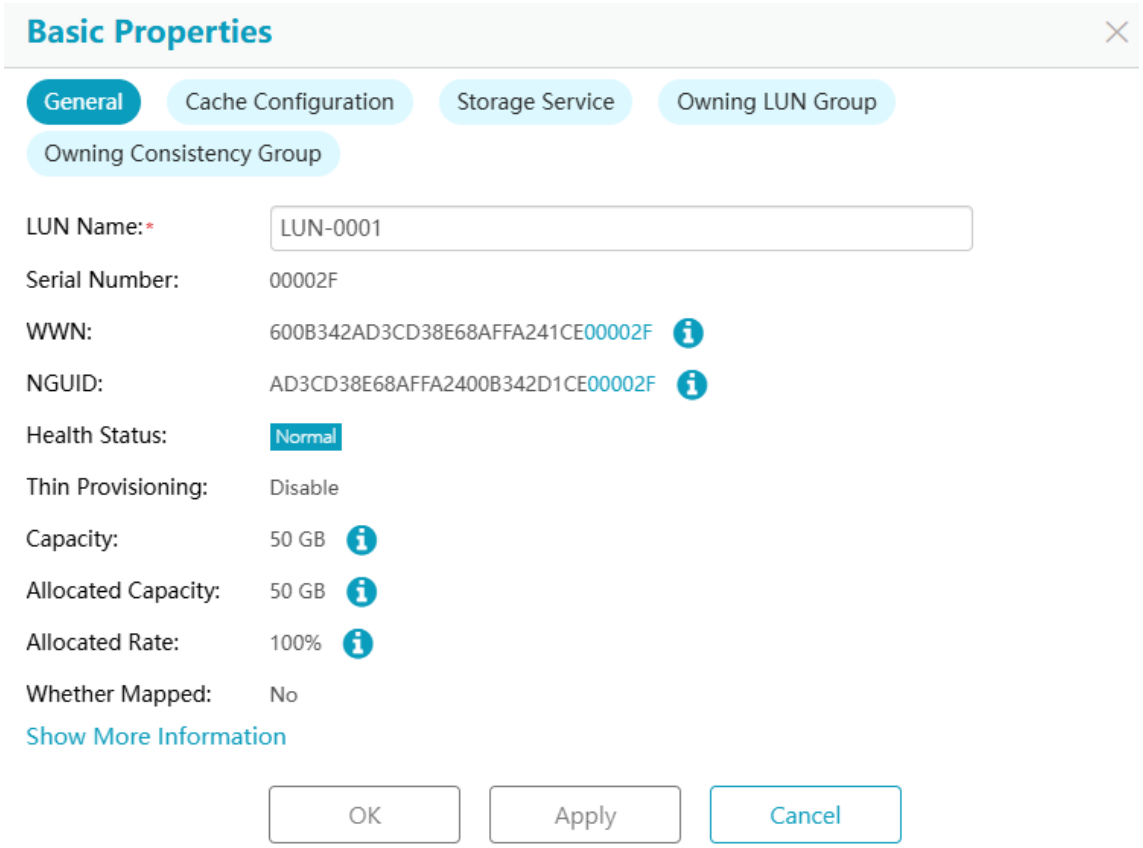

Figure 6-27 LUN basic properties interface

Table 6-16 Description of the parameters for LUN basic properties interface

Parameter	Description
LUN Name	It refers to the name of LUN. • Length: 1-63 characters. • Valid character range: [a-zA-Z0-9.-_:]. • It is recommended that the prefix of LUN name is "LUN-".
Access Type	It refers to the access type of LUN. • ALUA (Asymmetric Logical Unit Access): Only the SP to which the LUN belongs reports the optimized path, and other SPs report non-optimized paths. • SLUA (Symmetric Logical Unit Access): All SPs report optimized path.
Default SP	It refers to the default SP of LUN.
Delay Alarm Threshold	It refers to the threshold for triggering the LUN delay alarm, which will be triggered when the IO delay on the LUN exceeds the threshold.

6.4.4.2 Modifying Cache Configuration

This section explains how to modify LUN's cache configuration on reading and writing.

Steps

Step 1: Select "Storage" -> "LUN" on the navigation tree to open the LUN interface.

Step 2: Select the desired LUN in the **LUNs** tab of the information display area and click the <Properties> button to open the **Basic Properties** window. The **Cache Configuration** tab is shown in Figure 6-28. Modify cache configuration (see Table 6-17 for details) and click the <Apply> button to complete the configuration.

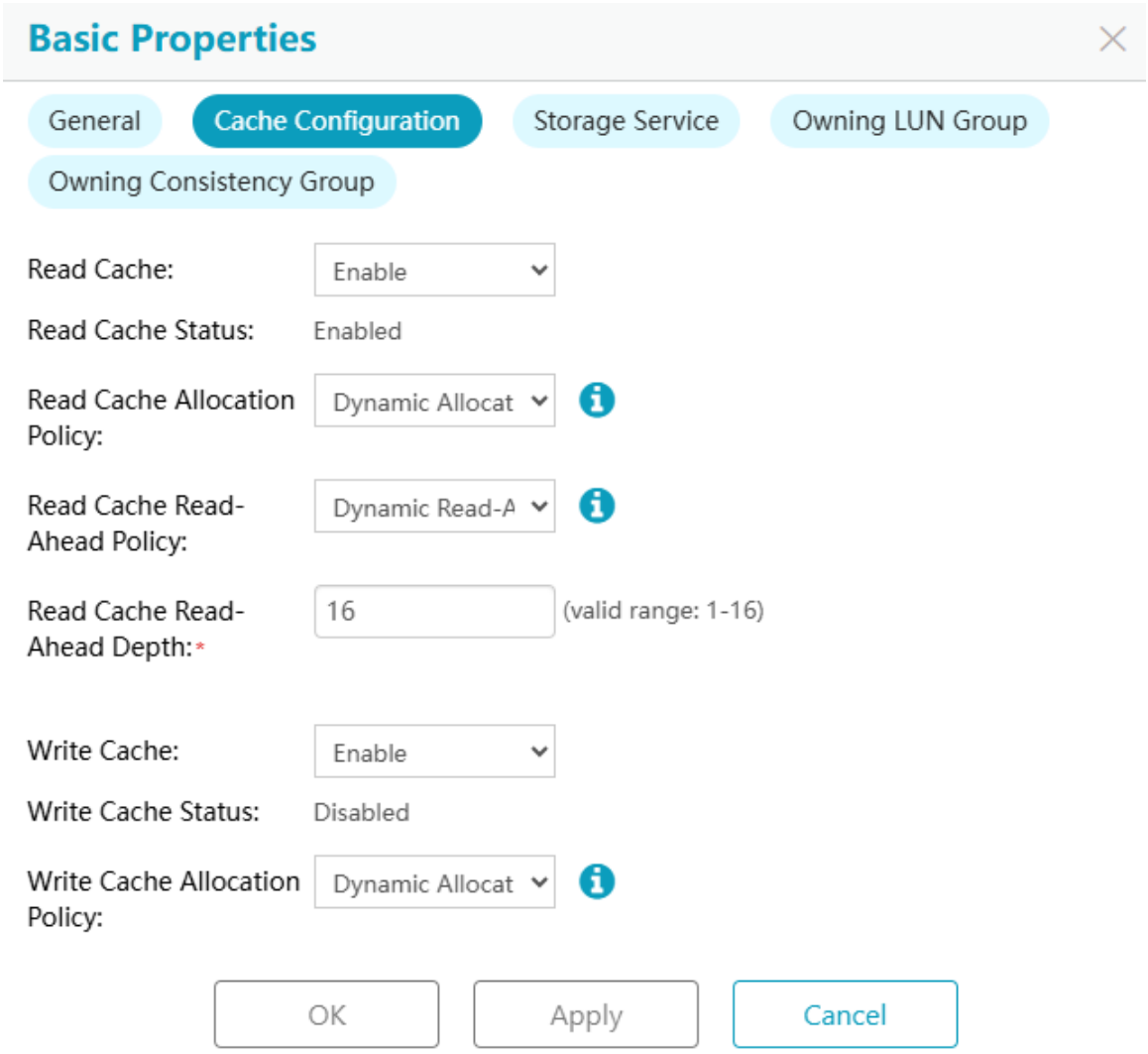

Figure 6-28 LUN cache configuration interface

Table 6-17 Description of the parameters for LUN cache configuration interface

Parameter	Description
Read Cache	It refers to enabling or disabling read cache for the LUN. ⚠CAUTION Disabling LUNs read cache will affect their read performance. It is recommended to enable LUNs read cache except for some special requirements.

Read Cache Status	It refers to current state of LUN read cache.
Read Cache Allocation Policy	The system supports two read cache allocation policies, and different policies can be set for each LUN: ● Dynamic allocation: The system dynamically adjusts the read cache space occupied by each LUN according to the read I/O on each LUN in the current statistical period, so as to optimize the overall utilization of the system read cache. ● Fixed allocation: The system allocates the read cache space for the LUN according to the set percentage. **⚠CAUTION** Modifying LUN read cache allocation policy will affect its read performance. Please do not modify it arbitrarily unless you know the I/O model of the business well to avoid affecting business performance.
Read Cache Read-Ahead Policy	The system supports three read cache read-ahead policies and different policies can be set for each LUN: ● Dynamic read-ahead: It refers to the read-ahead carried only for read I/O with consecutive addresses, which is applicable to applications whose traffic model is sequential reading. ● Fixed read-ahead: It refers to the read-ahead for all read IOs, which is applicable to occasions where the traffic model is a pseudo-sequential reading. ● No read-ahead: It refers to disabling LUN read cache read-ahead function, which is applicable to occasions where the traffic model is random reading. **⚠CAUTION** Modifying LUN read cache read-ahead policy will affect its read performance. Please do not modify it arbitrarily unless you know the I/O model of the business well to avoid affecting business performance.
Read Cache Read-Ahead Depth	It is used for dynamic read-ahead and fixed read-ahead, and it can be set according to the actual business model.
Write Cache	It refers to enabling or disabling write cache for the LUN. **⚠CAUTION** Disabling LUN write cache will affect its write performance. It is recommended to enable LUN write cache except for some special requirements.
Write Cache Status	It refers to the current state of the write cache.
Write Cache Allocation Policy	The system supports two write cache allocation policies, and different policies can be set for each LUN:

	• Dynamic allocation: The system dynamically adjusts the write cache space occupied by each LUN according to the write I/O on each LUN in the current statistical period, so as to optimize the overall utilization of the system write cache. • Fixed allocation: The system allocates write cache space for the LUN according to the set percentage. **⚠CAUTION** Modifying LUN write cache allocation policy will affect its write performance. Please do not modify it arbitrarily unless you know the I/O model of the business well to avoid affecting business performance.

6.4.5 Batch Modifying LUN Write Cache

This section explains how to batch modify LUN write cache.

Steps

Step 1: Select "Storage" -> "LUN" on the navigation tree to open the LUN interface.

Step 2: Click the <More> button in the information display area and click the <Batch Modify LUN Write Cache> button in the drop-down menu to open the **Batch Modify LUN Write Cache** window, as shown in Figure 6-29. Enable or Disable write cache, select pool and LUN, and click the <OK> button to complete the configuration.

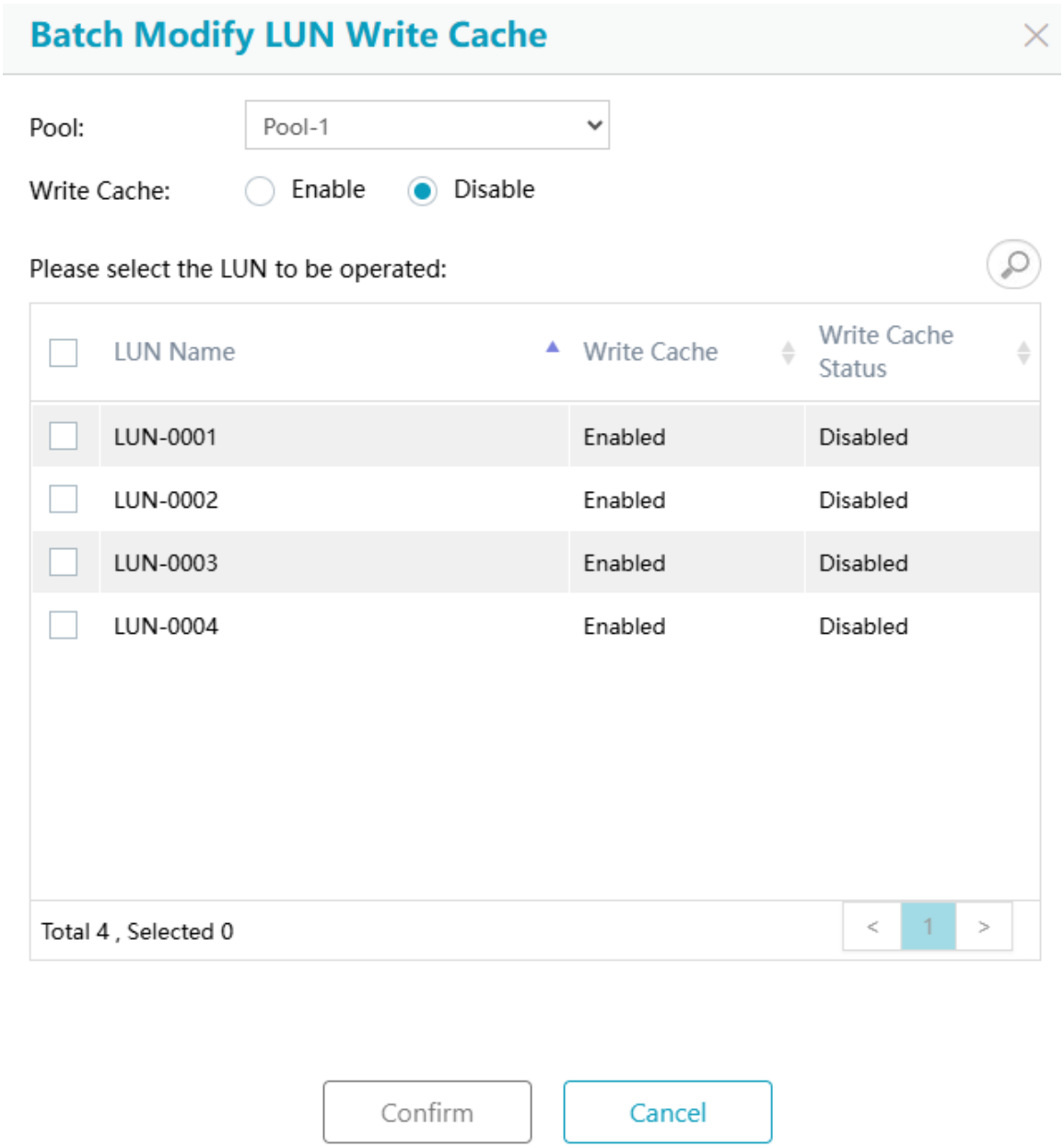

Figure 6-29 Batch modify LUN write cache interface

6.4.6 Refreshing LUN

This section explains how to refersh Thin-LUN's used capacity and usage.

Steps

Step 1: Select "Storage" -> "LUN" on the navigation tree to open the LUN interface.

Step 2: Click the <Refresh> button in the **LUNs** tab of the information display area to complete the configuration.

6.4.7 Deleting LUN

This section explains how to delete LUN.

Prerequisites

LUN is not used and not in the consistency group.

Steps

Step 1: Select "Storage" -> "LUN" on the navigation tree to open the LUN interface.

Step 2: Select the desired LUN in the **LUNs** tab of the information display area, click the <Delete> button, enter "yes" in the pop-up warning box, and click the <OK> button to complete the configuration.

6.4.8 Destroying LUN

This section explains how to destroy LUN.

⚠CAUTION

- Data of LUNs will be lost and cannot be recovered after destruction, please operate with caution.
- Please delete data destruction task after data is destroyed. Otherwise, the LUN cannot be mapped with Target.

Prerequisites

The data destroy license is valid.

Steps

Step 1: Select "Storage" -> "LUN" on the navigation tree to open the LUN interface.

Step 2: Select the desired LUN in the **LUNs** tab of the information display area, click the <Destroy> button, select the "Delete the LUN after data destruction" option as needed and enter "yes" in the pop-up warning box, and click the <OK> button to start destroying.

After the LUN data destroy task is started, select the LUN in the **LUNs** tab of the information display area, and click the <Properties> button to open the **Basic Properties** window. The **Destruction Status** tab is shown in Figure 6-30. You can view the LUN destruction task information or perform operations such as deleting data destruction task as required.

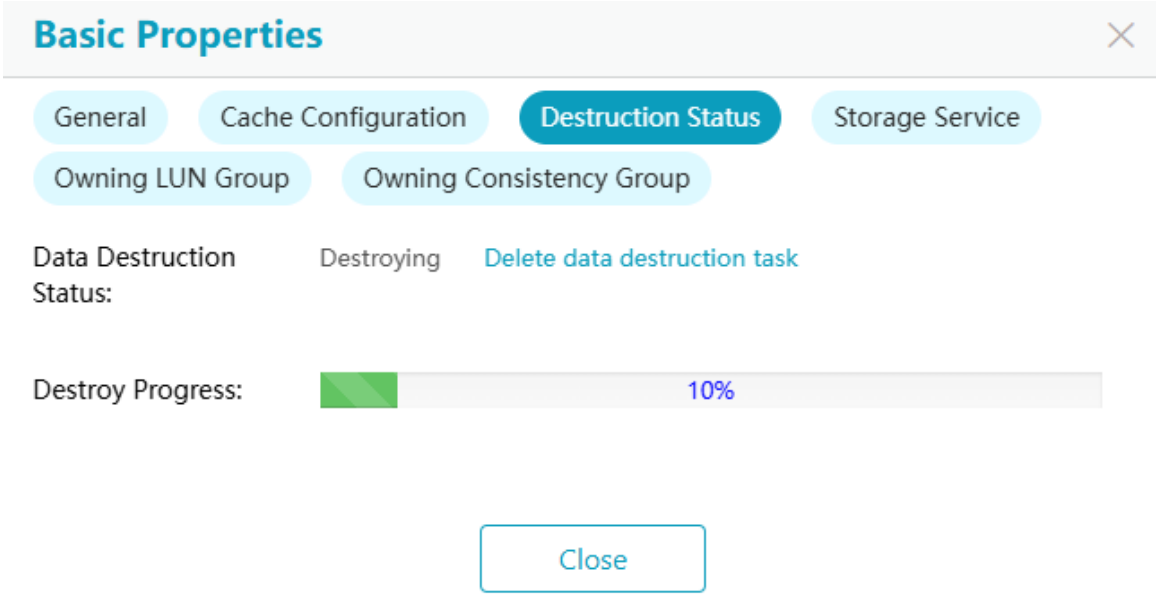

Figure 6-30 LUN destruction task interface

7 Clients

7.1 Introduction to Client

Application server can use the resources provided by storage device through ODSP software in the following two methods:

- SCSI method refers to traditional IP SAN or FC SAN. Application server is connected to storage device through IP network or FC network, and data is transmitted based on SCSI protocol. In the ODSP resource management framework, the mapping relationship can be configured through I_T_L mode or mapping domain mode. For details, see 7.4 Configuring I_T_L or 7.5 Configuring Mapping Domain.
- NVMe method is an emerging NVMf environment. Application server can be connected to storage device through a high-speed Ethernet network that supports RDMA and iNOF functions (NVMe over RDMA environment), and it can also be connected to the storage device through a high-speed FC network (NVMe over FC environment), both of which transmit data is based on the NVMe protocol. In the ODSP resource management framework, the mapping relationship can be configured through the NVMf Subsystem. For details, see 7.6 Configuring NVMf.

You need to configure Initiator corresponding to the application server before configuring mapping relationship whatever method you choose. For details, see 7.2 Managing Initiator.

For the SCSI method, you need to configure Target port of storage device before configuring mapping relationship. For details, see 7.3 Managing Target.

7.2 Managing Initiator

7.2.1 Introduction to Initiator

An Initiator is corresponding to a certain feature of application server in ODSP resource management framework. Initiators can be divided into the following types according to different application environments:

- iSCSI Initiator: An iSCSI Initiator is corresponding to an application server in an IP SAN environment (also called an iSCSI environment).
- FC Initiator: An FC Initiator is corresponding to an FC port of application server in an FC SAN environment or NVMe over FC environment.
- RDMA Initiator: An RDMA Initiator is corresponding to an application server in an NVMe over RDMA environment.

You can also configure uni-directional CHAP authentication for iSCSI Initiator, which means authentication of Target on Initiator, the details are as follows:

- Enable CHAP authentication for Initiator on storage device and set authentication information (username and password).
- Enter corresponding authentication information (username and password) when connecting the Initiator on application server to storage device.
- The device checks whether authentication information carried in iSCSI connection request is consistent with the preset authentication information in storage device after receiving iSCSI connection request. If yes, the connection can be established. Otherwise, the connection establishment fails.

7.2.2 Creating Initiator

This section explains how to create Initiator.

Prerequisites

Please log in to Initiator's corresponding client server and record its WWN before creating Initiator.

Steps

Step 1: Select "Client" -> "I_T Connection" on the navigation tree to open the I_T connection interface.

Step 2: Click the <Create> button in the **Initiators** tab of the information display area to open the **Create Initiator** window, as shown in Figure 7-1. Enter Initiator parameters (see Table 7-1 for details) and click the <OK> button to complete the configuration.

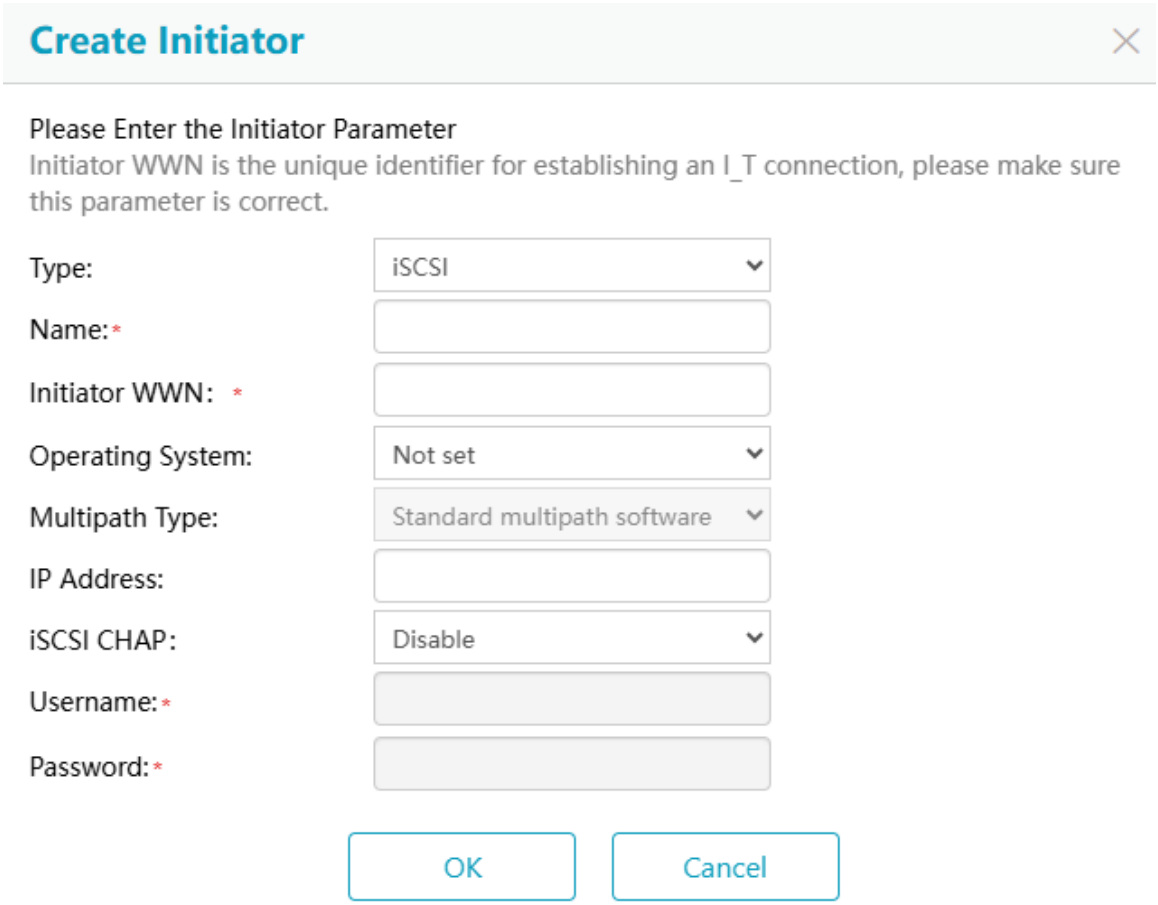

Figure 7-1 Create Initiator interface

Table 7-1 Description of the parameters for creating Initiator interface

Parameter	Description
Type	It refers to the type of Initiator, including iSCSI, FC and RDMA.
Name	It refers to the name of Initiator. • Length: 1-31 characters. • Valid character range: [a-zA-Z0-9.-_:].
Initiator WWN	It refers to the WWN of Initiator. • iSCSI Initiator WWN length: 1-221 characters. • FC Initiator WWN is in WWPN format with 8 hexadecimal numbers, the valid range is 00-ff, and the separator is ":". • RDMA Initiator WWN length: 1-223 characters.
Operating System	It refers to the operating system of application server.
Multipath Type	It refers to the multipath type of operating system. It can be set only when the operating system is "Windows2012 and above", "Linux" and "SuSE". Otherwise, it defaults to "Standard multipath software". • Standard multipath software • Manufacturer self-developed multipath software
IP Address	It refers to the IP address of application server.

iSCSI CHAP	CHAP authentication can be enabled or disabled for iSCSI Initiator. Authentication username and password can be set when the CHAP authentication is enabled.
Username	It refers to the username of iSCSI CHAP. ● Length: 1-221 characters. ● Valid character range: [a-z0-9.-:].
Password	It refers to the password of iSCSI CHAP's username. ● Length: 12-16 characters. ● Valid character range: [a-zA-Z0-9.-_:,!@#%&*()].

7.2.3 Viewing Initiator Properties

This section explains how to view Initiator's basic properties.

Steps

Step 1: Select "Client" -> "I_T Connection" on the navigation tree to open the I_T connection interface.

Step 2: Select the desired Initiator in the **Initiators** tab of the information display area and click the <Properties> button to open the **Basic Properties** window. You can view the basic properties of the Initiator.

7.2.4 Modifying Initiator

7.2.4.1 Modifying Properties

This section explains how to modify Initiator's name, operating system, multipath type and IP address.

Steps

Step 1: Select "Client" -> "I_T Connection" on the navigation tree to open the I_T connection interface.

Step 2: Select the desired Initiator in the **Initiators** tab of the information display area and click the <Properties> button to open the **Basic Properties** window, as shown in Figure 7-2. Modify the properties of Initiator (see Table 7-2 for details) and click the <OK> button to complete the configuration.

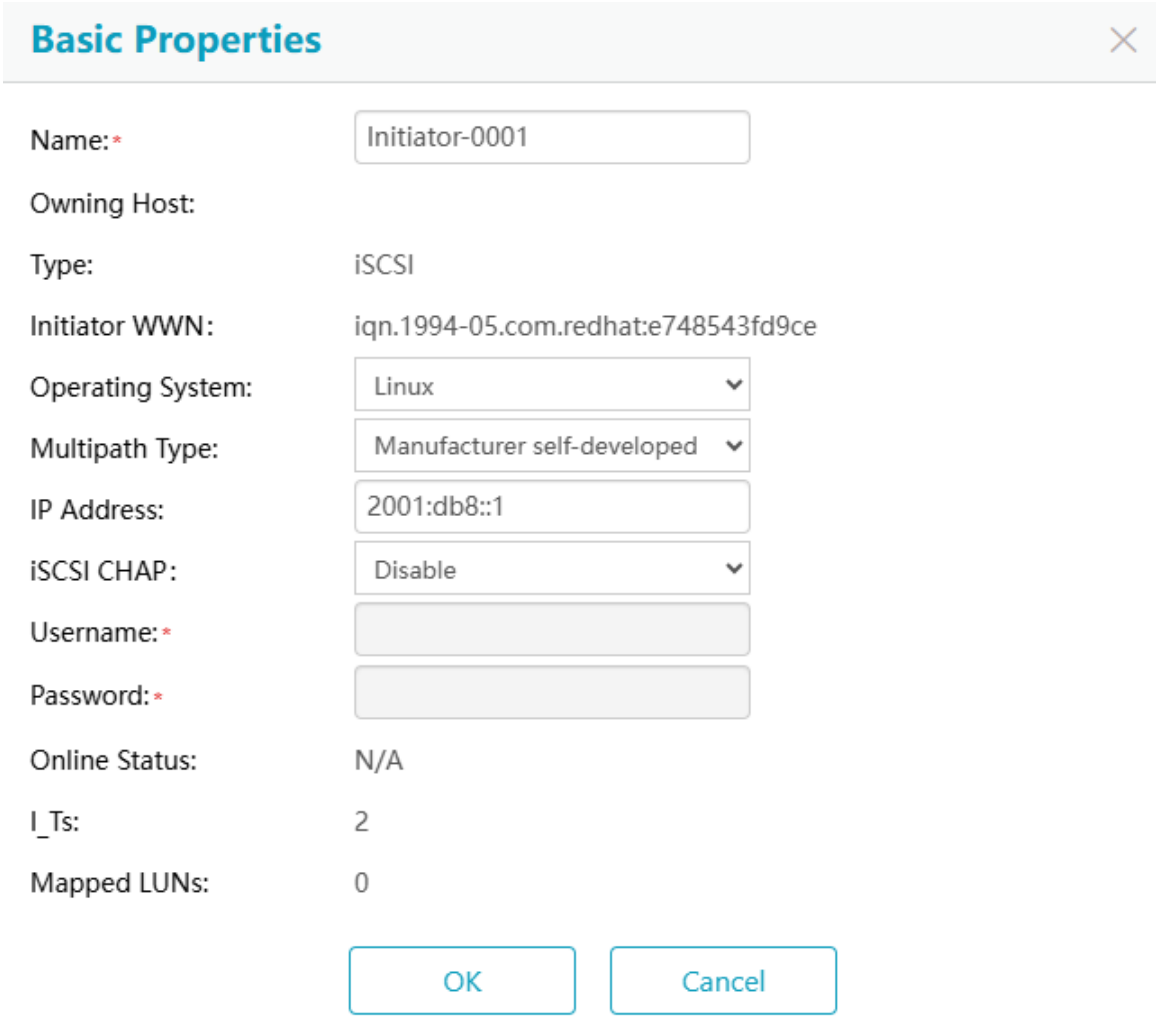

Figure 7-2 Initiator basic properties interface

Table 7-2 Description of the parameters for Initiator basic properties interface

Parameter	Description
Name	It refers to the name of Initiator name. • Length: 1-31 characters. • Valid character range: [a-zA-Z0-9.-_:].
Operating System	It refers to the operating system of application server. **⚠CAUTION** Please modify Initiator's OS in the case of I_T connection status is disconnected and then re-establish the I_T connection to make sure configuration takes effect.
Multipath Type	It refers to the multipath type of operating system. It can be modify only when the operating system is "Windows2012 and above", "Linux" and "SuSE". • Standard multipath software • Manufacturer self-developed multipath software

IP Address	It refers to the IP address of application server.
iSCSI CHAP	CHAP authentication can be enabled or disabled for iSCSI Initiator. Authentication username and password can be set when the CHAP authentication is enabled:
Username	It refers to the username of iSCSI CHAP. • Length: 1-221 characters. • Valid character range: [a-z0-9.-:].
Password	It refers to the password of iSCSI CHAP's username. • Length: 12-16 characters. • Valid character range: [a-zA-Z0-9.-_:,!@#%&*()].

7.2.4.2 Modifying Auto-Discovery Initiator Switch

This section explains how to enable or disable auto-discovery Initiator switch.

ⓘNOTE

Auto-discovery Initiator switch is a global parameter. The Initiator will be automatically added to device in the case of the device receives its connection request after enabling the switch if the Initiator does not exist in the device before.

Steps

Step 1: Select "Client" -> "I_T Connection" on the navigation tree to open the I_T connection interface.

Step 2: Click the <More> button in the **Initiators** tab of the information display area and click the <Advanced Settings> button in the drop-down menu to open the **Initiator Advanced Settings** window, as shown in Figure 7-3. Enable or disable auto-discovery Initiator switch and click the <OK> button to complete the configuration.

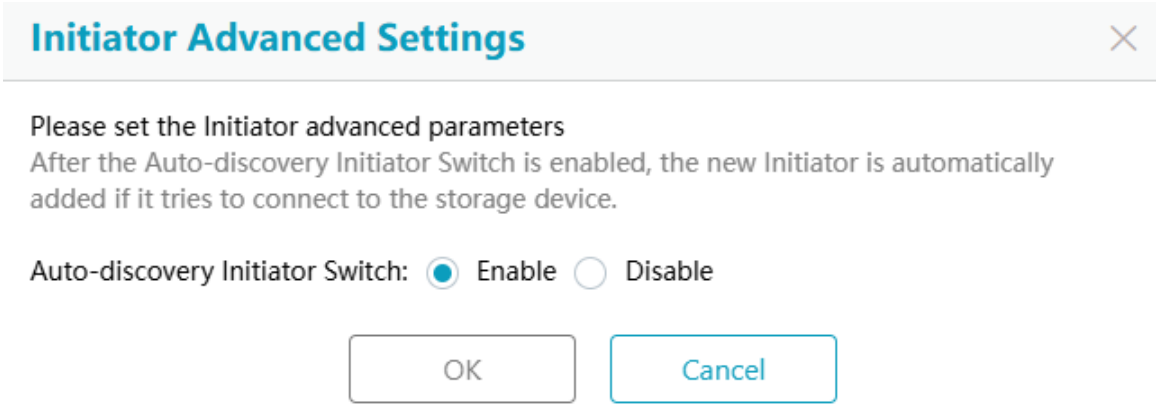

Figure 7-3 Initiator advanced settings interface

7.2.4.3 Batch Modifying Initiators

This section explains how to batch modify Initiators' name, operating system and multipath type.

Steps

Step 1: Select "Client" -> "I_T Connection" on the navigation tree to open the I_T connection interface.

Step 2: Click the <More> button in the **Initiators** tab of the information display area and click the <Batch Modify Initiator> button in the drop-down menu to open the **Batch Modify Initiator** window, as shown in Figure 7-4. Modify relevant parameters in batches (see Table 7-3 for details) and click the <OK> button to complete the configuration.

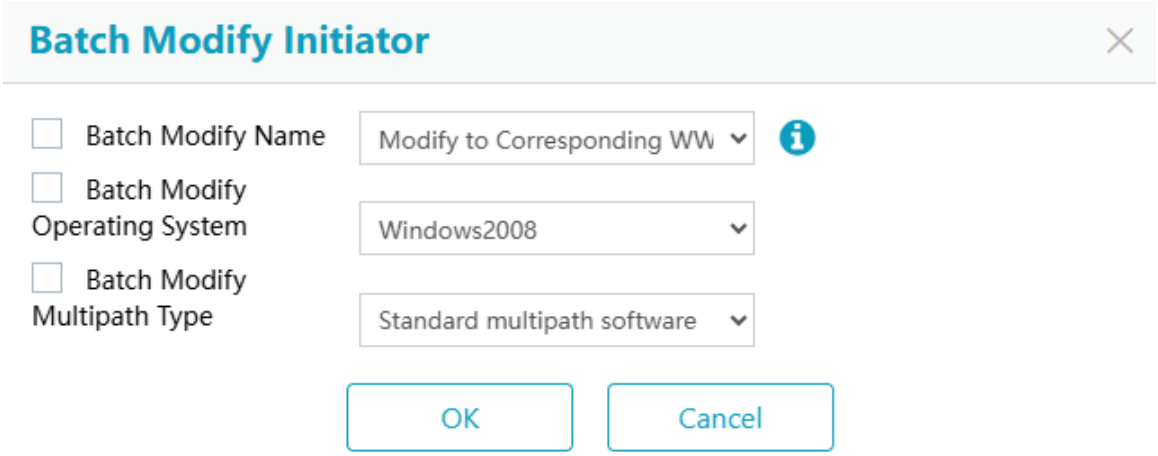

Figure 7-4 Batch modify Initiator interface

Table 7-3 Description of the parameters for batch modifying Initiator interface

Parameter	Description
Batch Modify Name	It refers to batch modifying Initiators' name. • Modify to corresponding WWN: It refers to modifying the Initiator names to the corresponding Initiator WWN in batches. If the length of the Initiator WWN exceeds 31 characters, the Initiator will be skipped. • Custom: It refers to customize name prefix and starting number of the Initiator name. The valid character range of the name prefix is [a-zA-Z0-9.-_:], and the maximum number of characters is 25; the valid range of the starting number is 1-9998.
Batch Modify Operating System	It refers to batch modifying the operating systems of application servers.
Batch Modify Multipath Type	It refers to batch modifying the multipath types of application servers. It can be modify only when the operating system is "Windows2012 and above", "Linux" and "SuSE".

7.2.5 Refreshing Initiator Online Status

This section explains how to refresh Initiator's online status.

Steps

Step 1: Select "Client" -> "I_T Connection" on the navigation tree to open the I_T connection interface.

Step 2: Click the <Refresh> button in the **Initiators** tab of the information display area to complete the configuration.

7.2.6 Deleting Initiator

This section explains how to delete Initiator.

Prerequisites

- The Initiator is not mapped with I_T.
- The Initiator is not added to Host.

Steps

Step 1: Select "Client" -> "I_T Connection" on the navigation tree to open the I_T connection interface.

Step 2: Select the desired Initiator in the **Initiators** tab of the information display area, click the <Delete> button, confirm the object and enter "yes" in the pop-up warning box, and click the <OK> button to complete the configuration.

7.3 Managing Target

ⓘNOTE

Only IP SAN or FC SAN needs to be configured with Target, and this chapter can be ignored in NVMf environment.

7.3.1 Introduction to Target

In the ODSP resource management framework, a Target is corresponding to a physical port used to provide the Initiator on the client server to establish a connection request in the environment of IP SAN or FC SAN, including the followings:

- iSCSI Target: It is an Ethernet port or an aggregate port in IP SAN.
- FC Target: It is an FC port in FC SAN.

In order to provide a higher level of security, you can also configure bi-directional CHAP authentication for iSCSI Target, which is authentication of Initiator on Target. The details are as follows:

- Enable bi-directional CHAP authentication for Initiator on application server and set authentication information (username and password).

- Enter corresponding authentication information (username and password) when enabling bi-directional CHAP authentication for Target on storage device.
- The storage device will carry authentication information in the response message when it receives an iSCSI connection request.
- The application server checks whether authentication information carried in the response message is consistent with that preset by Initiator after receiving response message. If yes, the connection can be established. Otherwise, the connection establishment fails.

⚠CAUTION

Bi-directional CHAP authentication is an enhancement to security based on uni-directional CHAP authentication (authentication of Target on Initiator). If you want to use the bi-directional CHAP authentication function, it is required to enable uni-directional CHAP authentication first (enabling CHAP authentication for Initiator on storage device), and then enable bi-directional CHAP authentication (enabling bi-directional CHAP authentication for Target on storage device). Otherwise, the bi-directional CHAP authentication mechanism will be ignored on device and not take effect.

7.3.2 Creating Target

This section explains how to create Target。

Steps

Step 1: Select "Client" -> "I_T Connection" on the navigation tree to open the I_T connection interface.

Step 2: Click the <Create> button in the **Targets** tab of the information display area to open the **Create Target** wizard.

Step 3: The first step of the **Create Target** wizard is shown in Figure 7-5. Select Target type and IP protocol version (see Table 7-4 for details) and click the <Next> button to enter the next interface.

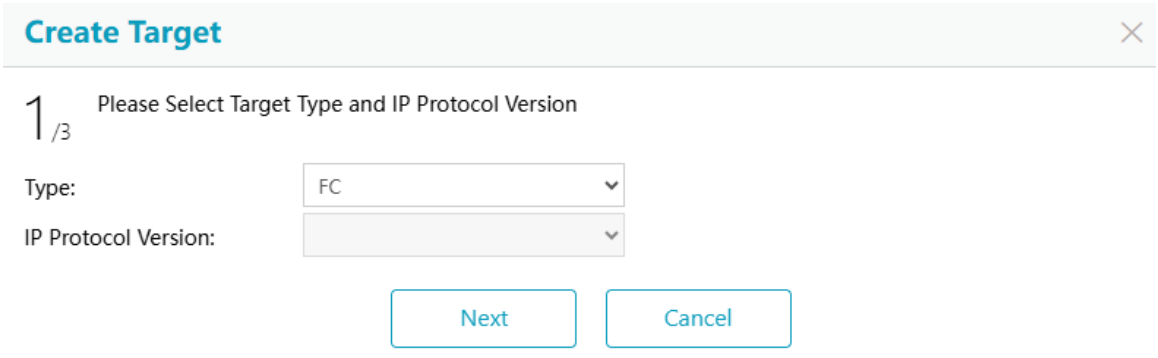

Figure 7-5 Create Target wizard interface (1)

Table 7-4 Description of the parameters for creating Target wizard interface (1)

Parameter	Description
Type	It refers to the Target type, including iSCSI and FC.
IP Protocol Version	You can specify the IP protocol version for SCSI Target, including IPv4 and IPv6 protocol.

Step 4: The second step of the **Create Target** wizard is shown in Figure 7-6. Select physical ports and Target WWN allocation method and click the <Next> button to enter the next interface.

⚠CAUTION

Targets are required to be created symmetrically. In other words, the ports at the same position on every SP are used to create Target.

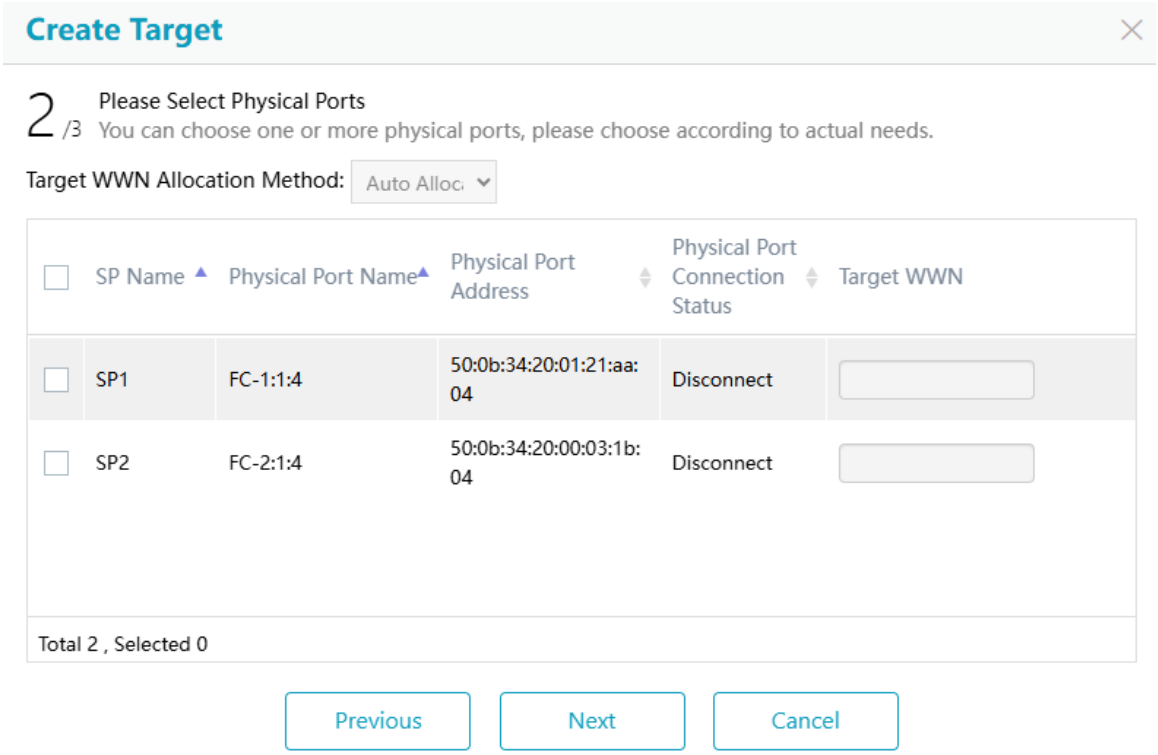

Figure 7-6 Create Target wizard interface (2)

Table 7-5 Description of the parameters for creating Target wizard interface (2)

Parameter	Description
Target WWN Allocation Method	It refers to the allocation method of Target WWN of the selected physical port. • Both auto allocation and manual allocation are supported for iSCSI Target. You can manually enter the Target WWN according to actual business requirements in the case of manual allocation method. • Only auto allocation is supported for FC Target.

Step 5: In the third step of the **Create Target** wizard, you can check the configuration information and click the <Finish> button to complete the configuration.

7.3.3 Viewing Target Properties

Thin section explains how to view Target's basic properties.

Steps

Step 1: Select "Client" -> "I_T Connection" on the navigation tree to open the I_T connection interface.

Step 2: Select the desired Target in the **Targets** tab of the information display area and click the <Properties> button to open the **Basic Properties** window. You can view the basic properties of the Target.

7.3.4 Modifying Target Properties

This section explains how to modify Target's bi-directional CHAP authentication and delay alarm threshold

Steps

Step 1: Select "Client" -> "I_T Connection" on the navigation tree to open the I_T connection interface.

Step 2: Select the desired Target in the **Targets** tab of the information display area and click the <Properties> button to open the **Basic Properties** window, as shown in Figure 7-7. Modify the properties of Target (see Table 7-6 for details) and click the <OK> button to complete the configuration.

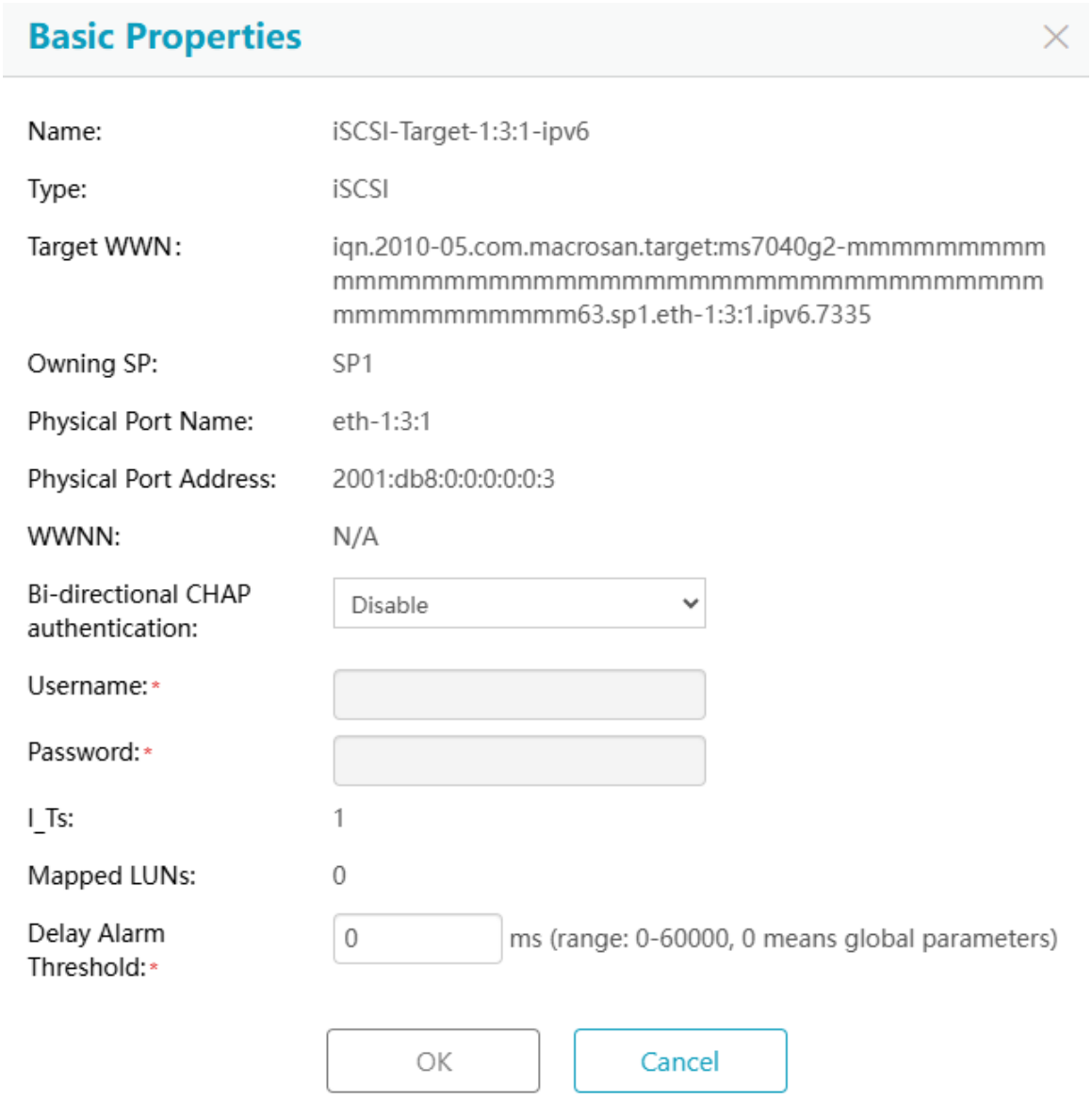

Figure 7-7 Target basic properties interface

Table 7-6 Description of the parameters for Target basic properties interface

Parameter	Description
Bi-directional CHAP authentication	It refers to enabling or disabling bi-directional CHAP authentication for iSCSI Target. If it is enabled, a username and password need to be set. **⚠CAUTION** • Bi-directional CHAP authentication enabled on the iSCSI Target (CHAP authentication is enabled on iSCSI Target) takes effect only when CHAP authentication is enabled on corresponding iSCSI Initiator. Otherwise, the CHAP authentication will be ignored. • If CHAP authentication is enabled for Initiator and bi-directional CHAP authentication is enabled for Target, please set different CHAP authentication passwords.

Username	It refers to the username of bi-directional CHAP authentication. • Length: 1-221 characters. • Valid character range: [a-z0-9.-:].
Password	It refers to the password of username of bi-directional CHAP authentication. • Length: 12-16 characters. • Valid character range: [a-zA-Z0-9.-_:,!@#%&*()].
Delay Alarm Threshold	It refers to the threshold for triggering Target delay alarm. The delay alarm will be triggered when the IO delay on the Target exceeds the threshold.

7.3.5 Deleting Target

This section explains how to delete Target.

Prerequisites

- The Target is not mapped with Initiator.
- The Target is not added to Target group.

Steps

Step 1: Select "Client" -> "I_T Connection" on the navigation tree to open the I_T connection interface.

Step 2: Select the desired Target in the **Targets** tab of the information display area, click the <Delete> button, confirm the object and enter "yes" in the pop-up warning box, and click the <OK> button to complete the configuration.

7.4 Configuring I_T_L

ⓘNOTE

Please firstly configure iSCSI Initiator and iSCSI Target for IP SAN and configure FC Initiator and FC Target for FC SAN. Select appropriate configuration according to actual scenario during mapping process:

- I_T_L configuration: It is recommended to use it in the scenario with simple the I_T_L mapping relationship. See this chapter for details.
- Mapping domain configuration: It is recommended to use it in scenarios where multiple Initiators are needed to access multiple LUNs through multiple Targets at the same time, such as a cluster environment. For details, see 7.5 Configuring Mapping Domain.

7.4.1 Introduction to I_T_L

I_T_L mapping is the LUN Masking function. I_T_L corresponds to the mapping relationship between Initiator, Target, and LUN. In other words, only the specified Initiator can access the

specified LUN through the specified Target, preventing unauthorized access by the Initiator and ensuring access security.

In the specific configuration process, the Initiator can be mapped with one or more Targets according to actual networking situation. An Initiator and a Target form an I_T mapping and then one or more LUNs can be mapped with the I_T according to resource access requirements of application server. In this way, the I_T_L mapping is configured so that the specified Initiator can access the specified LUN through the specified Target. Storage space provided by the specified LUN can be used by application server corresponding to Initiator after the successful establishment of I_T connection. Table 7-7 shows the I_T_L specifications supported by storage devices.

ⓘNOTE

The I_T_L specifications are set according to hardware configuration of product. Table 7-7 shows the I_T_L specifications of each product in the optimal hardware configuration. For actual specifications, contact to MacroSAN technical supporters.

Table 7-7 I_T_L specifications

Item	MS2000 series	MS3000 series	MS5000 series	MS7000 series	MS9000 series
Maximum number of Initiator	1024	2048	4096	4096	4096
Maximum number of Target	64	128	256	256	256
Maximum number of I_T	1024	2048	4096	4096	4096
Maximum number of LUN Target port mapped	1024	1024	4096	4096	4096

Access rights can also be set for mapping a LUN with I_T. See Table 7-8 for details.

Table 7-8 Definition of LUN access rights

Access right	Right description
Read only	Application server can only read data from the mapped LUN without writing.
Read and write	Application servers can read or write data from the mapped LUN.

7.4.2 Configuring I_T_L

7.4.2.1 Mapping Initiator to Target

This section explains how to map Initiator to Target.

Steps

Step 1: Select "Client" -> "I_T Connection" on the navigation tree to open the I_T connection interface.

Step 2: Select the desired Initiator in the **Initiators** tab of the information display area and click the <Map Target> button to open the **Map Target** window, as shown in Figure 7-8. Select Target and click the <OK> button to complete the configuration.

⚠CAUTION

Initiator is required to be mapped with Target symmetrically. In other words, one Initiator is mapped with the Targets of every SP at the same time, and the physical port corresponding to the Target is in the same position.

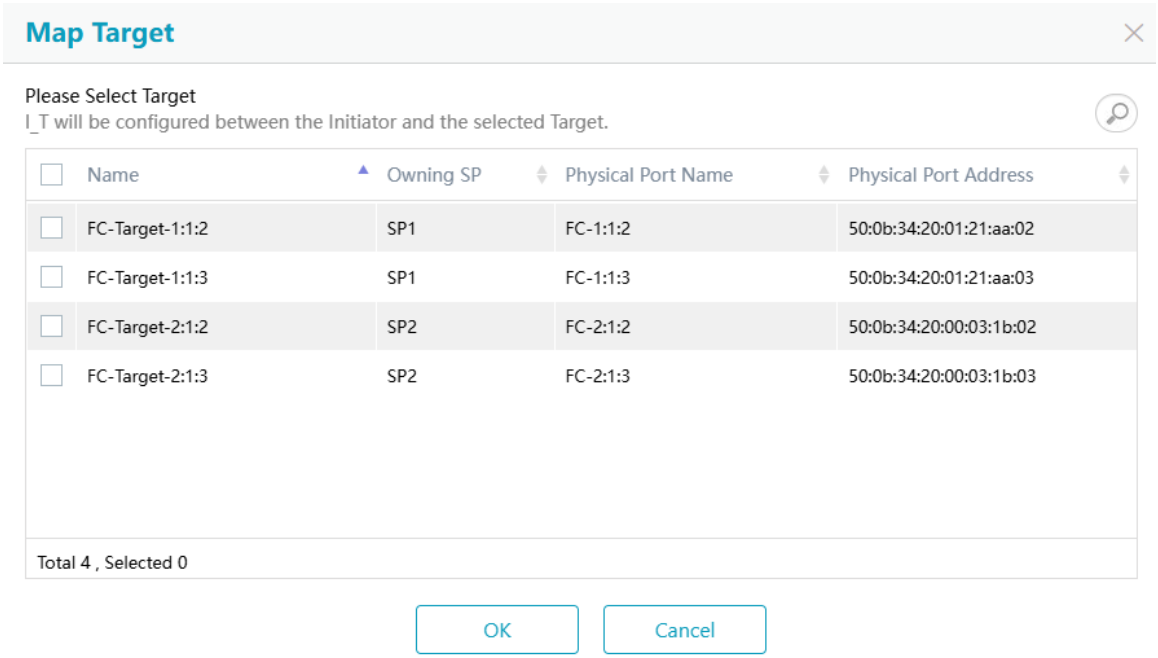

Figure 7-8 Map Target interface

7.4.2.2 Unmapping Initiator to Target

This section explains how to unmap Initiator to Target.

ⓘNOTE

- If the I_T is connected, please disconnect it before unmapping Target.
- If the I_T mapping corresponding to Target has been mapped with a LUN, the LUN will be unmapped automatically.

Steps

Step 1: Select "Client" -> "I_T Connection" on the navigation tree to open the I_T connection interface.

Step 2: Select the desired Initiator in the **Initiators** tab of the information display area, select the desired Target in the **Mapped Targets** tab of the extended area, click the <Unmap Target> button, and click the <OK> button in the pop-up confirmation box to complete the configuration.

7.4.2.3 Mapping Initiator to LUN

This section explains how to map Initiator to LUN.

Prerequisites

Initiator has been mapped with Target.

Steps

Step 1: Select "Client" -> "I_T Connection" on the navigation tree to open the I_T connection interface.

Step 2: Select the desired Initiator in the **Initiators** tab of the information display area and click the <Map LUN> button to open the **Map LUN** wizard.

Step 3: The first step of the **Map LUN** wizard is shown in Figure 7-9. Select desired I_T and click the <Next> button to enter the next interface.

⚠CAUTION

Initiator is required to be mapped with LUNs symmetrically. In other words, one Initiator can access the same LUN through Targets of every SP respectively.

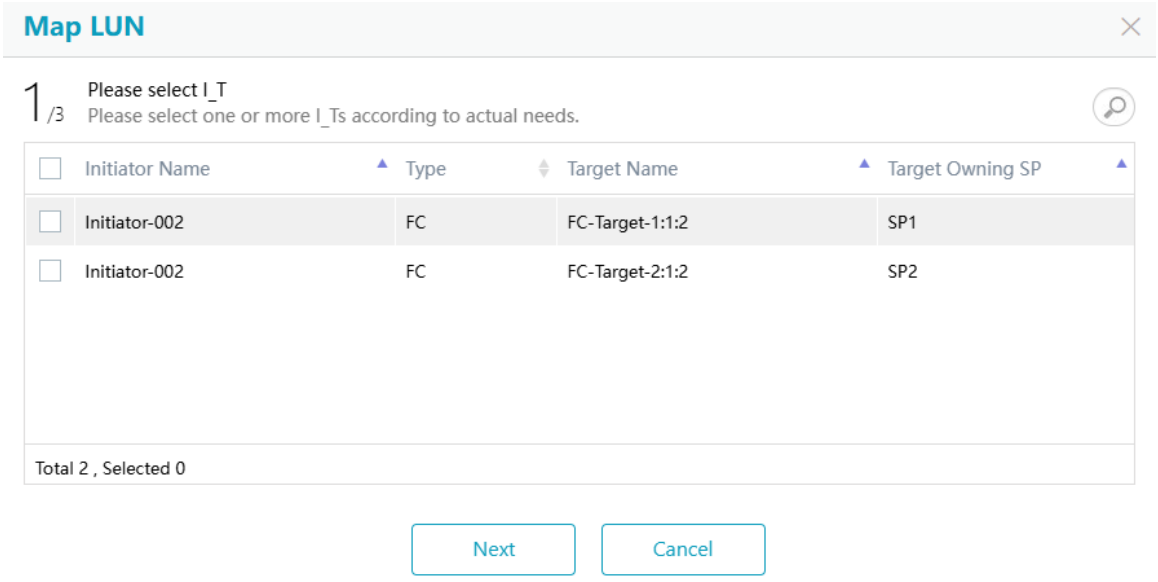

Figure 7-9 Map LUN wizard interface (1)

Step 4: The second step of the **Map LUN** wizard is shown in Figure 7-10. Select desired LUN or View, set access rights and LUN ID, and click the <Next> button to enter the next interface.

ⓘNOTE

LUNs that not mapped with Hosts are displayed in this step, and you can deselect the "Show Only LUNs Not Mapped With Hosts" option to view all LUNs.

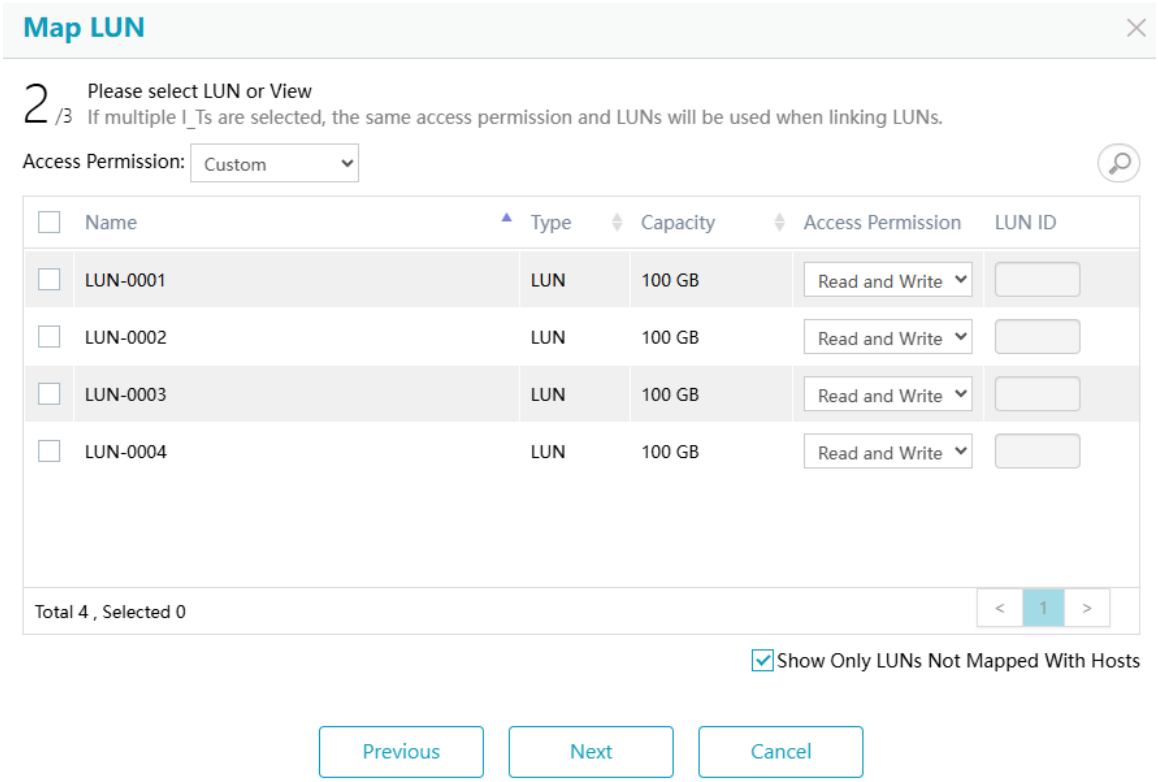

Figure 7-10 Map LUN wizard interface (2)

Step 5: In the third step of the **Map LUN** wizard, you can check the configuration information and click the <Finish> button to complete the configuration.

7.4.2.4 Unmapping Initiator to LUN

This section explains how to unmap Initiator to LUN.

ⓘNOTE

If the I_T is connected, please disconnect it before unmapping LUN.

Steps

Step 1: Select "Client" -> "I_T Connection" on the navigation tree to open the I_T connection interface.

Step 2: Select the desired Initiator in the **Initiators** tab of the information display area, select the desired LUN in the **Mapped LUNs** tab of the extended area, click the <Unmap LUN> button, and click the <OK> button in the pop-up confirmation box to complete the configuration.

7.4.2.5 Adding Access Path for LUN

This section explains how to add I_T to LUN's access path.

Steps

Step 1: Select "Client" -> "I_T Connection" on the navigation tree to open the I_T connection interface.

Step 2: Select the desired Initiator in the **Initiators** tab of the information display area, select the desired LUN in the **Mapped LUNs** tab of the extended area, click the <Add Access Path> button, and click the <OK> button in the pop-up confirmation box to open the **Add Access Path** window, as shown in Figure 7-11. Select access permission and I_T, click the <OK> button, enter "yes" in the pop-up warning box, and click the <OK> button to complete the configuration.

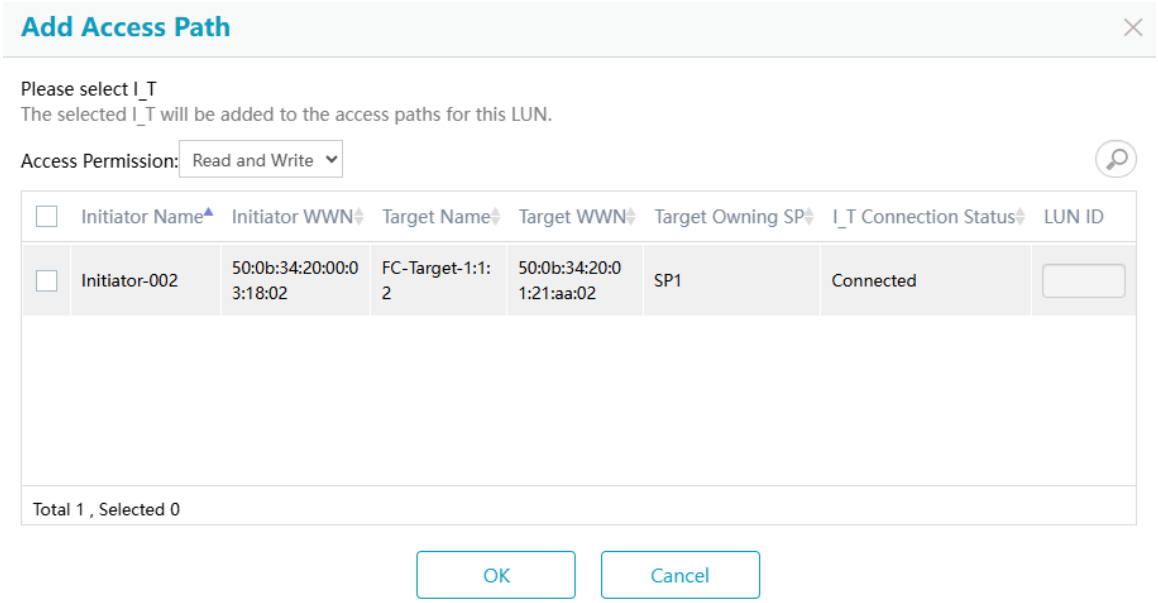

Figure 7-11 Add access path interface

7.4.2.6 Removing Access Path for LUN

This section explains how to remove I_T from LUN's access path.

Steps

Step 1: Select "Client" -> "I_T Connection" on the navigation tree to open the I_T connection interface.

Step 2: Select the desired Initiator in the **Initiators** tab of the information display area, select the desired LUN in the **Mapped LUNs** tab of the extended area, click the <Remove Access Path> button, and click the <OK> button in the pop-up confirmation box to open the **Remove Access Path** window, as shown in Figure 7-12. Select I_T and click the <OK> button, enter "yes" in the pop-up warning box to complete the configuration.

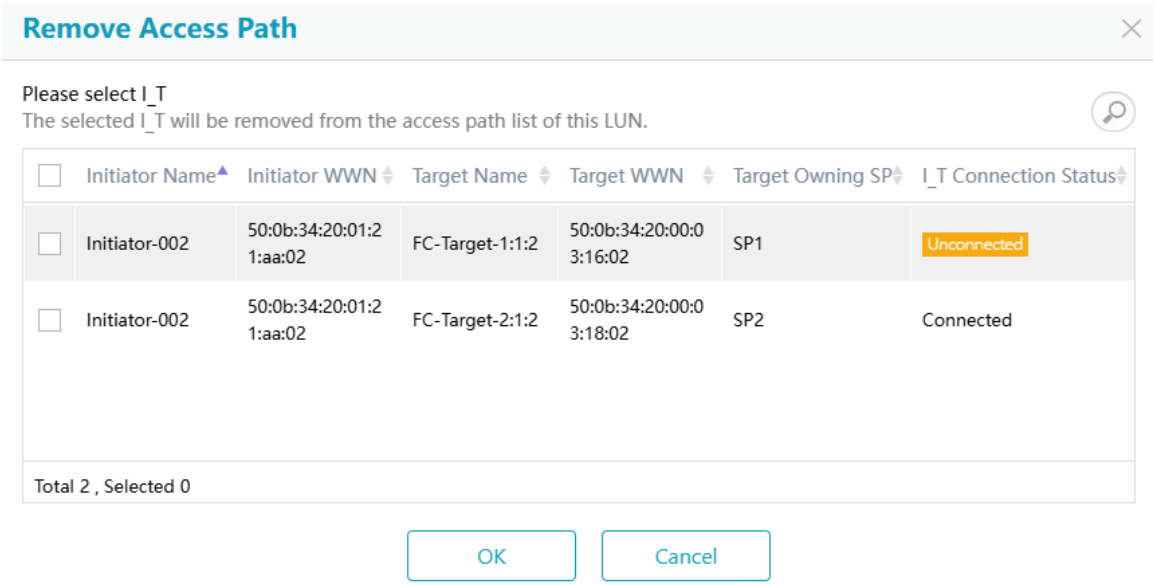

Figure 7-12 Remove access path interface

7.4.2.7 Batch Unmapping I_Ts

This section explains how to batch unmap I_T.

Steps

Step 1: Select "Client" -> "I_T Connection" on the navigation tree to open the I_T connection interface.

Step 2: Click the <More> button in the **Initiators** tab of the information display area and click the <Batch Unmap I_T> button in the drop-down menu to open the **Batch Unmap I_T** window, as shown in Figure 7-13. Select desired I_T, click the <OK> button, and click the <OK> button in the pop-up confirmation box to complete the configuration.

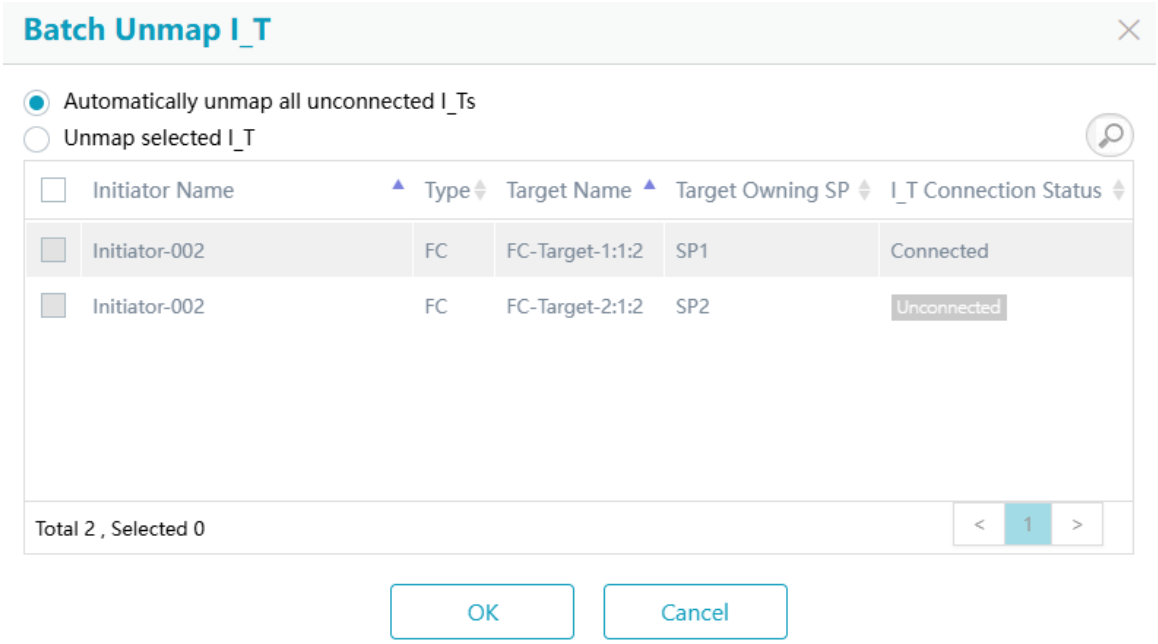

Figure 7-13 Batch unmap I_T interface

7.4.2.8 Batch Unmapping I_T_Ls

This section explains how to batch unmap I_T_Ls.

Steps

Step 1: Select "Client" -> "I_T Connection" on the navigation tree to open the I_T connection interface.

Step 2: Click the <More> button in the **Initiators** tab of the information display area and click the <Batch Unmap I_T_L> button in the drop-down menu to open the **Batch Unmap I_T_L** window, as shown in Figure 7-14. Select desired I_T_L, click the <OK> button, and click the <OK> button in the pop-up confirmation box to complete the configuration.

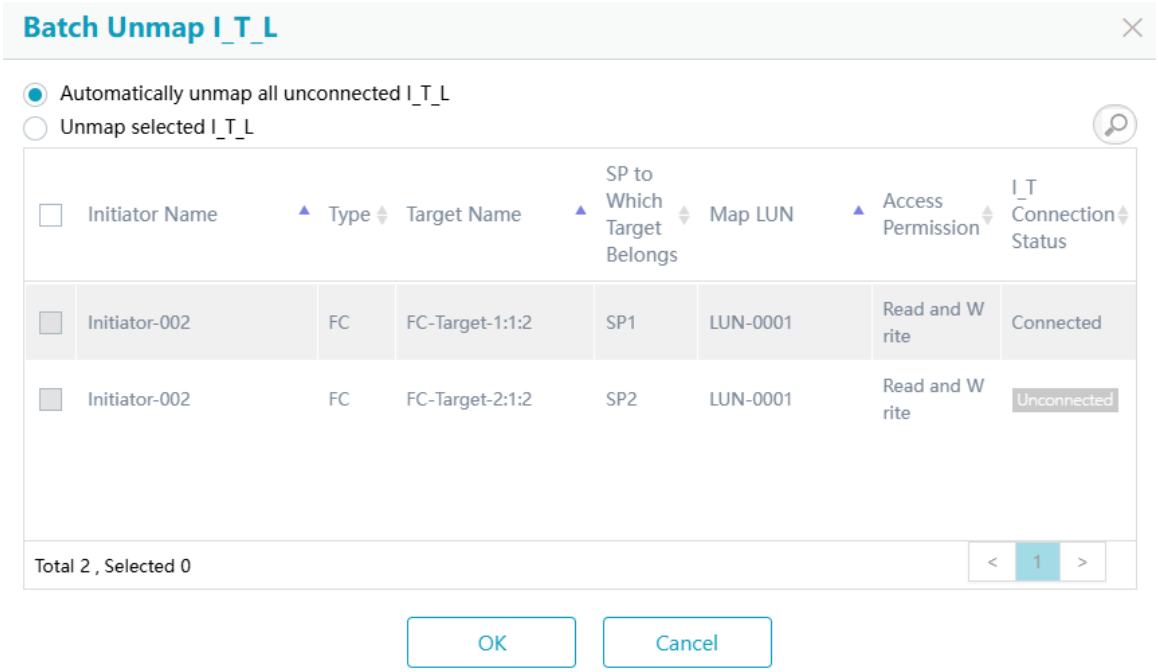

Figure 7-14 Batch unmap I_T_L interface

7.4.2.9 Batch Modifying I_T_L Access Permissions

This section explains how to batch modify I_T_L access permissions.

Steps

Step 1: Select "Client" -> "I_T Connection" on the navigation tree to open the I_T connection interface.

Step 2: Click the <More> button in the **Initiators** tab of the information display area and click the <Batch Modify I_T_L Access Permissions> button in the drop-down menu button to open the **Batch Modify I_T_L Access Permissions** wizard.

Step 3: The first step of the **Batch Modify I_T_L Access Permissions** wizard is shown in Figure 7-15. Select Initiator and click the <Next> button to enter the next interface.

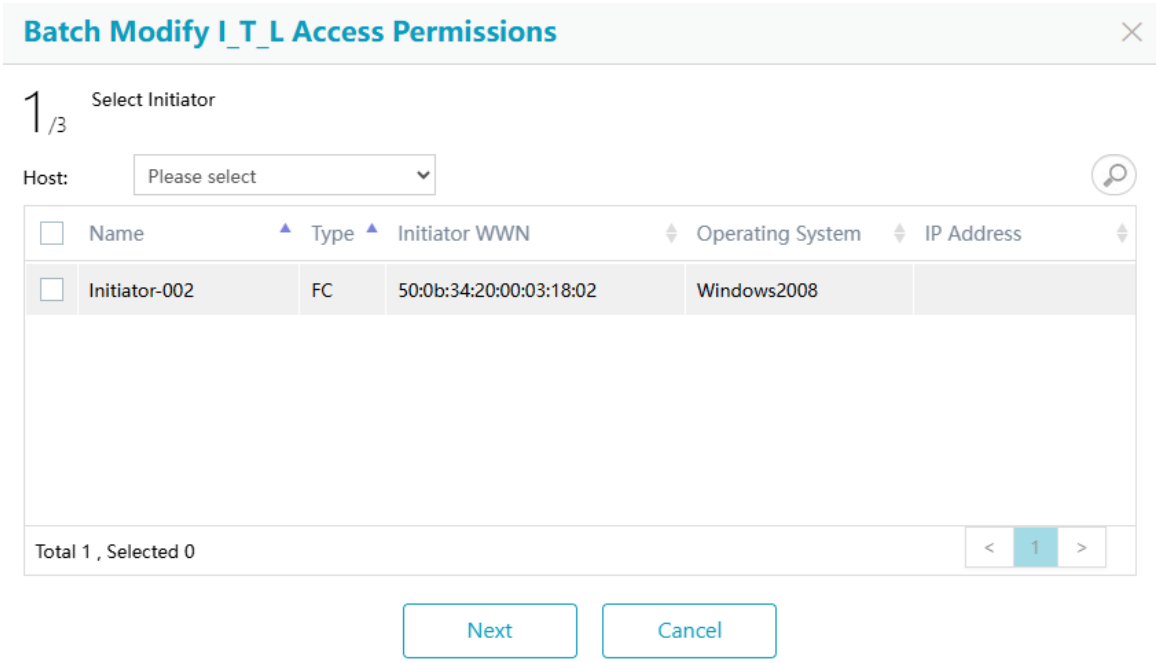

Figure 7-15 Batch modify I_T_L access permissions wizard interface (1)

Step 4: The second step of the **Batch Modify I_T_L Access Permissions** wizard is shown in Figure 7-16. Modify permission, select I_T_L, and click the <Next> button to enter the next interface.

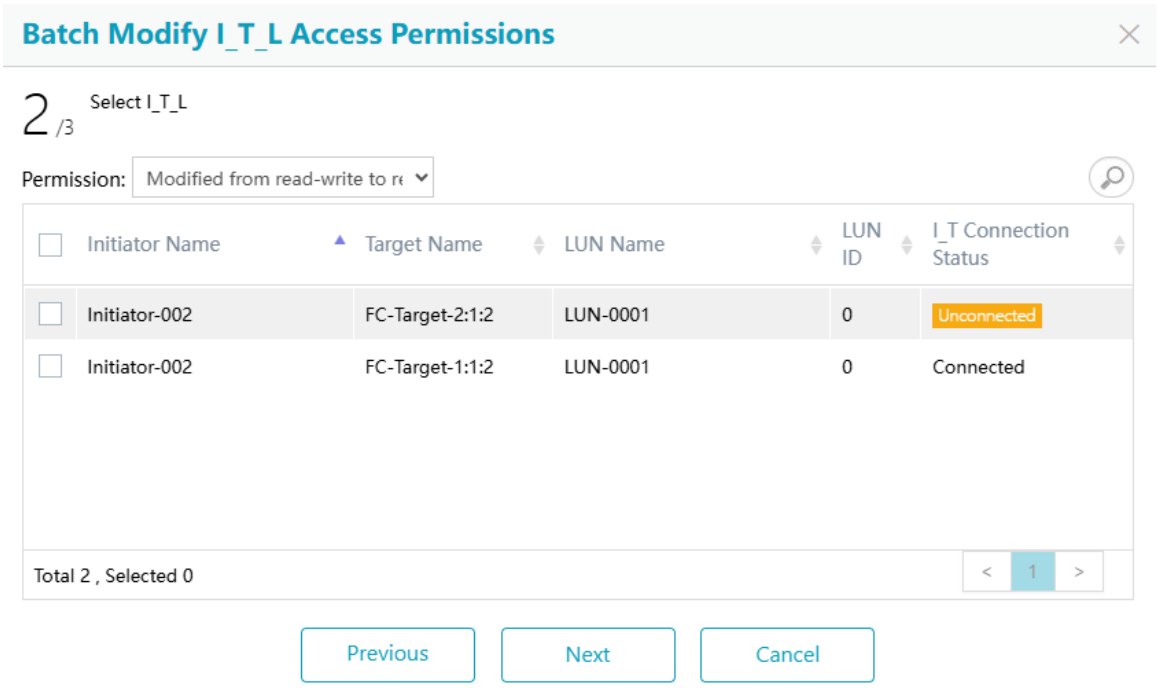

Figure 7-16 Batch modify I_T_L access permissions wizard interface (2)

Table 7-9 Description of the parameters for batch modifying I_T_L access permissions (2)

Parameter	Description
Permission	It refers to the I_T_L access permissions, including the followings: ● Modified from read-only to read-write ● Modified from read-write to read-only

Step 5: In the third step of the **Batch Modify I_T_L Access Permissions** wizard, you can check the configuration information and click the <Finish> button to complete the configuration.

7.5 Configuring Mapping Domain

ⓘNOTE

Please firstly configure iSCSI Initiator and iSCSI Target for IP SAN and configure FC Initiator and FC Target for FC SAN. Select appropriate configuration according to actual scenario during mapping process:

- I_T_L configuration: It is recommended to use it in the scenario with simple the I_T_L mapping relationship. For details, see 7.4 Configuring I_T_L.
- Mapping domain configuration: It is recommended to use it in scenarios where multiple Initiators are needed to access multiple LUNs through multiple Targets at the same time, such as a cluster environment. For details, see this chapter.

7.5.1 Introduction to Mapping Domain

A mapping domain consists of a Host group, a Target group, and a LUN group. Among them:

- A Host group is a collection of multiple Hosts and each Host is corresponding to an application server. An Initiator is corresponding to an application server in iSCSI SAN or a port on the server in FC SAN, so a Host is a collection of Initiators, and one or more Initiators can be added to Host.
- A Target group is a collection of multiple Targets.
- A LUN group is a collection of multiple LUNs.

I_T_L mapping relationship can be managed through a mapping domain with a Host group, a Target group and a LUN group, so that storage resources can be allocated conveniently and flexibly.

7.5.2 Managing Host

7.5.2.1 Creating Host

This section explains how to create Host.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Click the <Create> button in the **Hosts** tab of the information display area to open the **Create Host** wizard.

Step 3: The first step of the **Create Host** wizard is shown in Figure 7-17. Enter the Host parameters (see Table 7-10 for details) and click the <Next> button to enter the next interface.

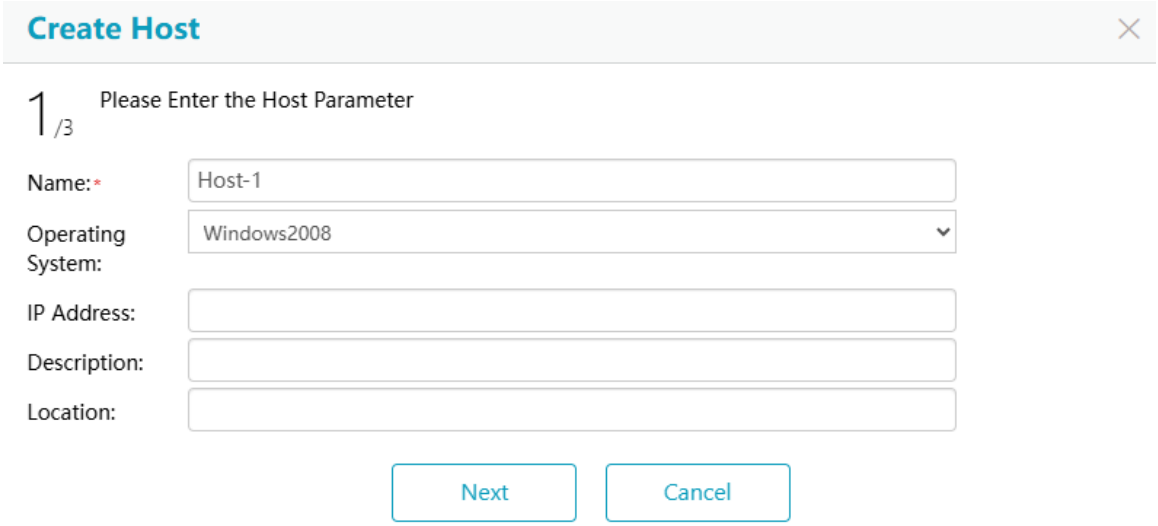

Figure 7-17 Create Host wizard interface (1)

Table 7-10 Description of the parameters for creating Host wizard interface (1)

Parameter	Description
Name	It refers to the name of Host. ● Length: 1-63 characters. ● Valid character range: [a-zA-Z0-9.-_:]. ● It is recommended that the prefix of Host name is "Host".
Operating System	It refers to the operating system of application server.
IP Address	It refers to the IP address of application server.
Description	It refers to the description of Host.
Location	It refers to the geographic location of Host.

Step 4: The second step of the **Create Host** wizard is shown in Figure 7-18. Select desired Initiator and click the <Next> button to enter the next interface.

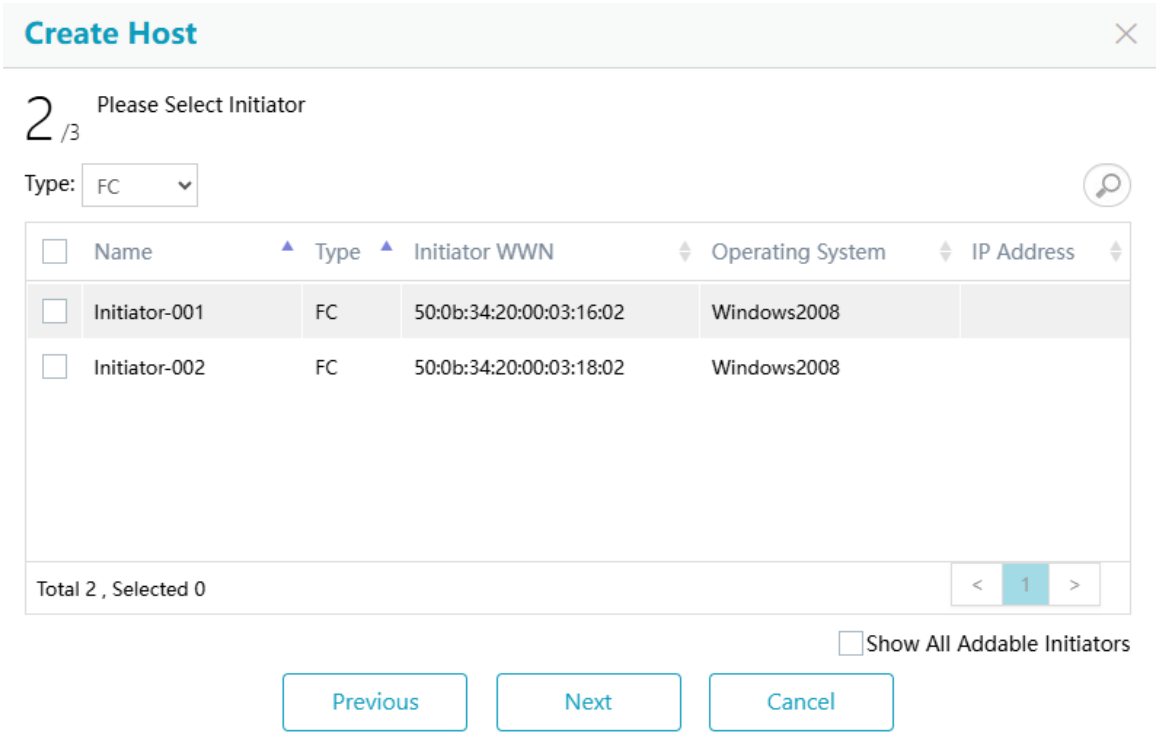

Figure 7-18 Create Host wizard interface (2)

Step 5: In the third step of the **Create Host** wizard, you can check the configuration information and click the <Finish> button to complete the configuration.

7.5.2.2 Viewing Host Properties

This section explains how to view Host's basic properties.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Select the desired Host in the **Hosts** tab of the information display area and click the <Properties> button to open the **Basic Properties** window. You can view the basic properties of the Host.

7.5.2.3 Modifying Host Properties

This section explains how to modify Host's name, operating system, IP address, description, location and delay alarm threshold.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Select the desired Host in the **Hosts** tab of the information display area and click the <Properties> button to open the **Basic Properties** window, as shown in Figure 7-19. Modify the properties of Host (see Table 7-11 for details) and click the <OK> button to complete the configuration.

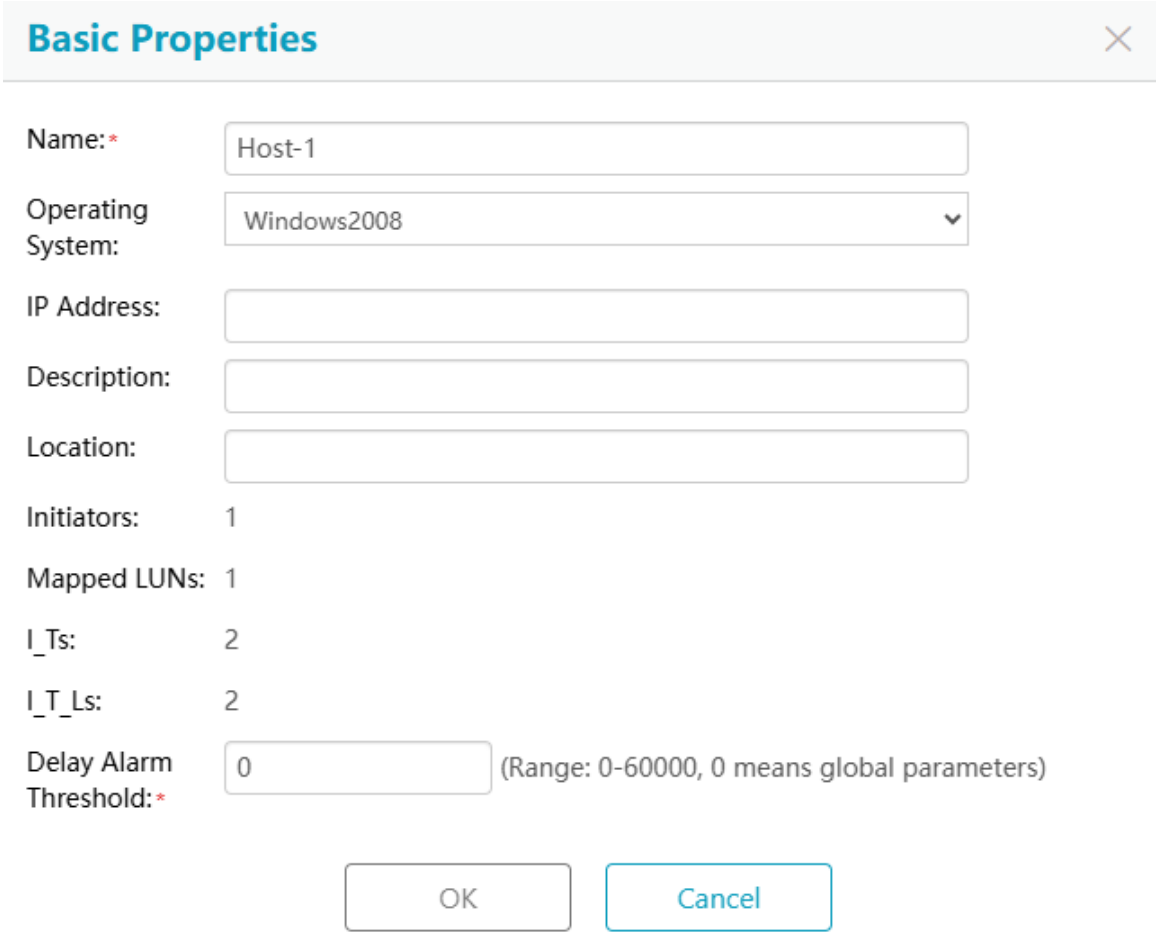

Figure 7-19 Host basic properties interface

Table 7-11 Description of the parameters for Host basic properties interface

Parameter	Description
Name	It refers to the name of Host. • Length: 1-63 characters. • Valid character range: [a-zA-Z0-9.-_:]. • It is recommended that the prefix of Host name is "Host- ".
Operating System	It refers to the operating system of application server.
IP Address	It refers to the IP address of application server.
Description	It refers to the description of Host.
Location	It refers to the geographic location of Host.
Delay Alarm Threshold	It refers to the threshold for triggering Host delay alarm. The delay alarm will be triggered when the IO delay on the Host exceeds the threshold.

7.5.2.4 Deleting Host

This section explains how to delete Host.

Prerequisites

The Host is not added to Host group.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Select the desired Host in the **Hosts** tab of the information display area, click the <Delete> button, select the "Delete I_T_L related to Initiator in Host" and "If there is traffic in the last 5 minutes, unmapping of the LUN is not allowed" option as needed in the pop-up confirmation box, and click the <OK> button to complete the configuration.

7.5.2.5 Adding Member for Host

This section explains how to add Host member.

ⓘNOTE

The I_T_L mapping of members in a Host of mapping domain will be automatically completed during the adding process.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Select the desired Host in the **Hosts** tab of the information display area and click the <Add> button in the **Initiators** tab of the extended area to open the **Add Initiator** window, as shown in Figure 7-20. Select Initiator and click the <OK> button to complete the configuration.

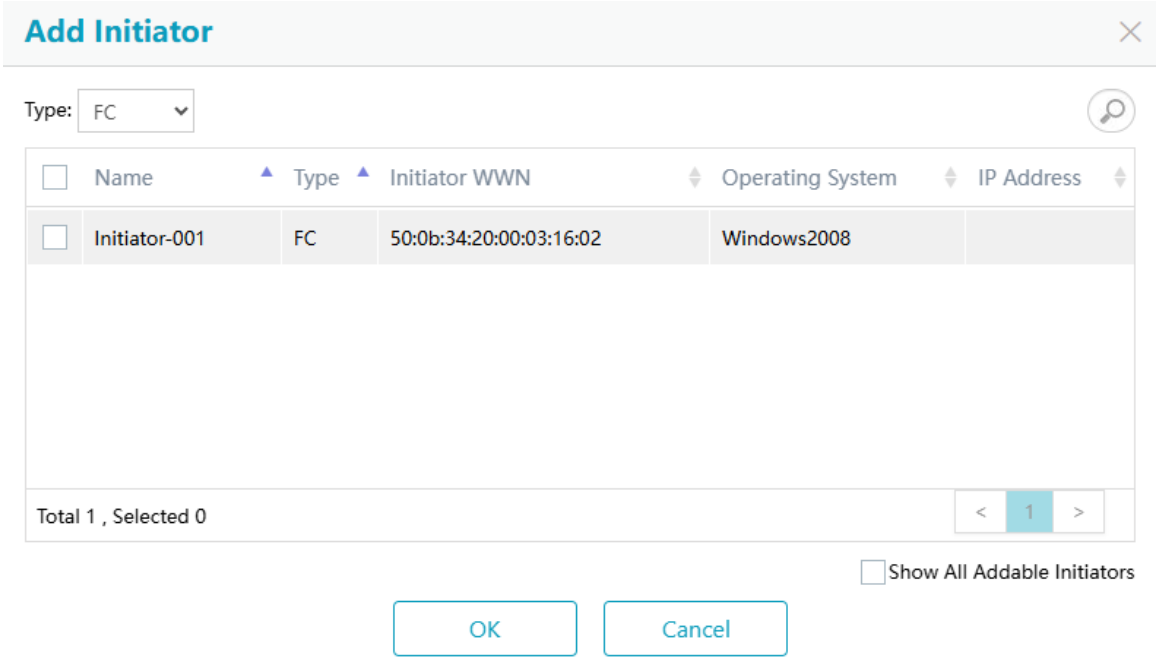

Figure 7-20 Add Initiator interface

7.5.2.6 Removing Member from Host

This section explains how to remove Host member.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Select the desired Host in the **Hosts** tab of the information display area, select the desired Initiator in the **Initiators** tab of the extended area, click the <Remove> button, select the "Delete Initiator related I_T_L" and "If there is traffic in the last 5 minutes, unmapping of the LUN is not allowed" option as needed in the pop-up confirmation box, and click the <OK>button to complete the configuration.

7.5.3 Managing Host Group

7.5.3.1 Creating Host Group

This section explains how to create Host Group.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Click the <Create> button in the **Host Groups** tab of the information display area to open the **Create Host Group** wizard.

Step 3: The first step of the **Create Host Group** wizard is shown in Figure 7-21. Enter Host group parameters (see Table 7-12 for details) and click the <Next> button to enter the next interface.

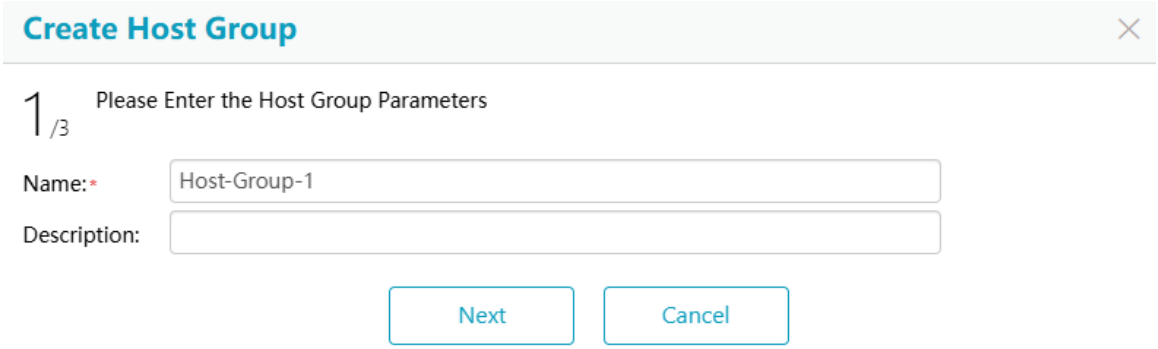

Figure 7-21 Create Host group wizard interface (1)

Table 7-12 Description of the parameters for creating Host group wizard interface (1)

Parameters	Description
Name	It refers to the name of Host group. • Length: 1-63 characters. • Valid character range: [a-zA-Z0-9.-_:]. • It is recommended that the prefix of Host group name is "Host-Group-".
Description	It refers to the description of Host group.

Step 4: The second step of the **Create Host Group** wizard is shown in Figure 7-22. Select group members and click the <Next> button to enter the next interface.

ⓘNOTE

Hosts that do not belong to any Host group are displayed by default in this step. You can select the "Show All Addable Hosts" option to view all Hosts.

⚠CAUTION

If multiple Hosts are needed to add to one Host group, make sure that the relevant software (such as cluster software, parallel file system software, etc.) is correctly installed on application servers corresponding to all Hosts in the Host group, so that multiple application servers can have mutual exclusion access to the same storage area and ensure accuracy and consistency of data.

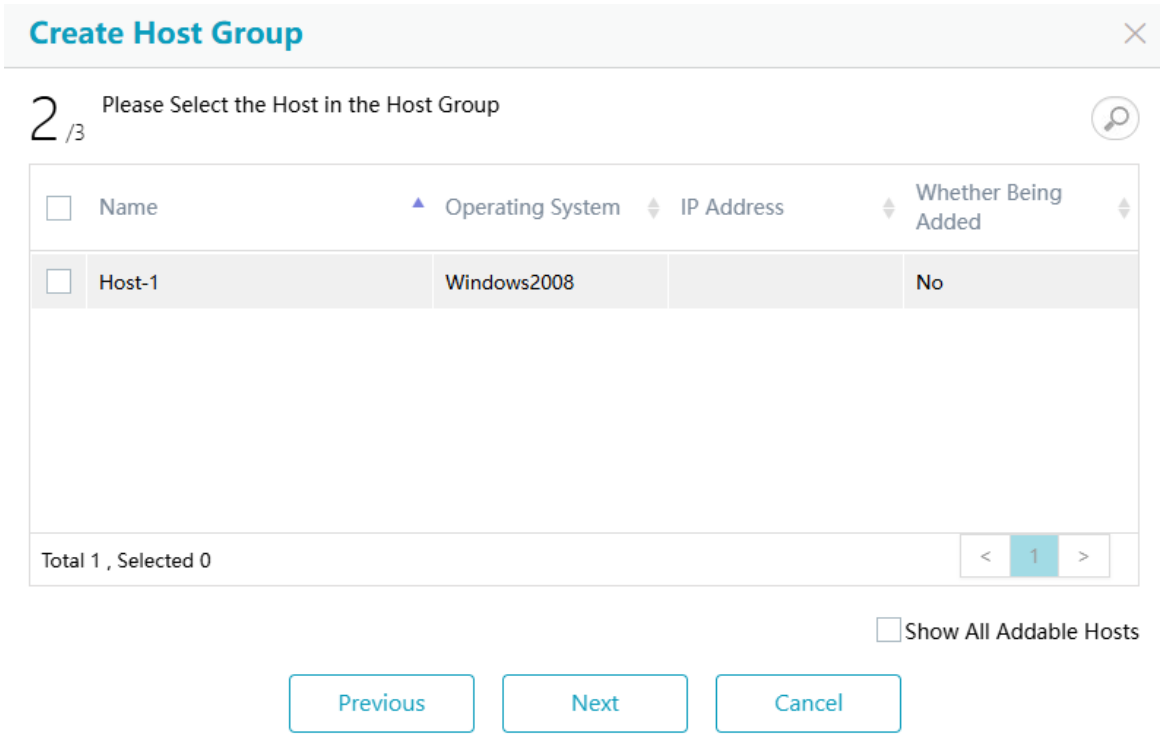

Figure 7-22 Create Host Group wizard interface (2)

Step 5: In the third step of the **Create Host Group** wizard, you can check the configuration information and click the <Finish> button to complete the configuration.

7.5.3.2 Viewing Host Group Properties

This section explains how to view Host group's basic properties.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Select the desired Host group in the **Host Groups** tab of the information display area and click the <Properties> button to open the **Basic Properties** window. You can view the basic properties of the Host group.

7.5.3.3 Modifying Host Group Properties

This section explains how to modify Host group's name and description.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Select the desired Host group in the **Host Groups** tab of the information display area and click the <Properties> button to open the **Basic Properties** window, as shown in Figure 7-23. Modify the properties of Host (see Table 7-12 for details) and click the <OK> button to complete the configuration.

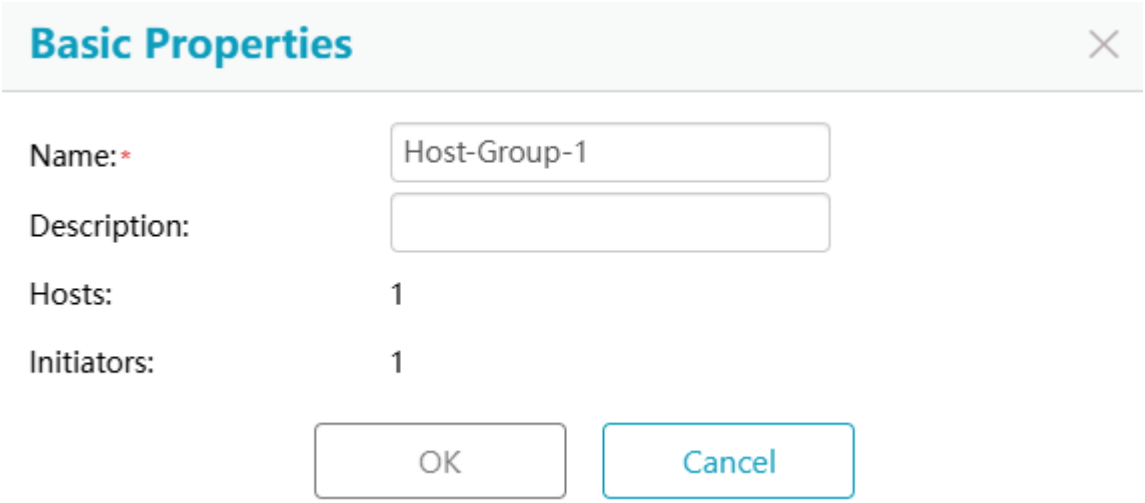

Figure 7-23 Host group basic properties interface

7.5.3.4 Deleting Host Group

This section explains how to delete Host group.

Prerequisites

The Host group is not added to mapping domain.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Select the desired Host group in the **Host Groups** tab of the information display area, click the <Delete> button, confirm the object and enter "yes" in the pop-up warning box, and click the <OK> button to complete the configuration.

7.5.3.5 Adding Member for Host Group

This section explains how to add member for Host group.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Select the desired Host group in the **Host Groups** tab of the information display area and click the <Add> button in the **Hosts** tab of the extended area to open the **Add Host** window, as

shown in Figure 7-24. Select the desired Host and click the <OK> button to complete the configuration.

ⓘNOTE

Hosts that do not belong to any Host group are displayed by default in this step. You can select the "Show All Addable Hosts" option to view all Hosts.

⚠CAUTION

If multiple Hosts are needed to add to one Host group, make sure that the relevant software (such as cluster software, parallel file system software, etc.) is correctly installed on application servers corresponding to all Hosts in the Host group, so that multiple application servers can have mutual exclusion access to the same storage area and ensure the accuracy and consistency of data.

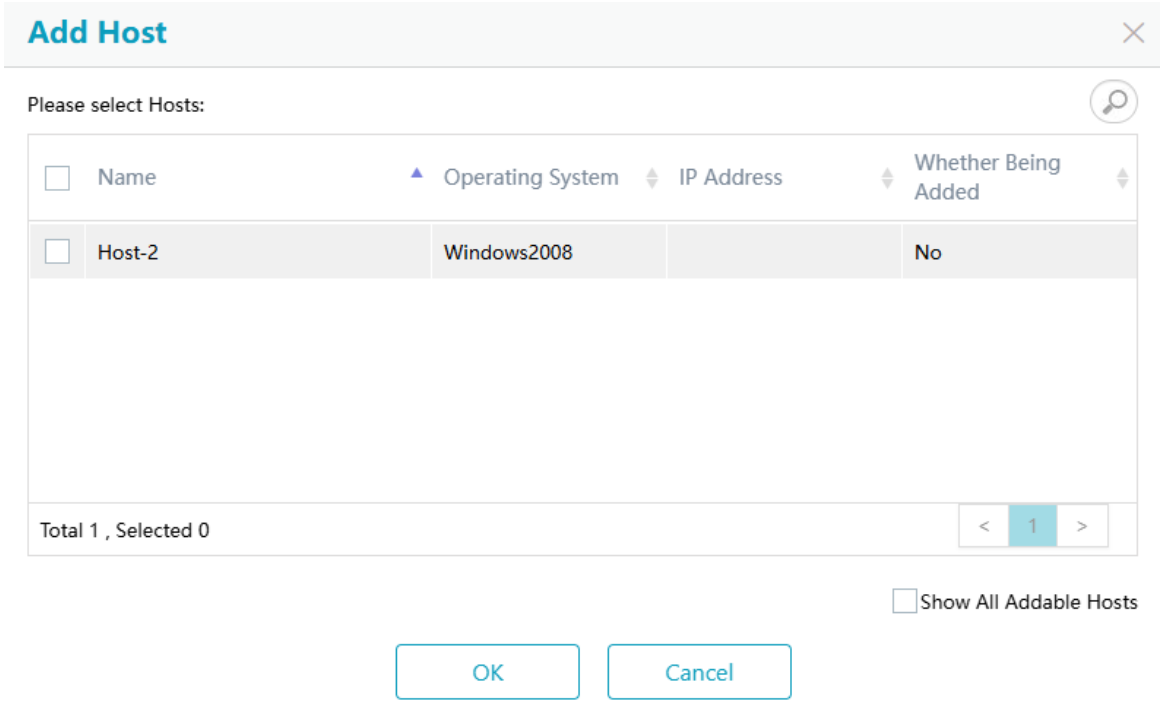

Figure 7-24 Add Host interface

7.5.3.6 Removing Member from Host Group

This section explains how to remove member from Host group.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Select the desired Host group in the **Host Groups** tab of the information display area, select the desired Host in the **Hosts** tab of the extended area, click the <Remove> button, and click the <OK> button in the pop-up confirmation box to complete the configuration.

ⓘNOTE

The I_T_L mapping of members in a Host group of mapping domain will be deleted by default during removing. If you do not need to delete it, please uncheck the "Delete the I_T_L related to the Host in the mapping domain to which the Host group belongs" check box in the pop-up confirmation box.

7.5.4 Managing Target Group

7.5.4.1 Creating Target Group

This section explains how to create Target group.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Click the <Create> button in the **Target Groups** tab of the information display area to open the **Create Target Group** wizard.

Step 3: The first step of the **Create Target Group** wizard is shown in Figure 7-25. Enter Target group parameters (see Table 7-13 for details) and click the <Next> button to enter the next interface.

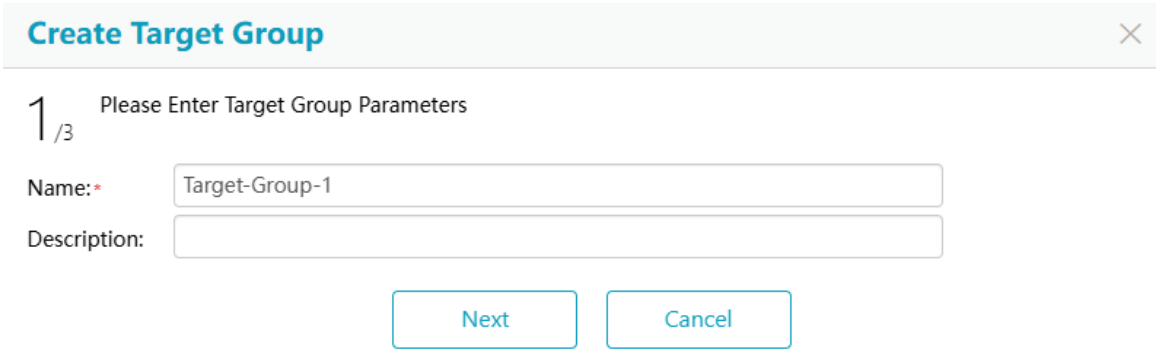

Figure 7-25 Create Target group wizard interface (1)

Table 7-13 Description of the parameters for creating Target group wizard interface (1)

Parameters	Description
Name	It refers to the name of Target group. • Length: 1-63 characters. • Valid character range: [a-zA-Z0-9.-_:]. • It is recommended that the prefix of Target group name is "Target-Group-".

Description	It refers to the description of Target group.

Step 4: The second step of the **Create Target group** wizard is shown in Figure 7-26. Select the group members and click the <Next> button to enter the next interface.

ⓘNOTE

Only Targets that do not belong to any Target group are displayed by default in this step. You can select the "Show All Addable Target" option to view all Targets.

⚠CAUTION

Target group members are required to be created symmetrically. In other words, the ports at the same position on every SP are used to create Target group.

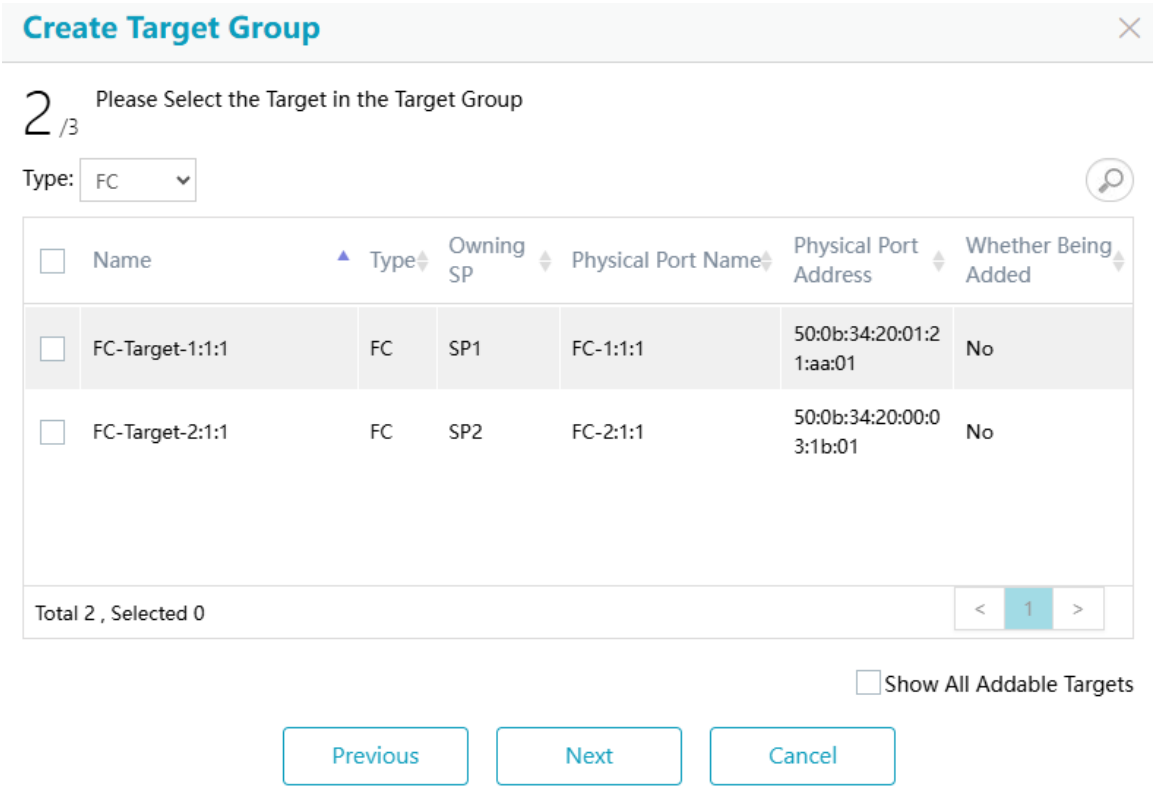

Figure 7-26 Create Target group wizard interface (2)

Step 5: In the third step of the **Create Target Group** wizard, you can check the configuration information and click the <Finish> button to complete the configuration.

7.5.4.2 Viewing Target Group Properties

This section explains how to view Target group's basic properties.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Select the desired Target group in the **Target Groups** tab of the information display area and click the <Properties> button to open the **Basic Properties** window. You can view the basic properties of the Target group.

7.5.4.3 Modifying Target Group Properties

This section explains how to modify Target group's name and description.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Select the desired Target group in the **Target Groups** tab of the information display area, click the <Properties> button to open the **Basic Properties** window, as shown in Figure 7-27. Modify the properties of Target group (see Table 7-13 for details) and click the <OK> button to complete the configuration.

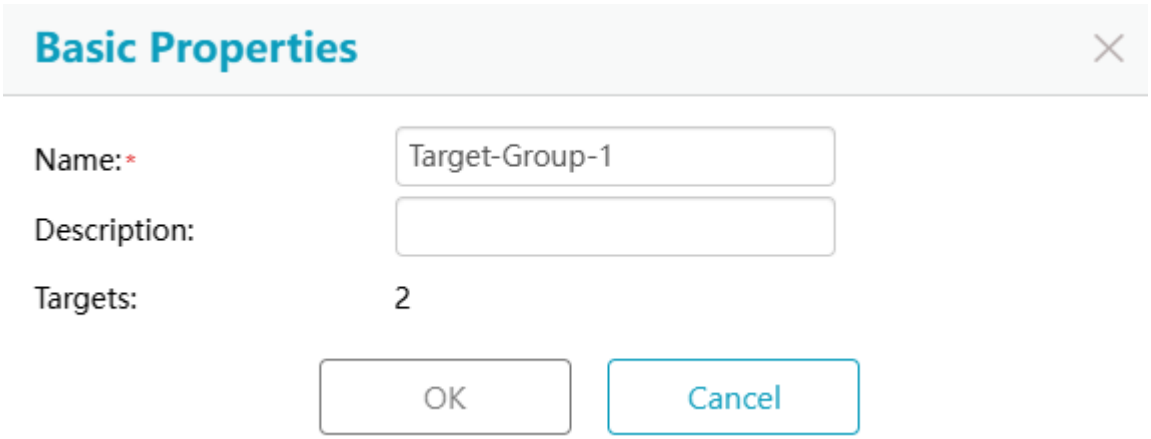

Figure 7-27 Target group basic properties interface

7.5.4.4 Deleting Target Group

This section explains how to delete Target group.

Prerequisites

The Target group is not added to mapping domain.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Select the desired Target group in the **Target Groups** tab of the information display area, click the <Delete> button, confirm the object and enter "yes" in the pop-up warning box, and click the <OK> button to complete the configuration.

7.5.4.5 Adding Member for Target Group

This section explains how to add member for Target group.

ⓘNOTE

The I_T_L mapping of members in a Target group of mapping domain will be automatically completed during the adding process.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Select the desired Target group in the **Target Groups** tab of the information display area and click the <Add> button in the **Targets** tab of the extended area to open the **Add Target** window, as shown in Figure 7-28. Select Target and click the <OK> button to complete the configuration.

ⓘNOTE

Targets that do not belong to any Target group are displayed by default in this step. You can select the "Show All Addable Targets" option to view all Targets.

⚠CAUTION

Target group members are required to be added symmetrically. In other words, the ports at the same position on every SP are used to create Target group.

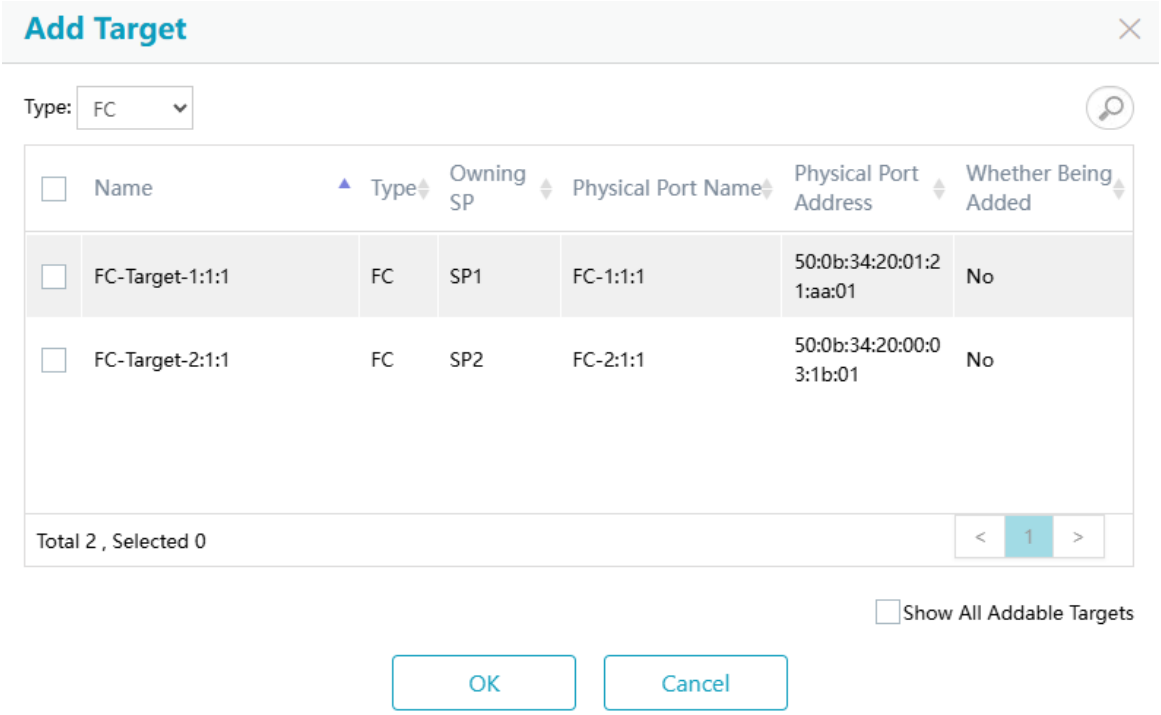

Figure 7-28 Add Target interface

7.5.4.6 Removing Member from Target Group

This section explains how to remove member from Target group.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Select the desired Target group in the **Target Groups** tab of the information display area, select the desired Target in the **Targets** tab of the extended area, click the <Remove> button, and click the <OK> button in the pop-up confirmation box to complete the configuration.

ⓘNOTE

The I_T_L mapping of members in a Target group of mapping domain will be deleted by default during removing. If you do not need to delete it, please uncheck the "Delete the I_T_L related to the Target in the mapping domain to which the Target group belongs" option in the pop-up confirmation box.

7.5.5 Managing LUN Group

7.5.5.1 Creating LUN Group

This section explains how to create LUN group.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Click the <Create> button in the **LUN Groups** tab of the information display area to open the **Create LUN Group** wizard.

Step 3: The first step of the **Create LUN Group** wizard is shown in Figure 7-29. Enter LUN group parameters (see Table 7-14 for details) and click the <Next> button to enter the next interface.

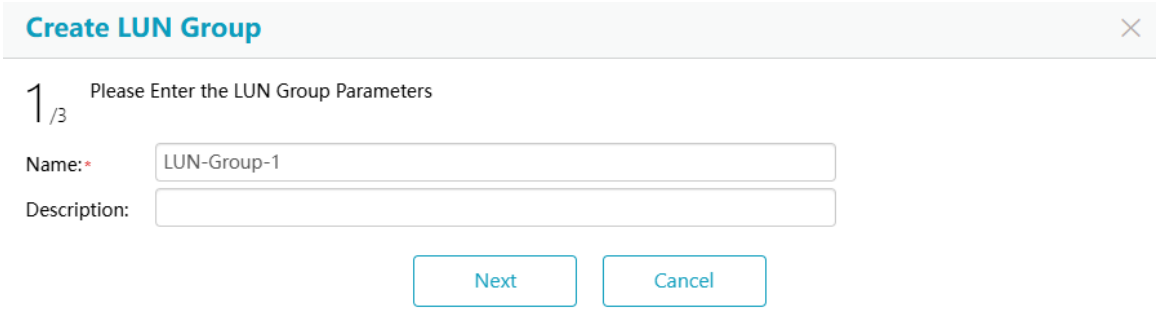

Figure 7-29 Create LUN group wizard interface (1)

Table 7-14 Description of the parameters for creating LUN group wizard interface (1)

Parameters	Description
Name	It refers to the name of LUN group. ● Length: 1-63 characters. ● Valid character range: [a-zA-Z0-9.-_:]. ● It is recommended that the prefix of LUN group name is "LUN-Group-".
Description	It refers to the description of LUN group.

Step 4: The second step of the **Create LUN Group** wizard is shown in Figure 7-30. Select LUN group members and click the <Next> button to enter the next interface.

ⓘNOTE

- LUNs that do not belong to any LUN group and without mapping with any Host are displayed by default. You can deselect the "Only display LUNs that do not belong to any LUN group and are not mapped with any host" option to view all LUNs.
- If the selected LUN belongs to a replica LUN of replication or a mirror LUN of remote mirror, it will be mapped with the front-end server in read-only mode.

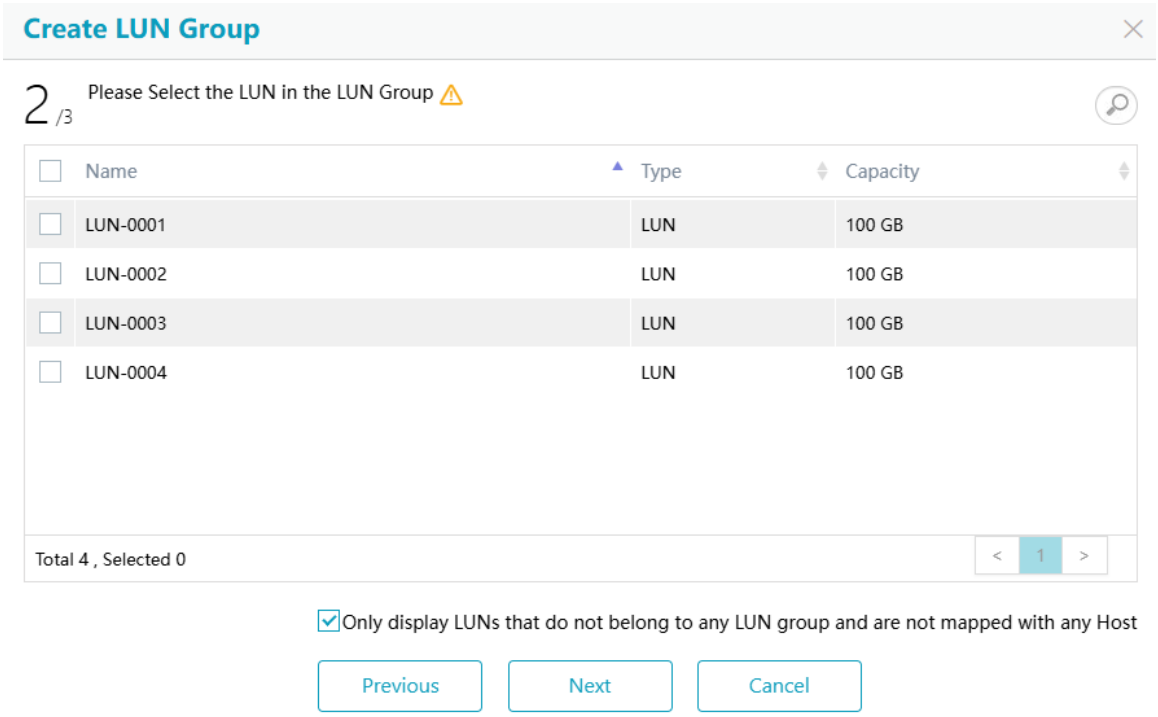

Figure 7-30 Create LUN group wizard interface (2)

Step 5: In the third step of the **Create LUN Group** wizard, you can check the configuration information and click the <Finish> button to complete the configuration.

7.5.5.2 Viewing LUN Group Properties

This section explains how to view LUN group's basic properties.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Select the desired LUN group in the **LUN Groups** tab of the information display area and click the <Properties> button to open the **Basic Properties** window. You can view the basic properties of the LUN group.

7.5.5.3 Modifying LUN Group Properties

This section explains how to modify LUN group's name and description.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Select the desired LUN group in the **LUN Groups** tab of the information display area and click the <Properties> button to open the **Basic Properties** window, as shown in Figure 7-31. Modify the properties of LUN group (see Table 7-14 for details) and click the <OK> button to complete the configuration.

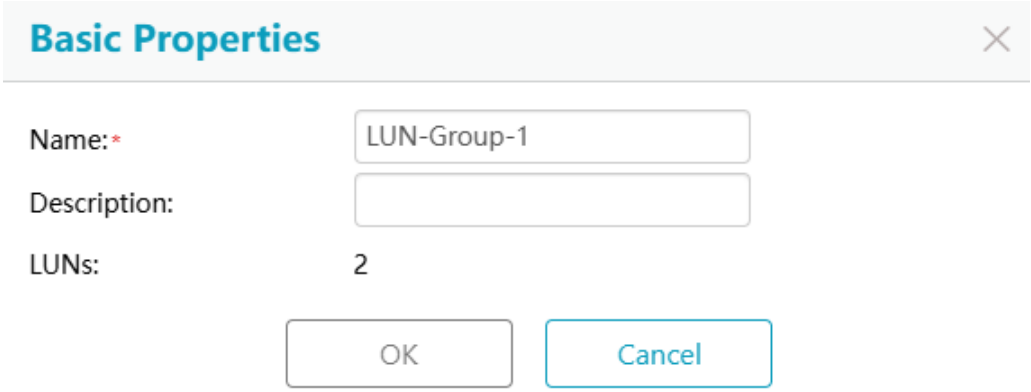

Figure 7-31 LUN group basic properties interface

7.5.5.4 Deleting LUN Group

This section explains how to delete LUN group.

Prerequisites

The LUN group is not added to mapping domain.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface。

Step 2: Select the desired LUN group in the **LUN Groups** tab of the information display area, click the <Delete> button, confirm the object and enter "yes" in the pop-up confirmation box, and click the <OK> button to complete the configuration.

7.5.5.5 Adding Member for LUN Group

This section explains how to add member for LUN group.

ⓘNOTE

The I_T_L mapping of members in a LUN group of mapping domain will be automatically completed during the adding process.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation to open the mapping domain interface.

Step 2: Select the desired LUN group in the **LUN Groups** tab of the information display area and click the <Add> button in the **LUNs** tab of the extended area to open the **Add LUN** window, as shown in Figure 7-32. Select LUN and click the <OK> button to complete the configuration.

ⓘNOTE

- LUNs that do not belong to any LUN group and without mapping with any Host are displayed by default. You can deselect "Only display LUNs that do not belong to any LUN group and are not mapped with any host" option to view all LUNs.
- If the selected LUN belongs to a replica LUN of replication or a mirror LUN of remote mirror, it will be mapped with the front-end server in read-only mode.

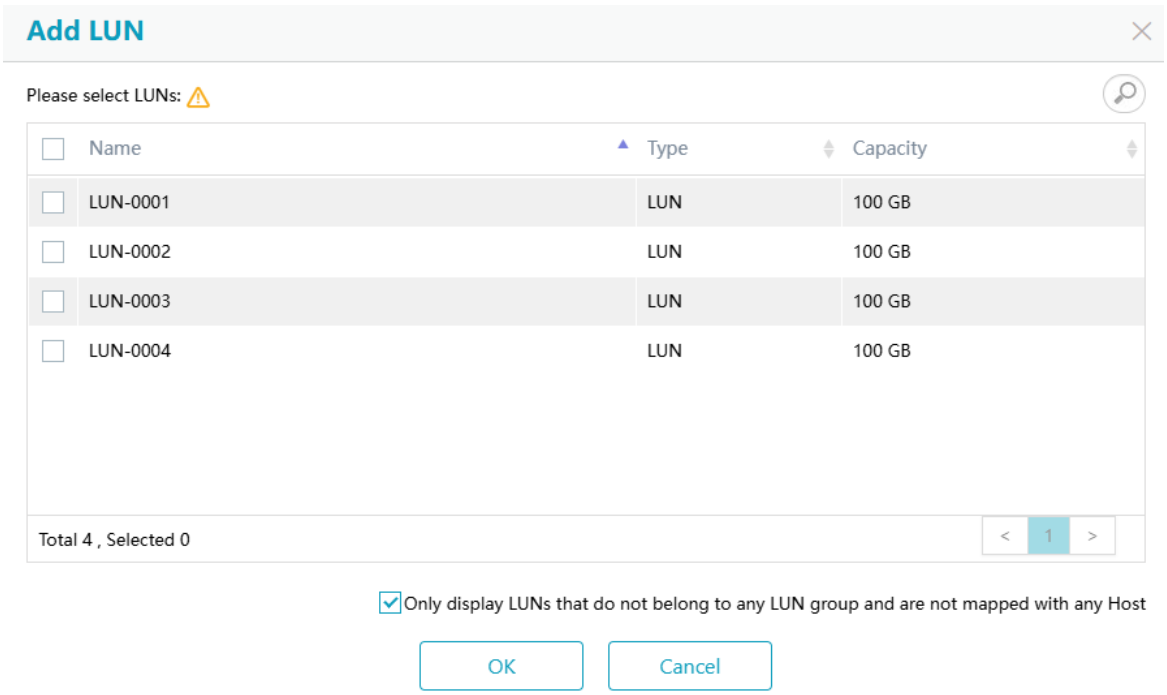

Figure 7-32 Add LUN interface

7.5.5.6 Removing Member from LUN Group

This section explains how to remove member from LUN group.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Select the desired LUN group in the **LUN Groups** tab of the information display area, and select the desired LUN in the **LUNs** tab of the extended area, click the <Remove> button, confirm the object in the pop-up confirmation box, and click the <OK> button to complete the configuration.

ⓘNOTE

The I_T_L mapping of members in a LUN group of mapping domain will be reserved by default during the removing process. If you do not need to reserve it, select the "Delete the I_T_L related to this LUN in the mapping domain of the LUN group" check box in the pop-up window.

7.5.6 Managing Mapping Domain

7.5.6.1 Creating Mapping Domain

This section explains how to create mapping domain.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Click the <Create> button in the **Mapping Domains** tab of the information display area to open the **Create Mapping Domain** wizard.

Step 3: The first step of the **Create Mapping Domain** wizard is shown in Figure 7-33. Enter mapping domain parameters (see Table 7-15 for details) and click the <Next> button to enter the next interface.

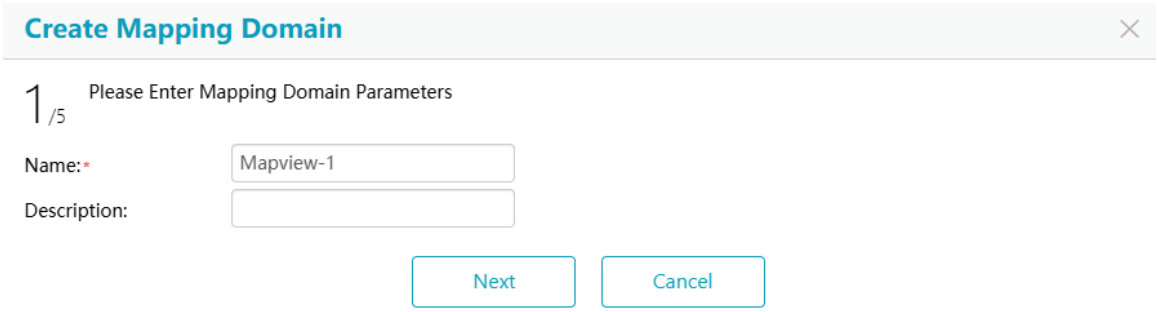

Figure 7-33 Create mapping domain wizard interface (1)

Table 7-15 Description of the parameters for creating mapping domain wizard interface (1)

Parameters	Description
Name	It refers to the name of mapping domain. • Length: 1-63 characters. • Valid character range: [a-zA-Z0-9.-_:]. • It is recommended that the prefix of mapping domain name is "Mapview-".
Description	It refers to the description of mapping domain.

Step 4: The second step of the **Create Mapping Domain** wizard is shown in Figure 7-34. Select Host group and click the <Next> button to enter the next interface.

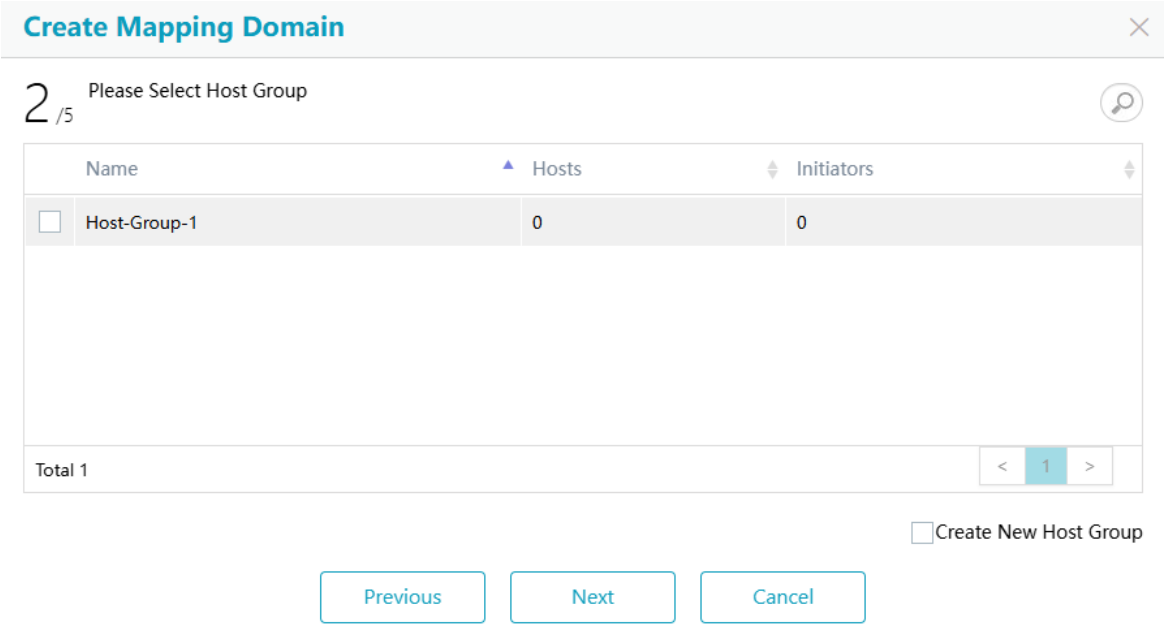

Figure 7-34 Create mapping domain wizard interface (2)

ⓘNOTE

If Host group is not created in advance, you can also select the "Create New Host group" option to create a new Host group in this step. In the next step, you will create a new Host group through extended steps, corresponding to steps 2a/5, 2b/5, etc. For details, see 7.5.3.1 Creating Host Group.

Step 5: The third step of the **Create Mapping Domain** wizard is shown in Figure 7-35. Select Target group and click the <Next> button to enter the next interface.

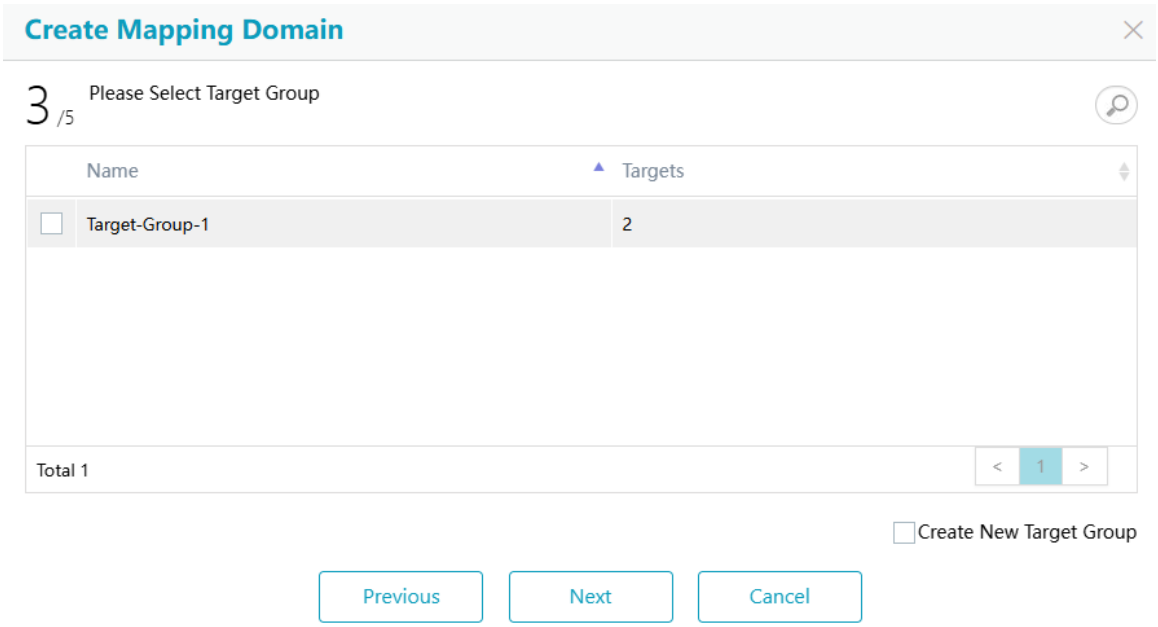

Figure 7-35 Create mapping domain wizard interface (3)

ⓘNOTE

If Target group is not created in advance, you can also select the "Create New Target Group" option to create a new Target group in this step. In the next step, you will create a new Target group through extended steps, corresponding to step 3a/5, 3b/5, etc. For details, see 7.5.4.1 Creating Target Group.

Step 6: The fourth step of the **Create Mapping Domain** wizard is shown in Figure 7-36. Select access rights and LUN group and click the <Next> button to enter the next interface.

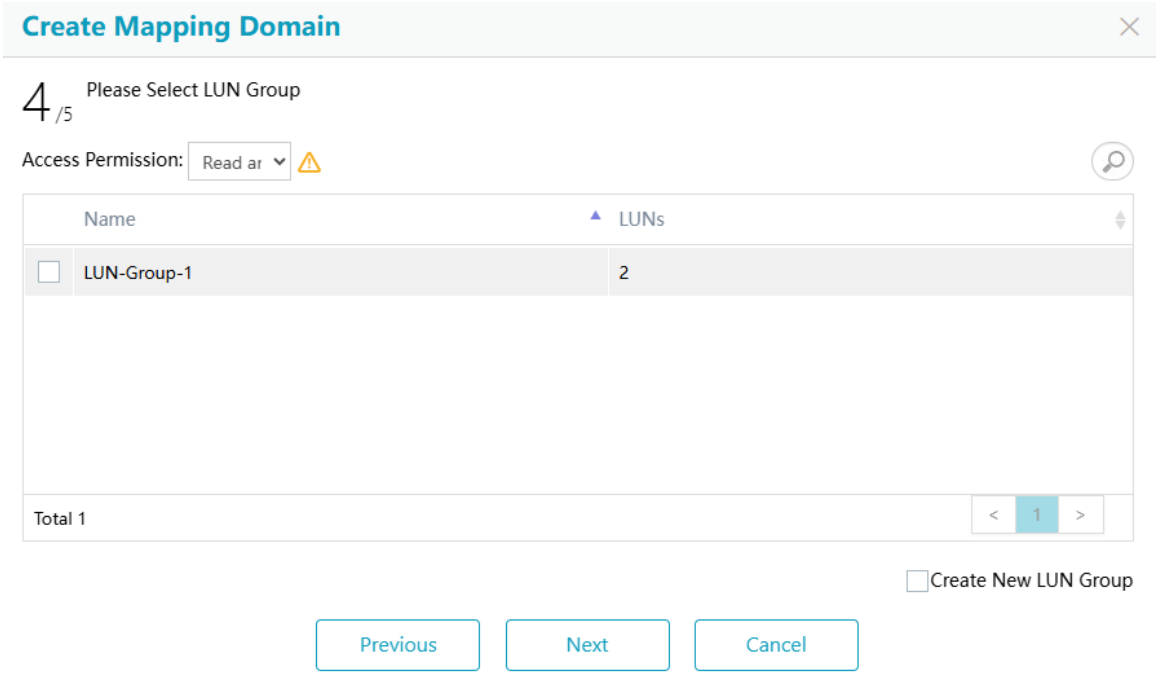

Figure 7-36 Create mapping domain wizard interface (4)

ⓘNOTE

If LUN group is not created in advance, you can also select the "Create New LUN Group" option to create a new LUN group in this step. In the next step, you will create a new LUN group through extended steps, corresponding to steps 4a/5, 4b/5, etc. For details, see 7.5.5.1 Creating LUN Group.

Step 7: In the fifth step of the **Create Mapping Domain** wizard, you can check the configuration information and click the <Finish> button to complete the configuration.

7.5.6.2 Viewing Mapping Domain Properties

This section explains how to view mapping domain's basic properties.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Select the desired mapping domain in the **Mapping Domains** tab of the information display area and click the <Properties> button to open the **Basic Properties** window. You can view the basic properties of the mapping domain.

7.5.6.3 Viewing I_Ts

This section explains how to view mapping domain's I_T connection information.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Select the desired mapping domain in the **Mapping Domains** tab of the information display area and click the <I_Ts> button to open the **I_Ts** window. You can view the I_T connection information of the mapping domain.

7.5.6.4 Modifying Mapping Domain Properties

This section explains how to modify mapping domain's name and description.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Select the desired mapping domain in the **Mapping Domains** tab of the information display area and click the <Properties> button to open the **Basic Properties** window, as shown in Figure 7-37. Modify the properties of mapping domain (see Table 7-15 for details) and click the <OK> button to complete the configuration.

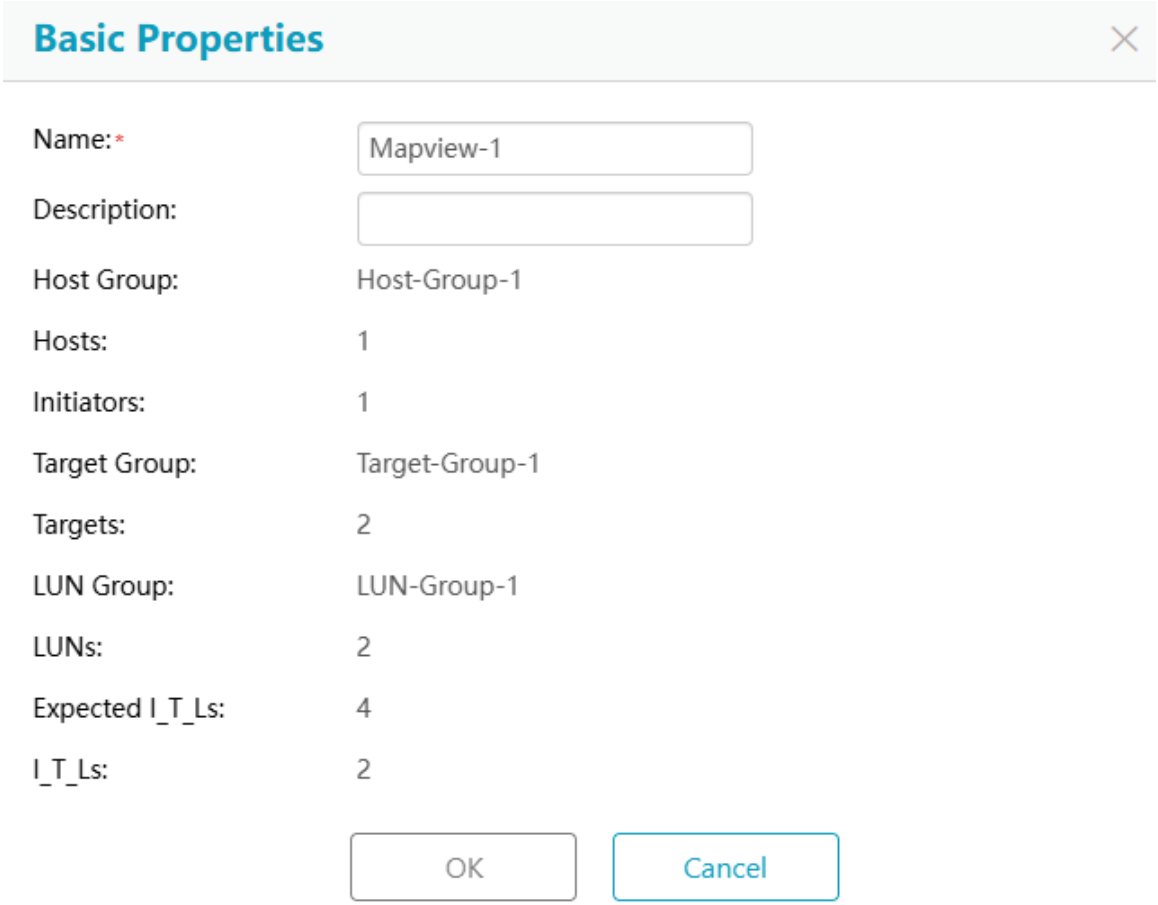

Figure 7-37 Mapping domain basic properties interface

7.5.6.5 Deleting Mapping Domain

This section explains how to delete mapping domain.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Select the desired mapping domain in the **Mapping Domains** tab of the information display area, click the <Delete> button, select the "Delete all I_T_L in the mapping domain" and "If there is traffic in the last 5 minutes, unmapping of the LUN is not allowed" option as needed in the pop-up confirmation box, and click the <OK> button to complete the configuration.

7.5.6.6 Modifying Access Permission

This section explains how to modify I_T_L's access permission.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Select the desired mapping domain in the **Mapping Domains** tab of the information display area, click the <More> button, and click the <Access Permission> button in the drop-down menu button to open the **Access Permission** window, as shown in Figure 7-38. Modify access permission, select Host, and click the <OK>button to complete the configuration.

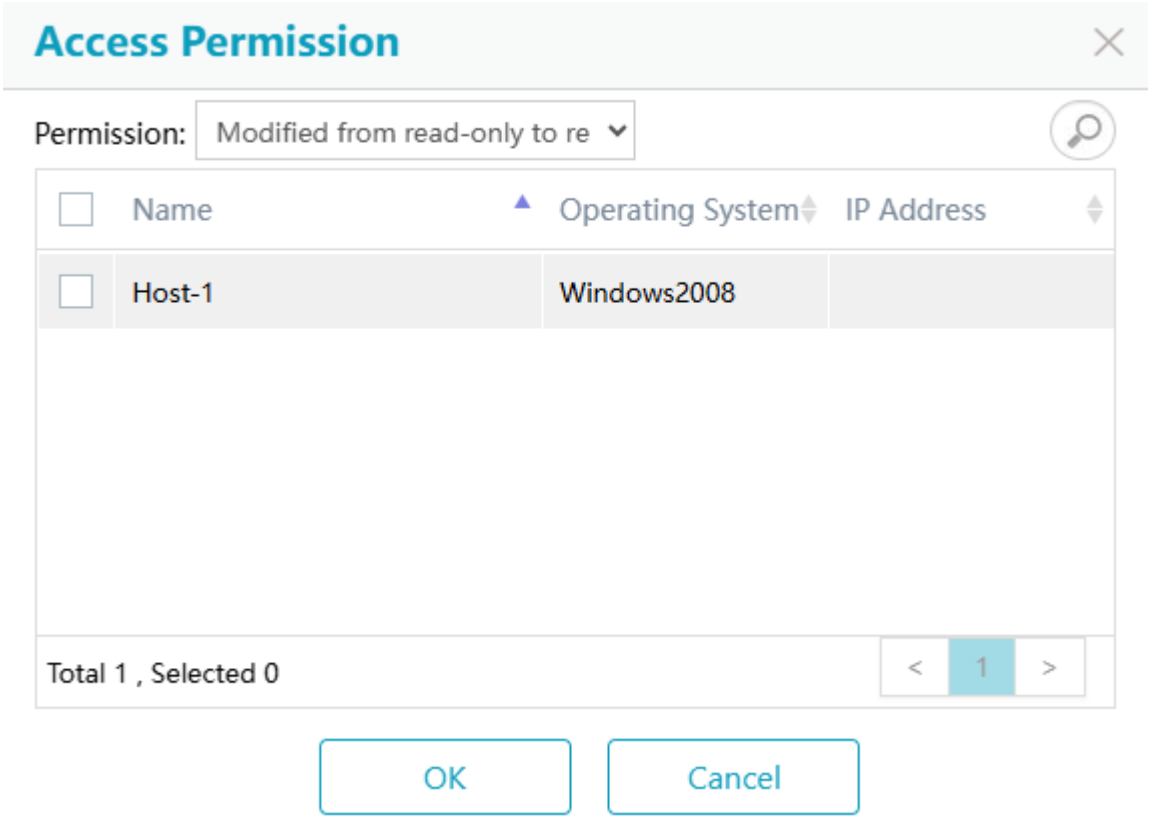

Figure 7-38 Access permission interface

7.5.6.7 Completing I_T_L

This section explains how to complete unmapped I_T_L.

ⓘNOTE

In the mapping domains, expected I_T_Ls is the number of I_T_L calculated according to mutual full-mapping among Initiators, Targets, and LUNs, and actual I_T_L is the number of I_T_Ls mapped currently. If the number of expected I_T_Ls is less than that of actual I_T_Ls, you can manually complete the unmapped I_T_Ls.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Select the desired mapping domain in the **Mapping Domains** tab of the information display area, click the <More> button, and click the <Complete I_T_L> button in the drop-down menu to open the **Auto Complete I_T_L** wizard.

Step 3: The first step of the **Auto Complete I_T_L** wizard is shown in Figure 7-39. Select Initiator and click the <Next> button to enter the next interface.

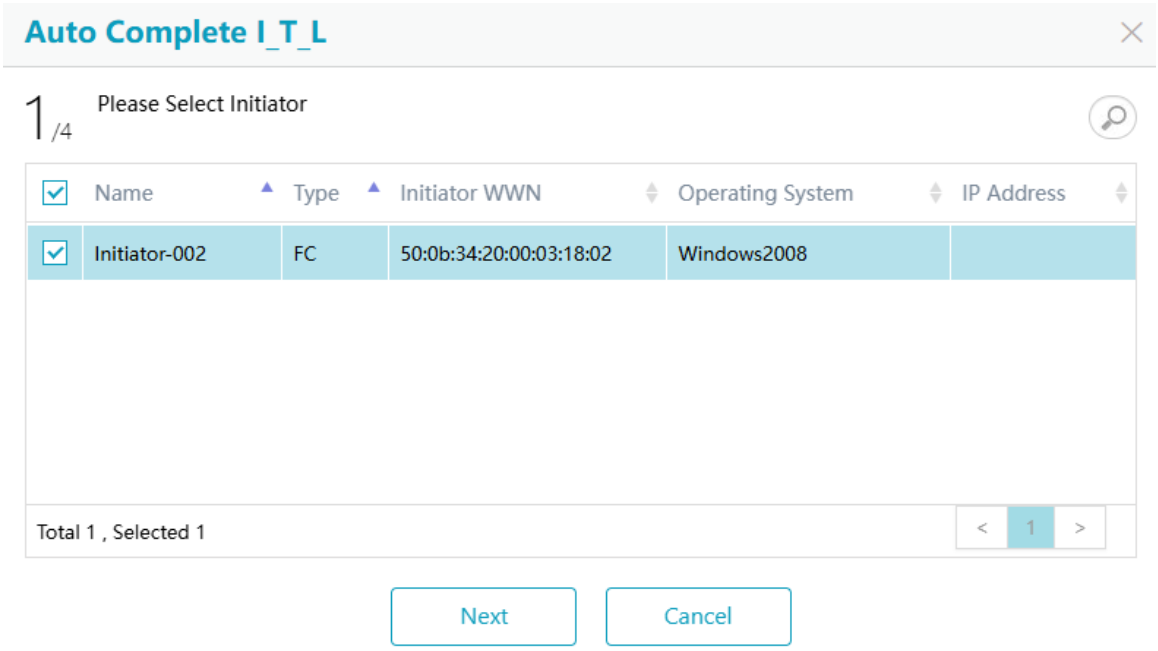

Figure 7-39 Auto complete I_T_L wizard interface (1)

Step 4: The second step of the **Auto Complete I_T_L** wizard is shown in Figure 7-40. Select Targets and click the <Next> button to enter the next interface.

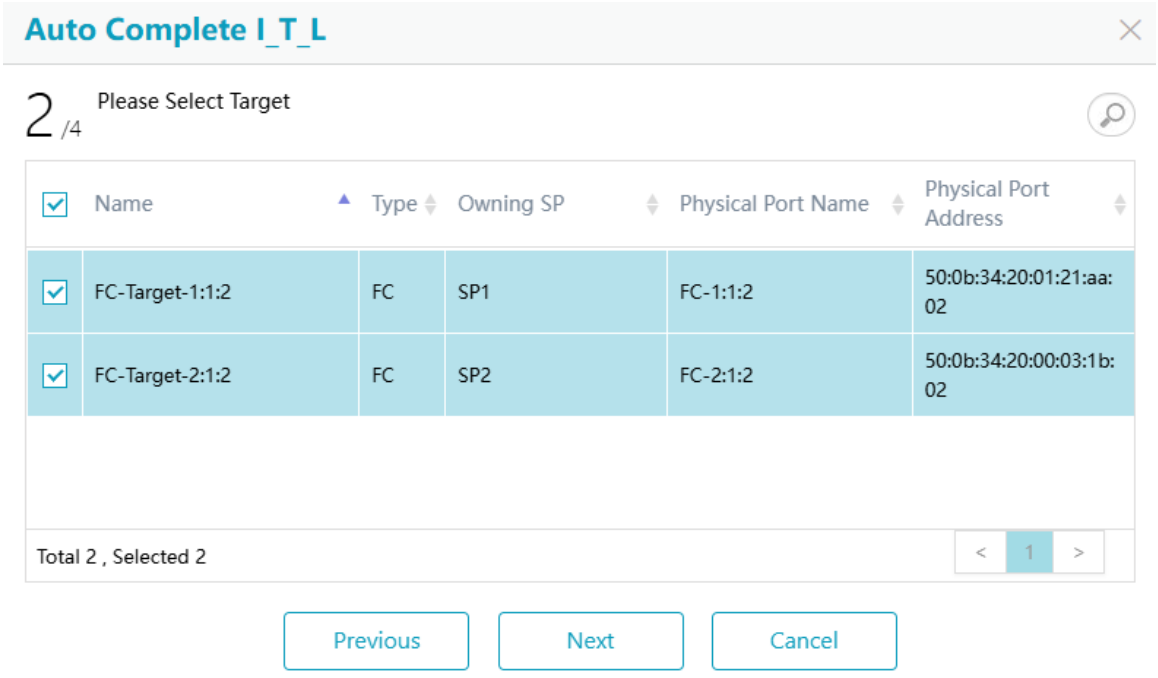

Figure 7-40 Auto complete I_T_L wizard interface (2)

Step 5: The third step of the **Auto Complete I_T_L** wizard is shown in Figure 7-41. Select access permission and LUN and click the <Next> button to enter the next interface.

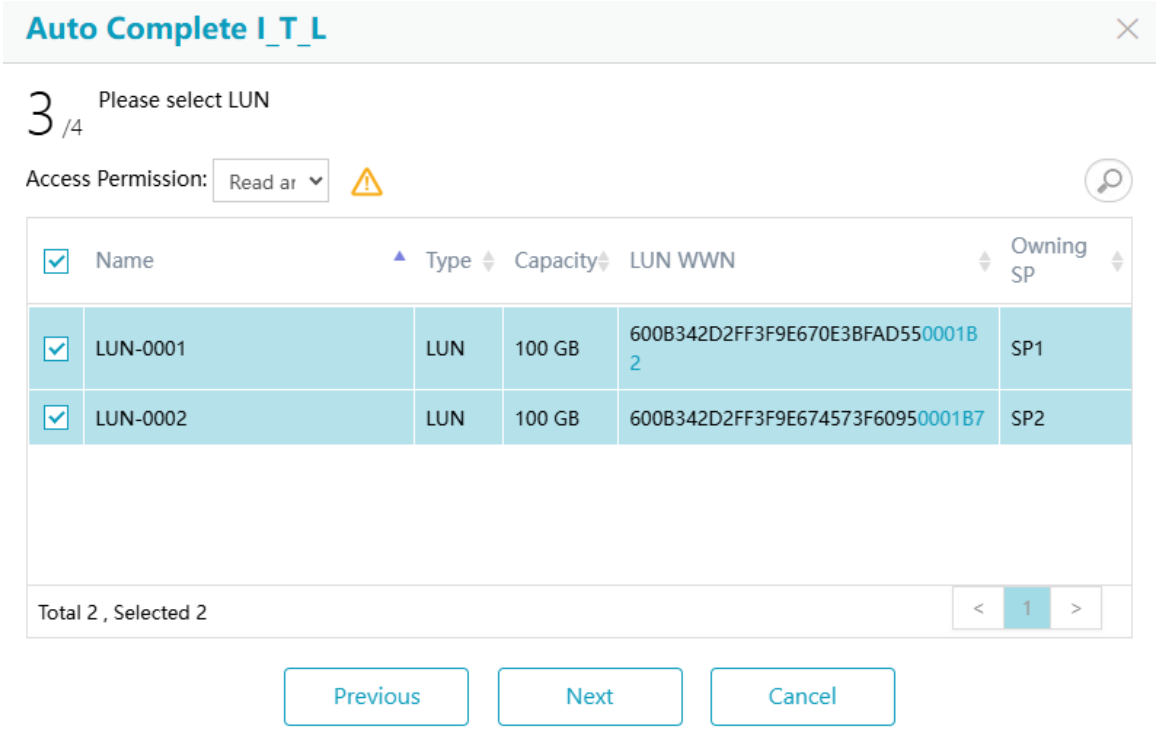

Figure 7-41 Auto complete I_T_L wizard interface (3)

Step 6: In the fourth step of the **Auto Complete I_T_L** wizard, you can check the configuration information and click the <Finish> button to complete the configuration.

7.5.6.8 Deleting Unused I_T_L

This section explains how to batch delete disconnected I_T and corresponding I_T_L in the mapping domain.

Steps

Step 1: Select "Client" -> "Mapping Domain" on the navigation tree to open the mapping domain interface.

Step 2: Select the desired mapping domain in the **Mapping Domains** tab of the information display area, click the <More> button, click the <Delete Unused I_T_L> button in the drop-down menu, enter "yes" in the pop-up warning box, and click the <OK> button to complete the configuration.

7.6 Configuring NVMf

ⓘNOTE

Please configure RDMA Initiator first in NVMe over RDMA. Please configure FC Initiator first in NVMe over FC.

7.6.1 Introduction to NVMf

As a new protocol specification, NVMe over fabrics (NVMf for short) adapts to Fabrics scenarios and further leverages the advantages of high performance, low latency, and low protocol burden of the NVMe protocol to the interconnection of storage systems on the base of NVMe protocol, which effectively solving the performance bottleneck of front-end network and improving storage performance. Fabrics network can be either a high-speed RDMA network or a high-speed FC network.

Mapping relationship of NVMf environment in ODSP resource management framework can be configured through NVMf Subsystem, which consists of NVMf Host group, NVMf port group and NVMf LUN group. Among them:

- An NVMf Host group is a collection of multiple NVMf Hosts. Each NVMf Host corresponds to an application server. For an NVMe over RDMA environment, each Initiator corresponds to an application server; for an NVMe over FC environment, each Initiator corresponds to an FC port of the application server. Therefore, NVMf Host is a collection of Initiators, and one or more Initiators can be added to a created NVMf Host.
- An NVMf port group is a collection of multiple NVMf ports.
- An NVMf LUN group is a collection of multiple LUNs.

All Hosts, ports, and LUNs in an NVMf Subsystem can realize simple and convenient configuration through intercommunication.

7.6.2 Activating NVMf License

This section explains how to activate NVMf license.

ⓘNOTE

After activating successfully, the "NVMf" sub-node will be displayed under the "Client" node on the navigation tree.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <License Setting> button to open the **License Setting** window, enter a valid NVMf license, and click the <Activate> button to activate the license.

7.6.3 Managing NVMf Host

7.6.3.1 Creating NVMf Host

This section explains how to create NVMf Host.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Click the <Create> button in the **NVMf Hosts** tab of the information display area to open the **Create NVMf Host** wizard.

Step 3: The first step of the **Create NVMf Host** wizard is shown in Figure 7-42. Enter NVMf Host parameters (see Table 7-16 for details) and click the <Next> button to enter the next interface.

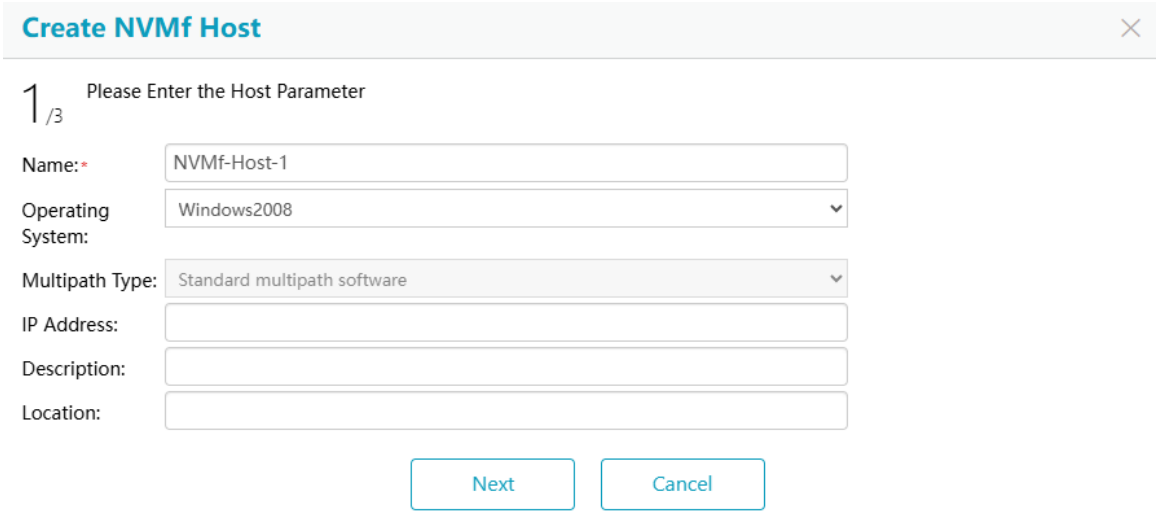

Figure 7-42 Create NVMf Host wizard interface (1)

Table 7-16 Description of the parameters for creating NVMf Host wizard interface (1)

Parameter	Description
Name	It refers to the name of NVMf Host. ● Length: 1-63 characters. ● Valid character range: [a-zA-Z0-9.-_:]. ● It is recommended that the prefix of NVMf Host name is "NVMf-Host-".
Operating System	It refers to the operating system of application server.
Multipath Type	It refers to the multipath types of application server. It can be set only when the operating system is "Linux" and "SuSE". Otherwise, it defaults to "Standard multipath software". It can be set as follows: ● DM multipath software ● NVMe multipath software ● Manufacturer self-developed multipath software
IP Address	It refers to the IP address of application server.
Description	It refers to the description of NVMf Host.

Location	It refers to the geographic location of NVMf Host.

Step 4: The second step of the **Create NVMf Host** wizard is shown in Figure 7-43. Select Initiator and click the <Next> button to enter the next interface.

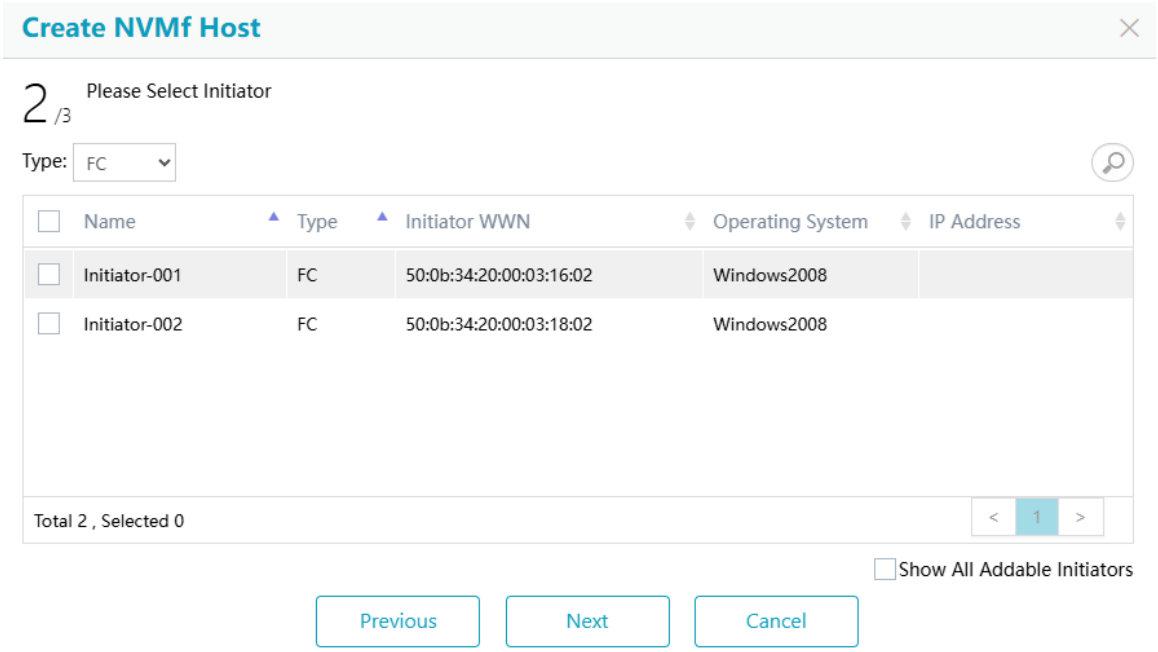

Figure 7-43 Create NVMf Host wizard interface (2)

Step 5: In the third step of the **Create NVMf Host** wizard, you can check the configuration information and click the <Finish> button to complete the configuration.

7.6.3.2 Viewing NVMf Host Properties

This section explains how to view NVMf Host's basic properties.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Select the desired NVMf Host in the **NVMf Hosts** tab of the information display area and click the <Properties> button to open the **Basic Properties** window. You can view the basic properties of the NVMf Host.

7.6.3.3 Modifying NVMf Host Properties

This section explains how to modify NVMf Host's name, operating system, multipath type, IP address, description, location and delay alarm threshold.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Select the desired NVMf Host in the **NVMf Hosts** tab of the information display area and click the <Properties> button to open the **Basic Properties** window, as shown in Figure 7-44. Modify the properties of NVMf Host (see Table 7-17 for details) and click the <OK> button to complete the configuration.

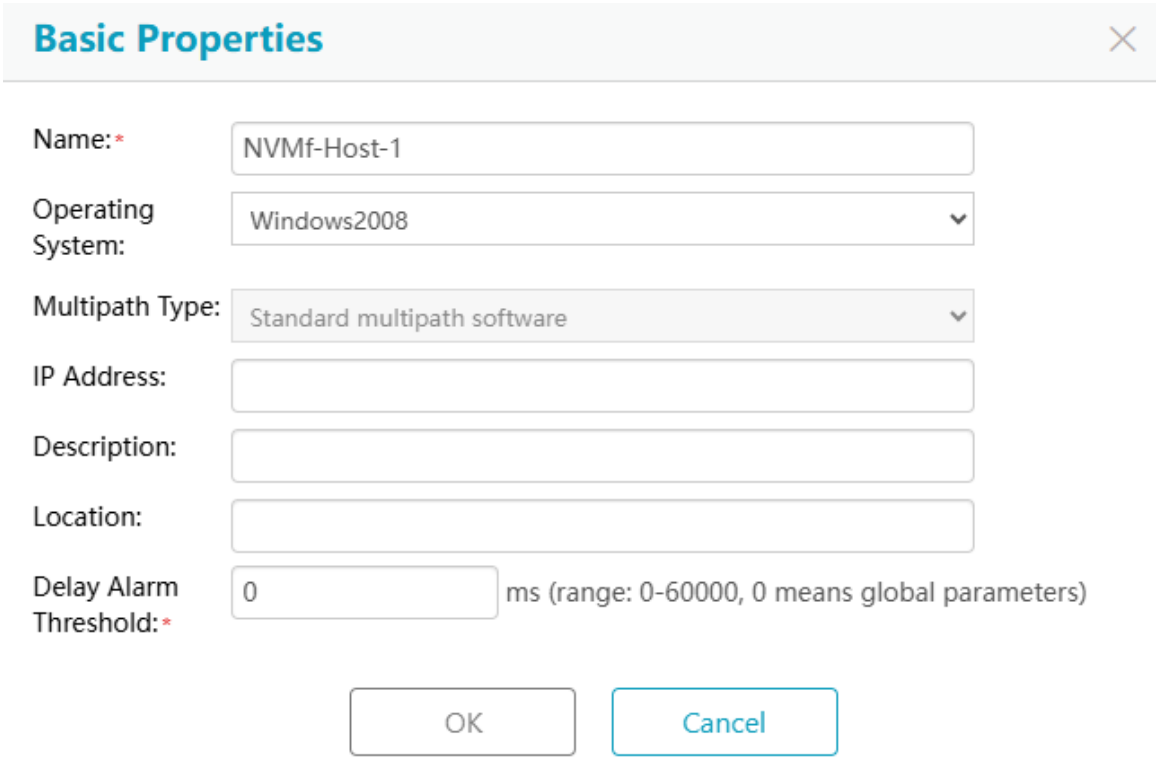

Figure 7-44 NVMf Host basic properties interface

Table 7-17 Description of the parameters for NVMf Host basic properties interface

Parameter	Description
Name	It refers to the name of NVMf Host. • Length: 1-63 characters. • Valid character range: [a-zA-Z0-9.-_:]. • It is recommended that the prefix of NVMf Host name is "NVMf-Host-".
Operating System	It refers to the operating system of application server.
Multipath Type	It refers to the multipath types of application server. It can be set only when the operating system is "Linux" and "SuSE". It can be set as follows: • DM multipath software • NVMe multipath software • Manufacturer self-developed multipath software
IP Address	It refers to the IP address of application server.
Description	It refers to the description of NVMf Host.
Location	It refers to the geographic location of NVMf Host.
Delay Alarm Threshold	It refers to the threshold for triggering NVMf Host delay alarm. The delay alarm will be triggered when the IO delay on the NVMf Host exceeds the

	threshold.

7.6.3.4 Deleting NVMf Host

This section explains how to delete NVMf Host.

Prerequisites

The NVMf Host is not added to NVMf Host group.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Select the desired NVMf Host in the **NVMf Hosts** tab of the information display area, click the <Delete> button, confirm the object and enter "yes" in the pop-up warning box, and click the <OK> button to complete the configuration.

7.6.3.5 Adding Member for NVMf Host

This section explains how to add member for NVMf Host.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Select the desired NVMf Host in the **NVMf Hosts** tab of the information display area and click <Add> button in the **Initiators** tab of the extended area to open the **Add Initiator** window, as shown in Figure 7-45. Select Initiator and click the <OK> button to complete the configuration.

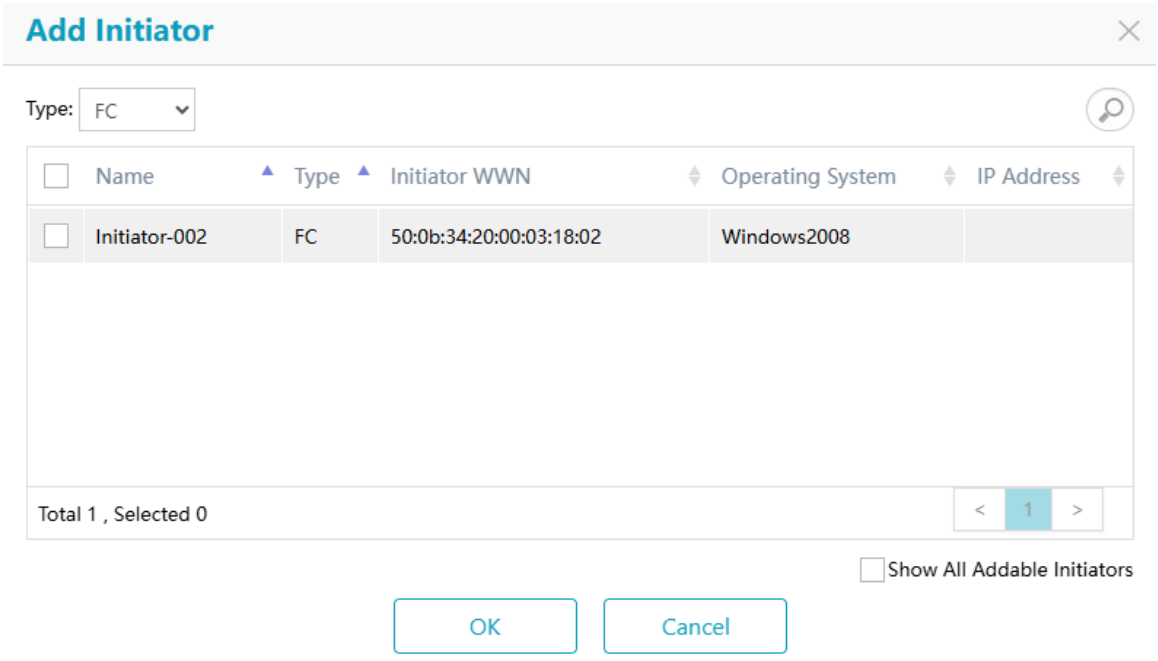

Figure 7-45 Add Initiator interface

7.6.3.6 Removing Member from NVMf Host

This section explains how to remove member from NVMf Host.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Select the desired NVMf Host in the **NVMf Hosts** tab of the information display area, select the desired Initiator in the **Initiators** tab of the extended area, click the <Remove> button, and click the <OK> button in the pop-up confirmation box to complete the configuration.

7.6.4 Managing NVMf Host Group

7.6.4.1 Creating NVMf Host Group

This section explains how to create NVMf Host Group.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Click the <Create> button in the **NVMf Host Groups** tab of the information display area to open the **Create NVMf Host Group** wizard.

Step 3: The first step of the **Create NVMf Host Group** wizard is shown in Figure 7-46. Enter NVMf Host group parameters (see Table 7-18 for details) and click the <Next> button to enter the next interface.

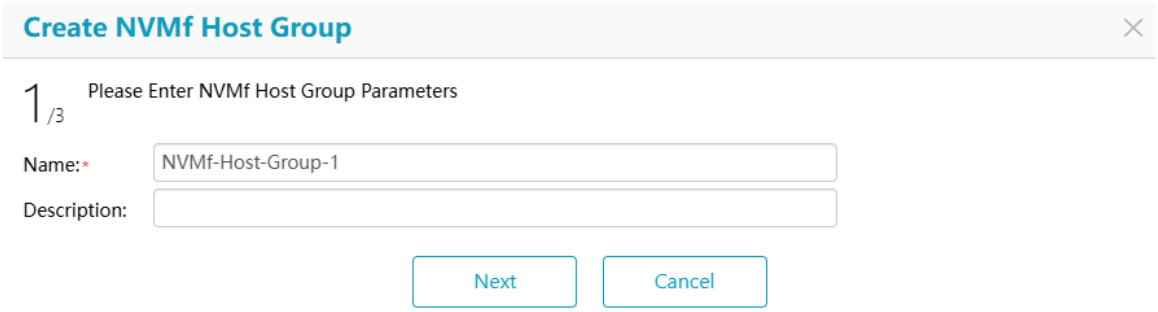

Figure 7-46 Create NVMf Host group wizard interface (1)

Table 7-18 Description of the parameters for creating NVMf Host group wizard interface (1)

Parameter	Description
Name	It refers to the name of NVMf Host group. • Length: 1-63 characters. • Valid character range: [a-zA-Z0-9.-_:]. • It is recommended that the prefix of NVMf Host group name is "NVMf-Host-Group-".
Description	It refers to the description of NVMf Host group.

Step 4: The second step of the **Create NVMf Host Group** wizard is shown in Figure 7-47. Select NVMf Host and click the <Next> button to enter the next interface.

ⓘNOTE

NVMf Hosts that do not belong to any NVMf Host group are displayed by default in this step. You can select the "Show All addable NVMf Host" option to view all NVMf Hosts.

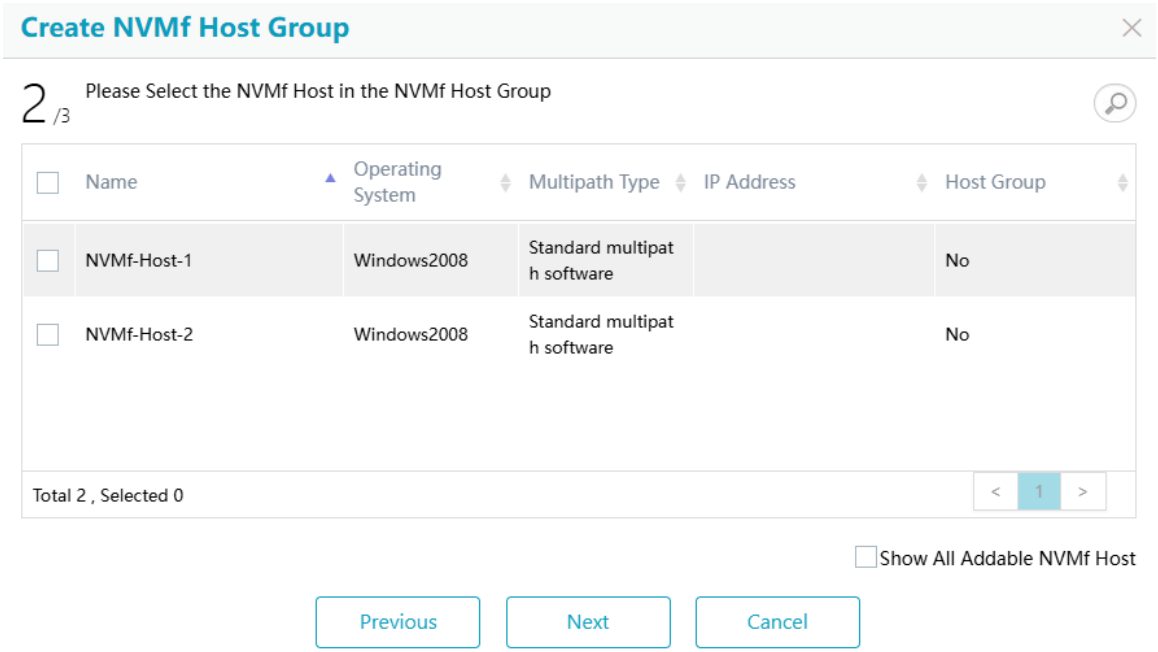

Figure 7-47 Create NVMf Host group wizard interface (2)

Step 5: In the third step of the **Create NVMf Host Group** wizard, you can check the configuration information and click the <Finish> button to complete the configuration.

7.6.4.2 Viewing NVMf Host Group Properties

This section explains how to view NVMf Host group's basic properties.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Select the desired NVMf Host group in the **NVMf Host Groups** tab of the information display area and click the <Properties> button to open the **Basic Properties** window. You can view the basic properties of the NVMf Host group.

7.6.4.3 Modifying NVMf Host Group Properties

This section explains how to modify NVMf Host group's name and description.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Select the desired NVMf Host group in the **NVMf Host Groups** tab of the information display area and click the <Properties> button to open the **Basic Properties** window, as shown in Figure 7-48. Modify the properties of NVMf Host (see Table 7-18 for details) and click the <OK> button to complete the configuration.

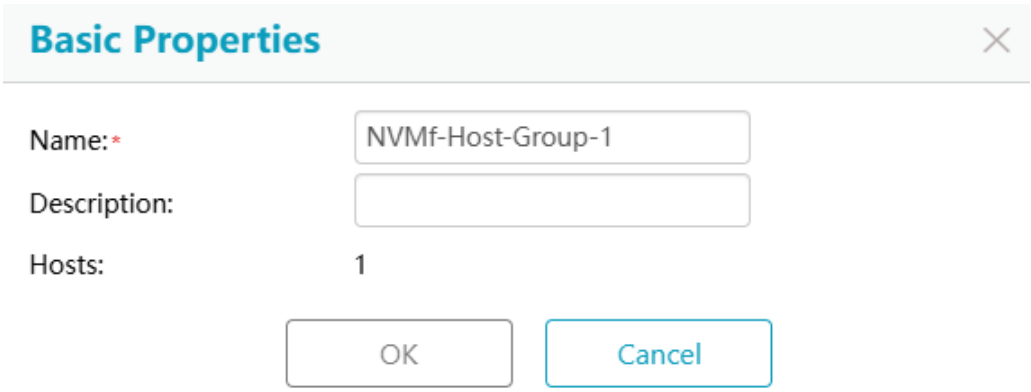

Figure 7-48 NVMf Host group basic properties interface

7.6.4.4 Deleting NVMf Host Group

This section explains how to delete NVMf Host group.

Prerequisites

The NVMf Host group is not added to NVMf Subsystem.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Select the desired NVMf Host group in the **NVMf Host Groups** tab of the information display area, click the <Delete> button, confirm the object and enter "yes" in the pop-up warning box, and click the <OK> button to complete the configuration.

7.6.4.5 Adding Member for NVMf Host Group

This section explains how to add member for NVMf Host group.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Select the desired NVMf Host group in the **NVMf Host Groups** tab of the information display area and click the <Add> button in the **NVMf Hosts** tab of the extended area to open the **Add NVMf Host** window, as shown in Figure 7-49. Select NVMf Host and click the <OK> button to complete the configuration.

ⓘNOTE

NVMf Hosts that do not belong to any NVMf Host group are displayed by default in this step. You can select the "Show All Addable NVMf Host" option to view all NVMf Hosts.

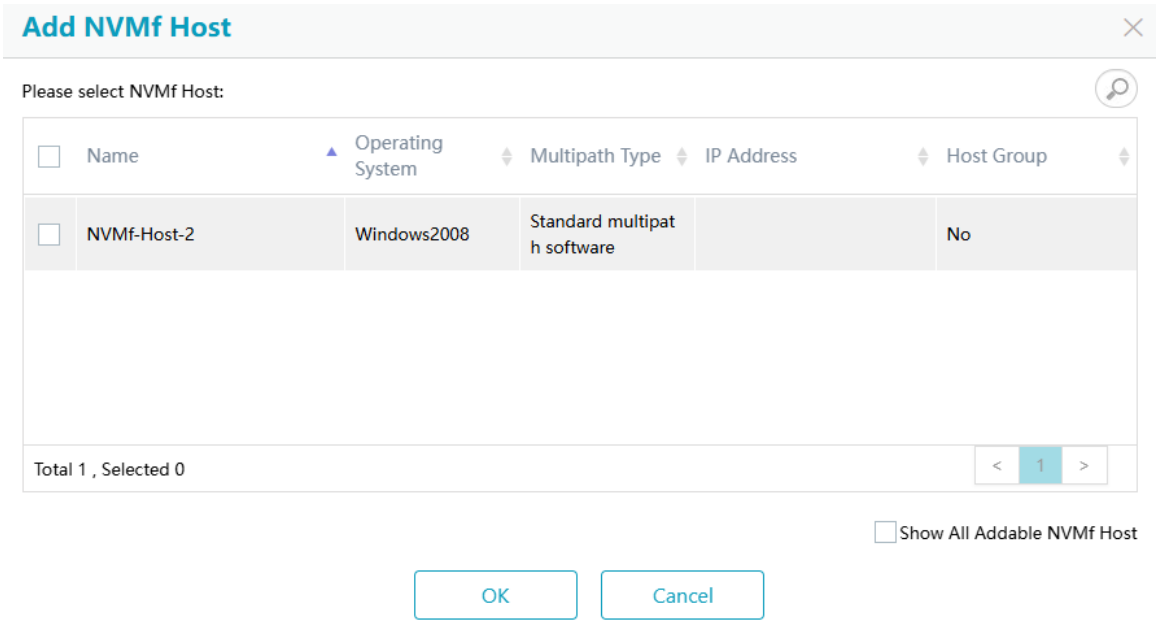

Figure 7-49 Add NVMf Host interface

7.6.4.6 Removing Member from NVMf Host Group

This section explains how to remove member from NVMf Host group.

Prerequisites

If the NVMf Host in the NVMf Host group is connected, you need to log in to the application server to disconnect the NVMf connection before removing it.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Select the desired NVMf Host group in the **NVMf Host Groups** tab of the information display area, select the desired NVMf Host in the **NVMf Hosts** tab of the extended area, click the <Remove> button, and click the <OK> button in the pop-up confirmation box to complete the configuration.

7.6.5 Managing NVMf Port

7.6.5.1 Creating NVMf Port.

This section explains how to create NVMf port.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Click the <Create> button in the **NVMf Ports** tab of the information display area to open the **Create NVMf Port** window, as shown in Figure 7-50. Select relevant parameters (see Table 7-19 for details) and physical ports and click the <OK> button to complete the configuration.

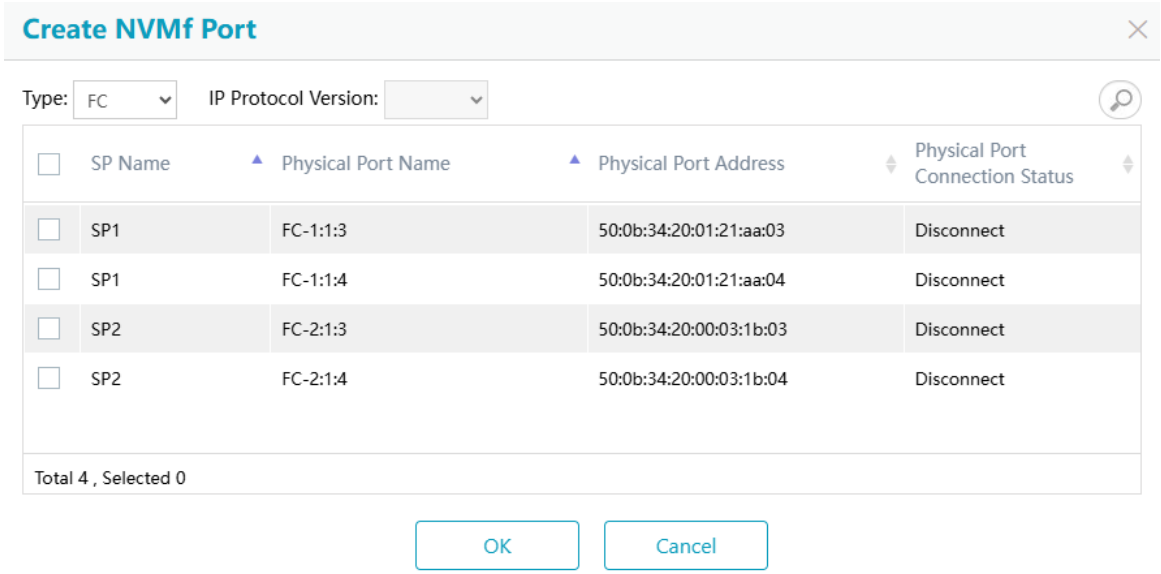

Figure 7-50 Create NVMf port interface

Table 7-19 Description of the parameters for creating NVMf port interface

Parameter	Description
Type	It refers to the type of NVMf ports, including RDMA and FC.
IP Protocol Version	You can specify IP protocol version for RDMA NVMf ports, including IPv4 and IPv6.

7.6.5.2 Viewing NVMf Port Properties

This section explains how to view NVMf port's basic properties.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Select the desired NVMf port in the **NVMf Ports** tab of the information display area and click the <Properties> button to open the **Basic Properties** window. You can view the basic properties of the NVMf port.

7.6.5.3 Modifying Delay Alarm Threshold

This section explains how to modify NVMf port's delay alarm threshold.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Select the desired NVMf port in the **NVMf Ports** tab of the information display area and click the <Properties> button to open the **Basic Properties** window, as shown in Figure 7-51. Modify delay alarm threshold and click the <OK> button to complete the configuration.

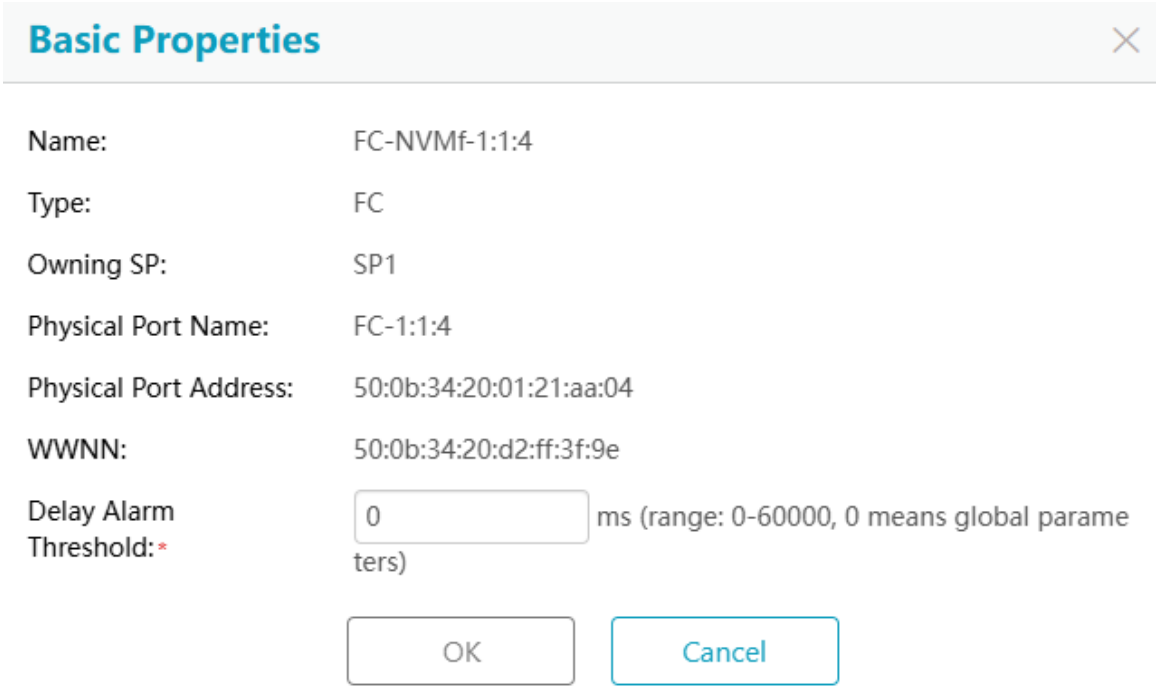

Figure 7-51 NVMf port basic properties interface

7.6.5.4 Deleting NVMf Port

This section explains how to delete NVMf port.

Prerequisites

The NVMf port is not added to NVMf port group.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Select the desired NVMf port in the **NVMf Ports** tab of the information display area, click the <Delete> button, confirm the object and enter "yes" in the pop-up warning box, and click the <OK> button to complete the configuration.

7.6.6 Managing NVMf Port Group

7.6.6.1 Creating NVMf Port Group

This section explains how to create NVMf port group.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Click the <Create> button in the **NVMf Port Groups** tab of the information display area to open the **Create NVMf Port Group** wizard.

Step 3: The first step of the **Create NVMf Port Group** wizard is shown in Figure 7-52. Enter NVMf port group parameters (see Table 7-20 for details) and click the <Next> button to enter the next interface.

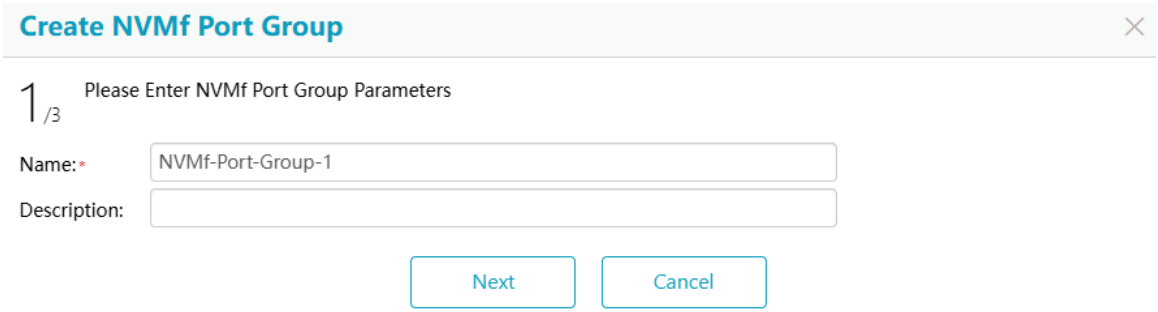

Figure 7-52 Create NVMf port group wizard interface (1)

Table 7-20 Description of the parameters for creating NVMf port group wizard interface (1)

Parameter	Description
Name	It refers to the name of NVMf port group. • Length: 1-63 characters. • Valid character range: [a-zA-Z0-9.-_:]. • It is recommended that the prefix of NVMf port group name is “NVMf-Port-Group-".
Description	It refers to the description of NVMf port group.

Step 4: The second step of the **Create NVMf Port Group** wizard is shown in Figure 7-53. Select NVMf port and click the <Next> button to enter the next interface.

ⓘNOTE

NVMf ports that do not belong to any NVMf port group are displayed by default in this step. You can select the "Show All Addable NVMf Ports" option to view all NVMf ports.

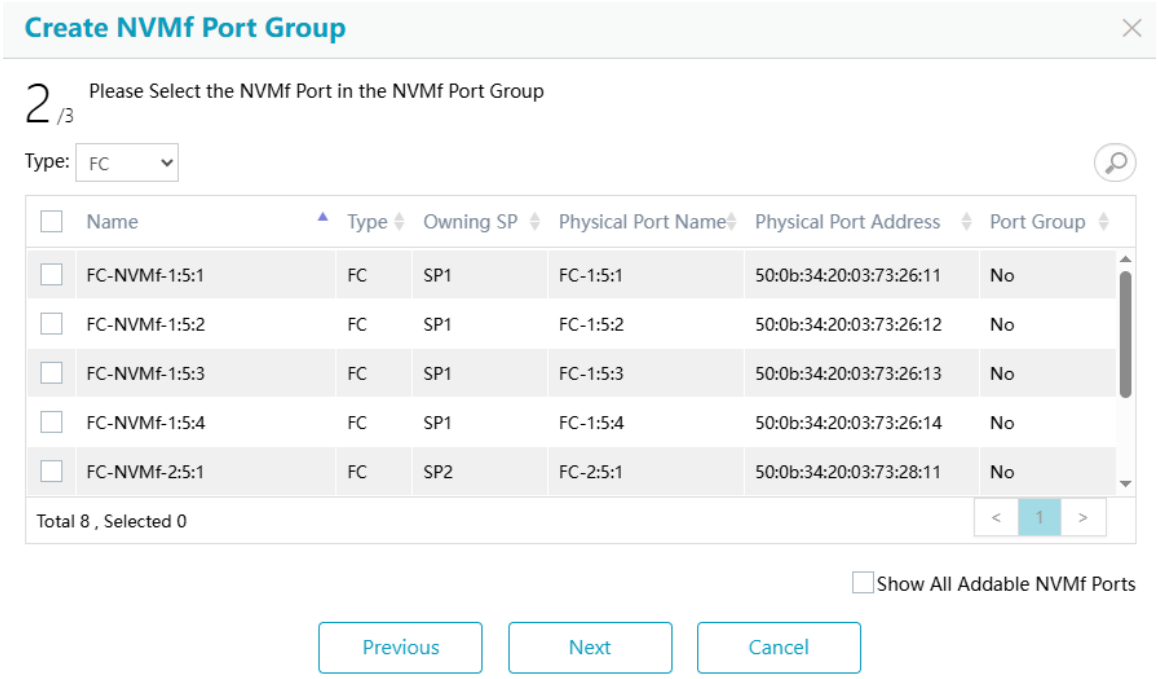

Figure 7-53 Create NVMf port group wizard interface (2)

Step 5: In the third step of the **Create NVMf Port Group** wizard, you can check the configuration information and click the <Finish> button to complete the configuration.

7.6.6.2 Viewing NVMf Port Group Properties

This section explains how to view NVMf port group's basic properties.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Select the desired NVMf port group in the **NVMf Port Groups** tab of the information display area and click the <Properties> button to open the **Basic Properties** window. You can view the basic properties of the NVMf port group.

7.6.6.3 Modifying NVMf Port Group Properties

This section explains how to modify NVMf port group's name and description.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Select the desired NVMf port group in the **NVMf Port Groups** tab of the information display area and click the <Properties> button to open the **Basic Properties** window, as shown in Figure 7-54. Modify the properties of NVMf port group (see Table 7-20 for details) and click the <OK> button to complete the configuration.

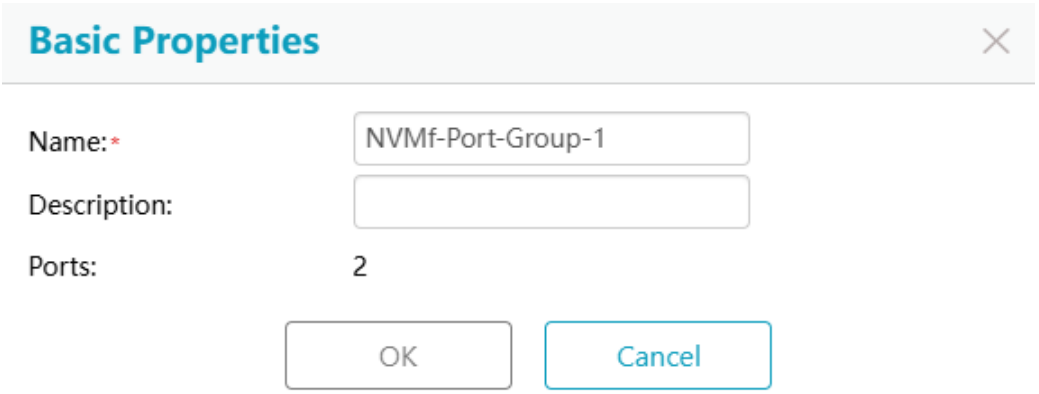

Figure 7-54 NVMf port group basic properties interface

7.6.6.4 Deleting NVMf Port Group

This section explains how to delete NVMf port group.

Prerequisites

The NVMf port group is not added to NVMf Subsystem.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Select the desired NVMf port group in the **NVMf Port Groups** tab of the information display area, click the <Delete> button, confirm the object and enter "yes" in the pop-up warning box, and click the <OK> button to complete the configuration.

7.6.6.5 Adding Member for NVMf Port Group

This section explains how to add member for NVMf port group.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Select the desired NVMf port group in the **NVMf Port Groups** tab of the information display area and click the <Add> button in the **NVMf Ports** tab of the extended area to open the **Add NVMf Port** window, as shown in Figure 7-55. Select NVMf port and click the <OK> button to complete the configuration.

ⓘNOTE

NVMf ports that do not belong to any NVMf port group are displayed by default in this step. You can select the "Show All Addable NVMf Ports" option to view all NVMf ports.

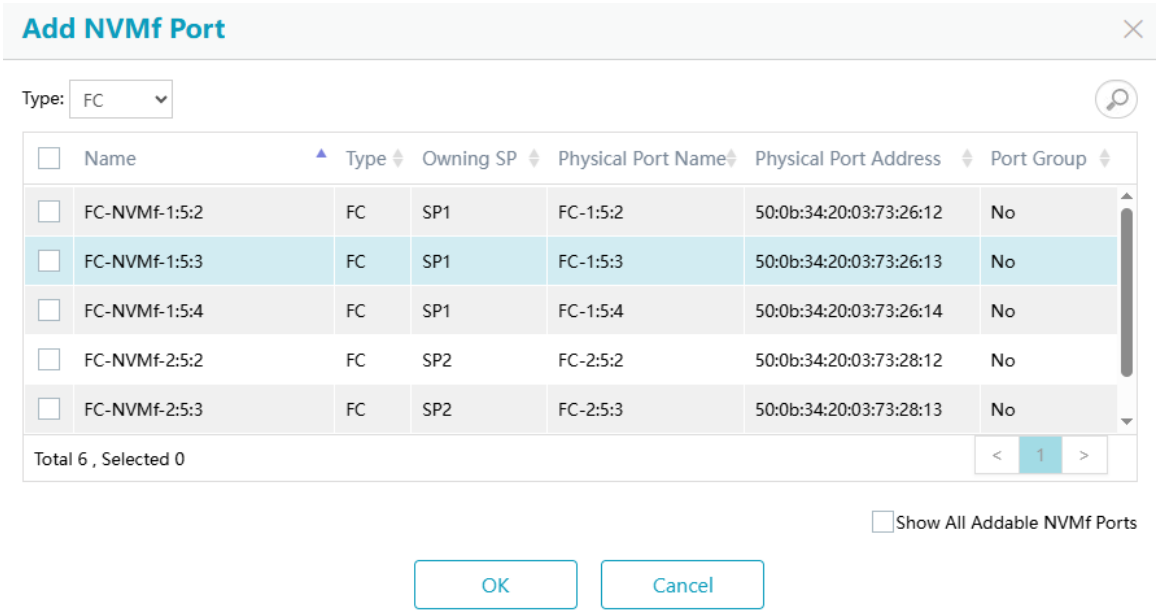

Figure 7-55 Add NVMf port group member interface

7.6.6.6 Removing Member from NVMf Port Group

This section explains how to remove member from NVMf port group.

Prerequisites

If the NVMf port in the NVMf port group is connected, you need to log in to the application server to disconnect the NVMf connection before removing it.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Select the desired NVMf port group in the **NVMf Port Groups** tab of the information display area, select the desired NVMf port in the **NVMf Ports** tab of the extended area, click the <Remove> button, and click the <OK> button in the pop-up confirmation box to complete the configuration.

7.6.7 Managing NVMf LUN Group

7.6.7.1 Creating NVMf LUN Group

This section explains how to create NVMf LUN Group.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Click the <Create> button in the **NVMf LUN Groups** tab of the information display area to open the **Create NVMf LUN Group** wizard.

Step 3: The first step of the **Create NVMf LUN Group** wizard is shown in Figure 7-56. Enter NVMf LUN group parameters (see Table 7-21 for details) and click the <Next> button to enter the next interface.

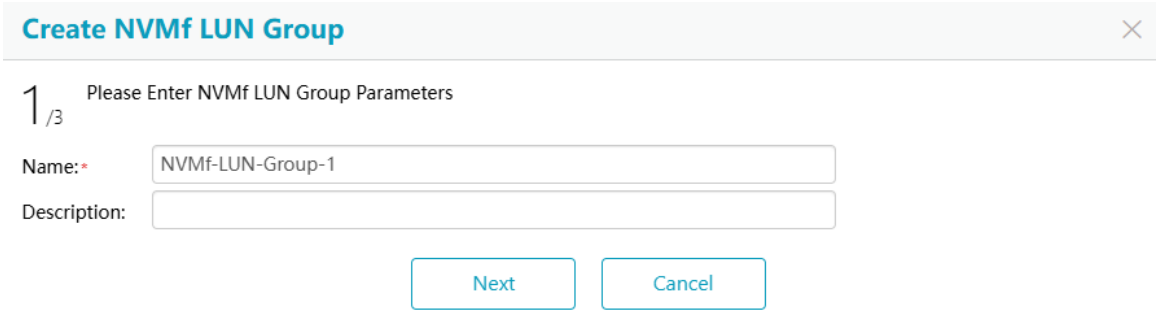

Figure 7-56 Create NVMf LUN group wizard interface (1)

Table 7-21 Description of the parameters for creating NVMf LUN group wizard interface (1)

Parameter	Description
Name	It refers to the name of NVMf LUN group. ● Length: 1-63 characters. ● Valid character range: [a-zA-Z0-9.-_:]. ● It is recommended that the prefix of NVMf LUN group name is "NVMf-LUN-Group-".
Description	It refers to the description of NVMf LUN group.

Step 4: The second step of the **Create NVMf LUN Group** wizard is shown in Figure 7-57. Select LUN and click the <Next> button to enter the next interface.

ⓘNOTE

- LUNs that do not belong to any LUN group and are not mapped with any Host are displayed by default in this step. You can deselect the "Only display LUNs that do not belong to any LUN group and are not mapped with any host" option to view all LUNs.
- If the selected LUN belongs to a replica LUN of replication or a mirror LUN of remote mirror, it will be mapped with front-end server in read-only mode.

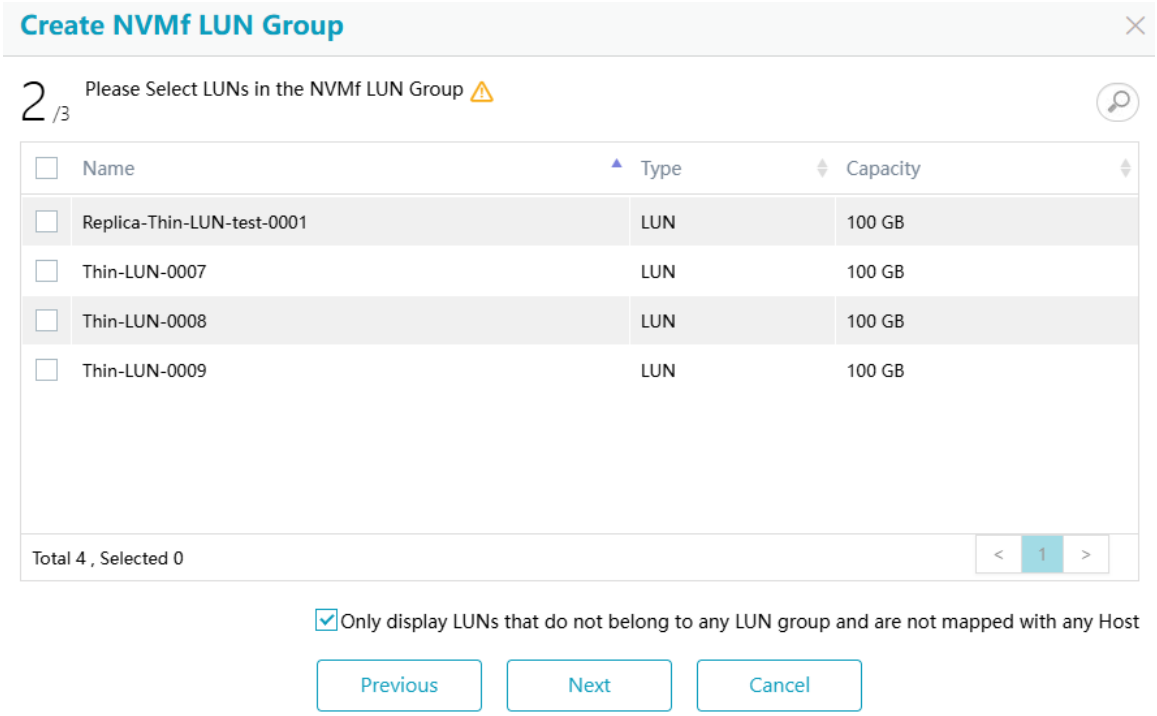

Figure 7-57 Create NVMf LUN group wizard interface (2)

Step 5: In the third step of the **Create NVMf LUN Group** wizard, you can check the configuration information and click the <Finish> button to complete the configuration.

7.6.7.2 Viewing NVMf LUN Group Properties

This section explains how to view NVMf LUN group's basic properties.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Select the desired NVMf LUN group in the **NVMf LUN Groups** tab of the information display area and click the <Properties> button to open the **Basic Properties** window. You can view the basic properties of the NVMf LUN group.

7.6.7.3 Modifying NVMf LUN Group Properties

This section explains how to modify NVMf LUN group's name and description.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Select the desired NVMf LUN group in the **NVMf LUN Groups** tab of the information display area and click the <Properties> button to open the **Basic Properties** window, as shown in

Figure 7-58. Modify the properties of NVMf LUN group (see Table 7-21 for details) and click the <OK> button to complete the configuration.

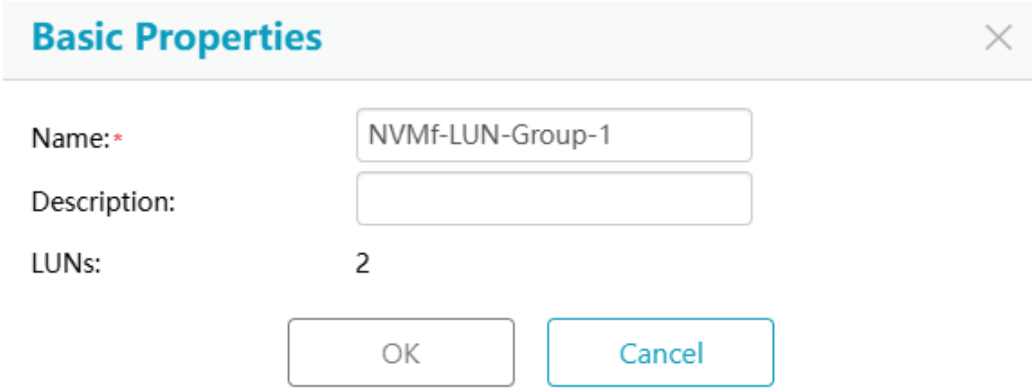

Figure 7-58 NVMf LUN group basic properties interface

7.6.7.4 Deleting NVMf LUN Group

This section explains how to delete NVMf LUN group.

Prerequisites

The NVMf LUN group is not added to NVMf Subsystem.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Select the desired NVMf LUN group in the **NVMf LUN Groups** tab of the information display area, click the <Delete> button, confirm the object and enter "yes" in the pop-up warning box, and click the <OK> button to complete the configuration.

7.6.7.5 Adding Member for NVMf LUN Group

This section explains how to add member for NVMf LUN group.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Select the desired NVMf LUN group in the **NVMf LUN Groups** tab of the information display area and click the <Add> button in the **LUNs** tab of the extended area to open the **Add LUN** window, as shown in Figure 7-59. Select LUN and click the <OK> button to complete the configuration.

ⓘNOTE

- LUNs that do not belong to any LUN group and are not mapped with any Host are displayed by default in this step. You can deselect the "Only display LUNs that do not belong to any LUN group and are not mapped with any host" option to view all LUNs.

- If the selected LUN belongs to a replica LUN of replication or a mirror LUN of remote mirror, it will be mapped with front-end server in read-only mode.

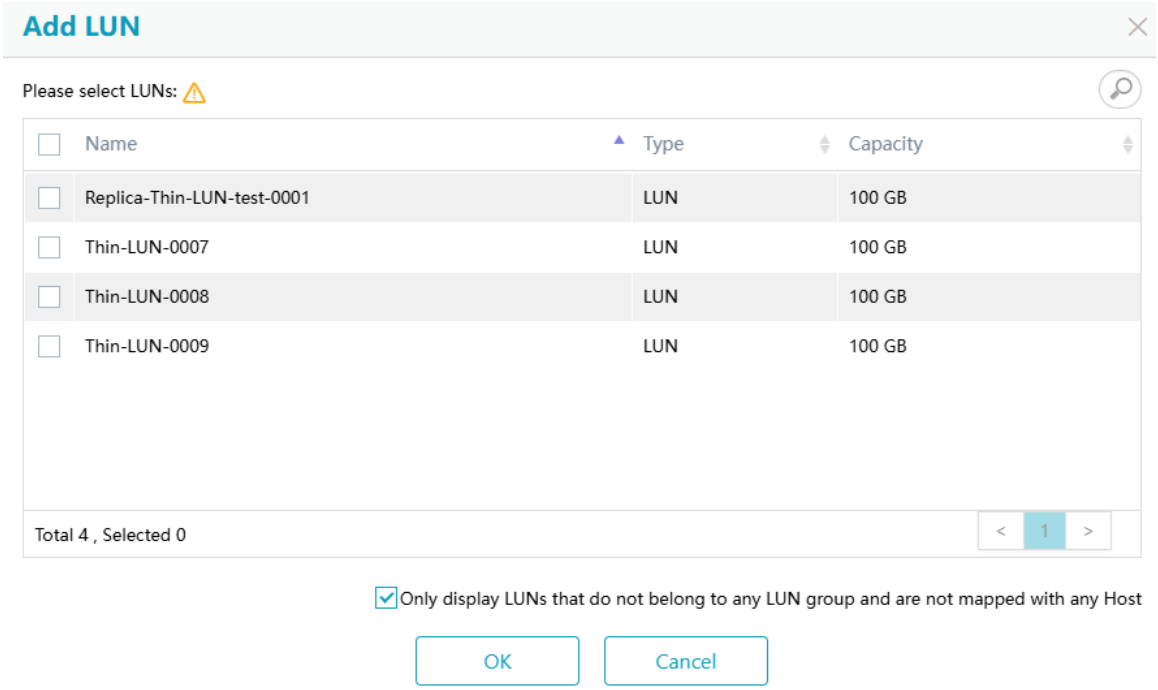

Figure 7-59 Add LUN interface

7.6.7.6 Removing Member from NVMf LUN Group

This section explains how to remove member from NVMf LUN group.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Select the desired NVMf LUN group in the **NVMf LUN Groups** tab of the information display area, select the desired LUN in the **LUNs** tab of the extended area, click the <Remove> button, and click the <OK> button in the pop-up confirmation box to complete the configuration.

7.6.8 Managing NVMf Subsystem

7.6.8.1 Creating NVMf Subsystem

This section explains how to create NVMf Subsystem.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Click the <Create> button in the **NVMf Subsystems** tab of the information display area to open the **Create NVMf Subsystem** wizard.

Step 3: The first step of the **Create NVMf Subsystem** wizard is shown in Figure 7-60. Enter NVMf Subsystem parameters (see Table 7-22 for details) and click the <Next> button to enter the next interface.

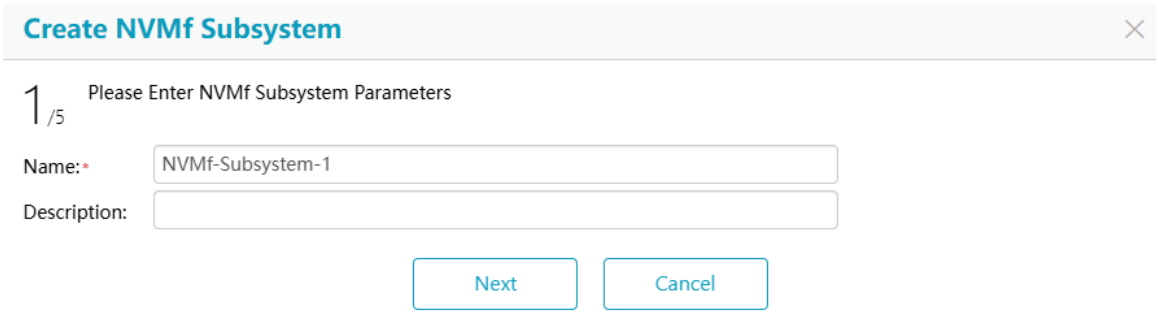

Figure 7-60 Create NVMf Subsystem wizard interface (1)

Table 7-22 Description of the parameters for creating NVMf Subsystem wizard interface (1)

Parameter	Description
Name	It refers to the name of NVMf Subsystem. • Length: 1-63 characters. • Valid character range: [a-zA-Z0-9.-_:]. • It is recommended that the prefix of NVMf Subsystem name is "NVMf-Subsystem-".
Description	It refers to the description of NVMf Subsystem.

Step 4: The second step of the **Create NVMf Subsystem** wizard is shown in Figure 7-61. Select NVMf Host group and click the <Next> button to enter the next interface.

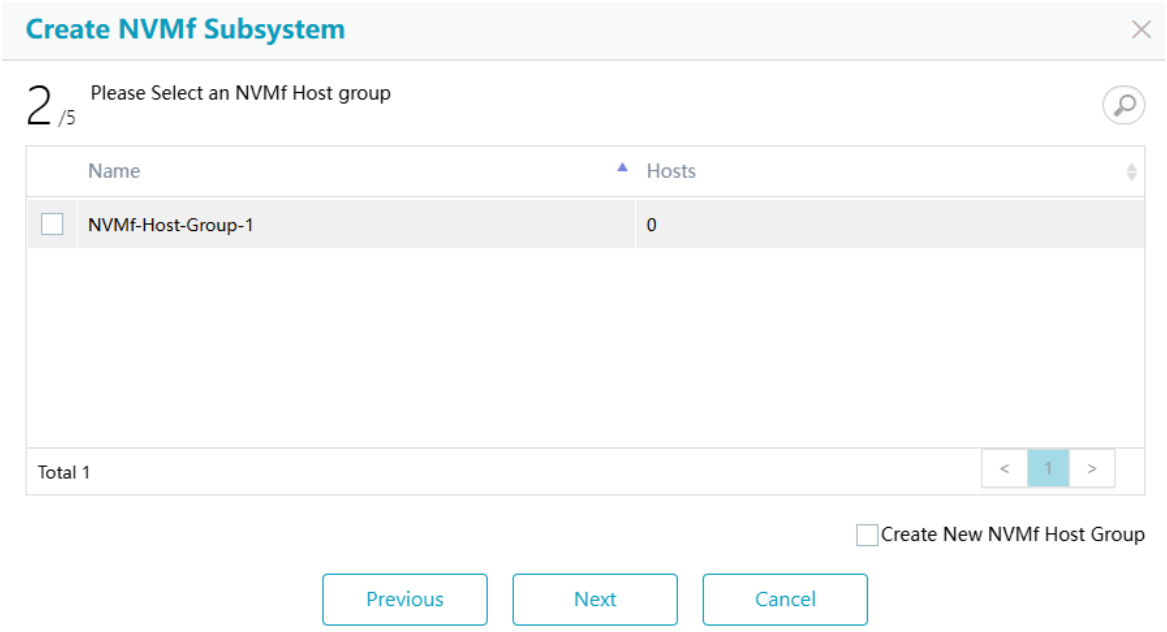

Figure 7-61 Create NVMf subsystem wizard interface (2)

ⓘNOTE

If the NVMf Host group is not created in advance, you can also select the "Create New NVMf Host Group" option to create a new NVMf Host group in this step. In the next step, you will create a new NVMf Host group through extended steps, corresponding to steps 2a/5, 2b/5, etc. For details, see 7.6.4.1 Creating NVMf Host Group.

Step 5: The third step of the **Create NVMf Subsystem** wizard is shown in Figure 7-62. Select NVMf port group and click the <Next> button to enter the next interface.

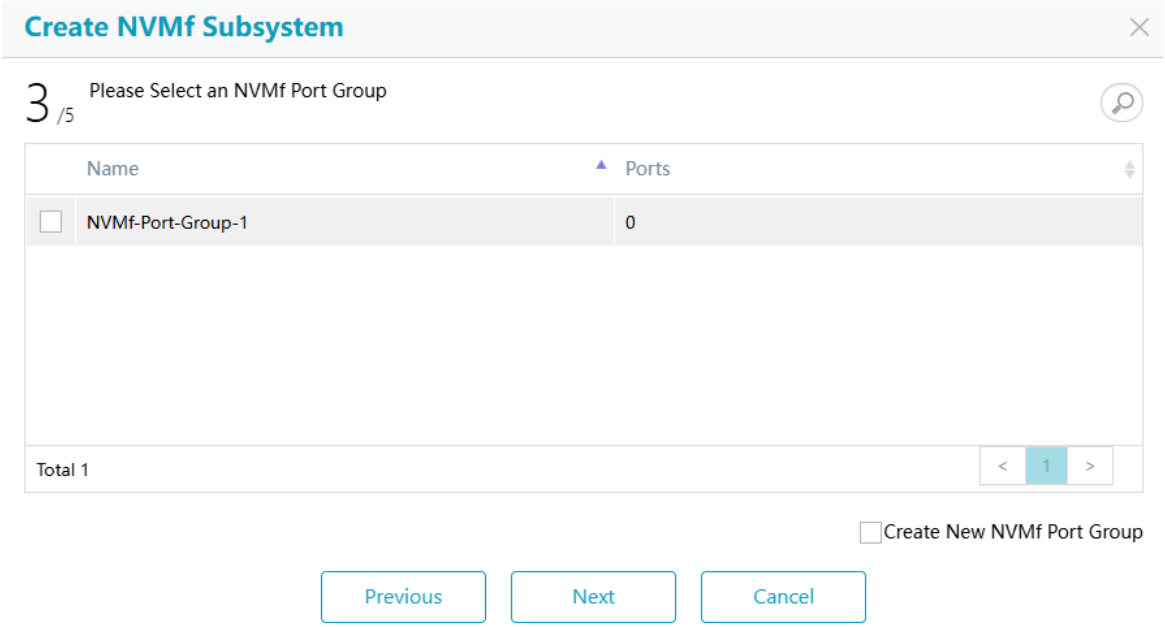

Figure 7-62 Create NVMf subsystem wizard interface (3)

ⓘNOTE

If the NVMf port group is not created in advance, you can also select the "Create New NVMf Port Group" option to create a new NVMf port group in this step. In the next step, you will create a new NVMf port group through extended steps, corresponding to steps 2a/5, 2b/5, etc. For details, see 7.6.6.1 Creating NVMf Port Group.

Step 6: The fourth step of the **Create NVMf Subsystem** wizard is shown in Figure 7-63. Set access rights, select NVMf LUN group, and click the <Next> button to enter the next interface.

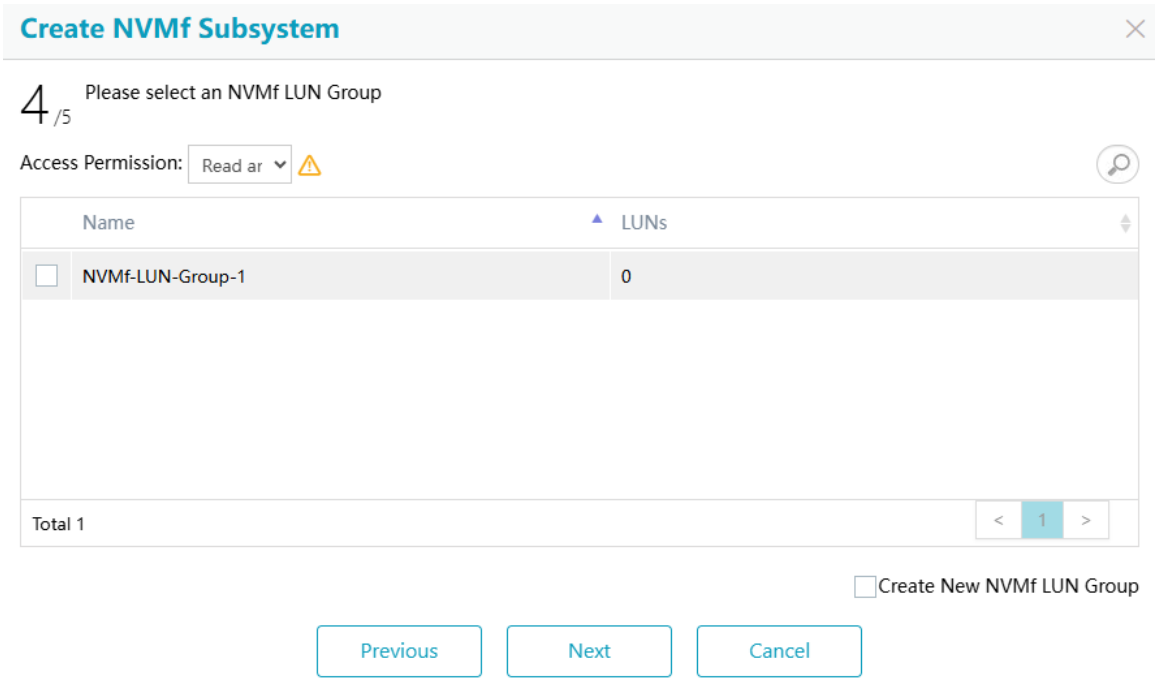

Figure 7-63 Create NVMf subsystem wizard interface (4)

NOTE

If the NVMf LUN group is not created in advance, you can also select the "Create New NVMf LUN Group" option to create a new NVMf LUN group in this step. In the next step, you will create a new NVMf LUN group through extended steps, corresponding to steps 4a/5, 4b/5, etc. For details, see 7.6.7.1 Creating NVMf LUN Group.

Step 7: In the fifth step of the **Create NVMf Subsystem** wizard, you can check the configuration information and click the <Finish> button to complete the configuration.

7.6.8.2 Viewing NVMf Subsystem Properties

This section explains how to view NVMf Subsystem's basic properties.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Select the desired NVMf Subsystem in the **NVMf Subsystems** tab of the information display area and click the <Properties> button to open the **Basic Properties** window. You can view the basic properties of the NVMf Subsystem.

7.6.8.3 Viewing NVMfs

This section explains how to view NVMf Subsystem's connection status.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Select the desired NVMf Subsystem in the **NVMf Subsystems** tab of the information display area and click the <NVMfs> button to open the **NVMfs** window. You can view the connection status of the NVMf Subsystem.

7.6.8.4 Modifying NVMf Subsystem Properties

This section explains how to modify NVMf Subsystem's name and description.

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Select the desired NVMf Subsystem in the **NVMf Subsystems** tab of the information display area and click the <Properties> button to open the **Basic Properties** window, as shown in Figure 7-64. Modify the properties of NVMf Subsystem (see Table 7-22 for details) and click the <OK> button to complete the configuration.

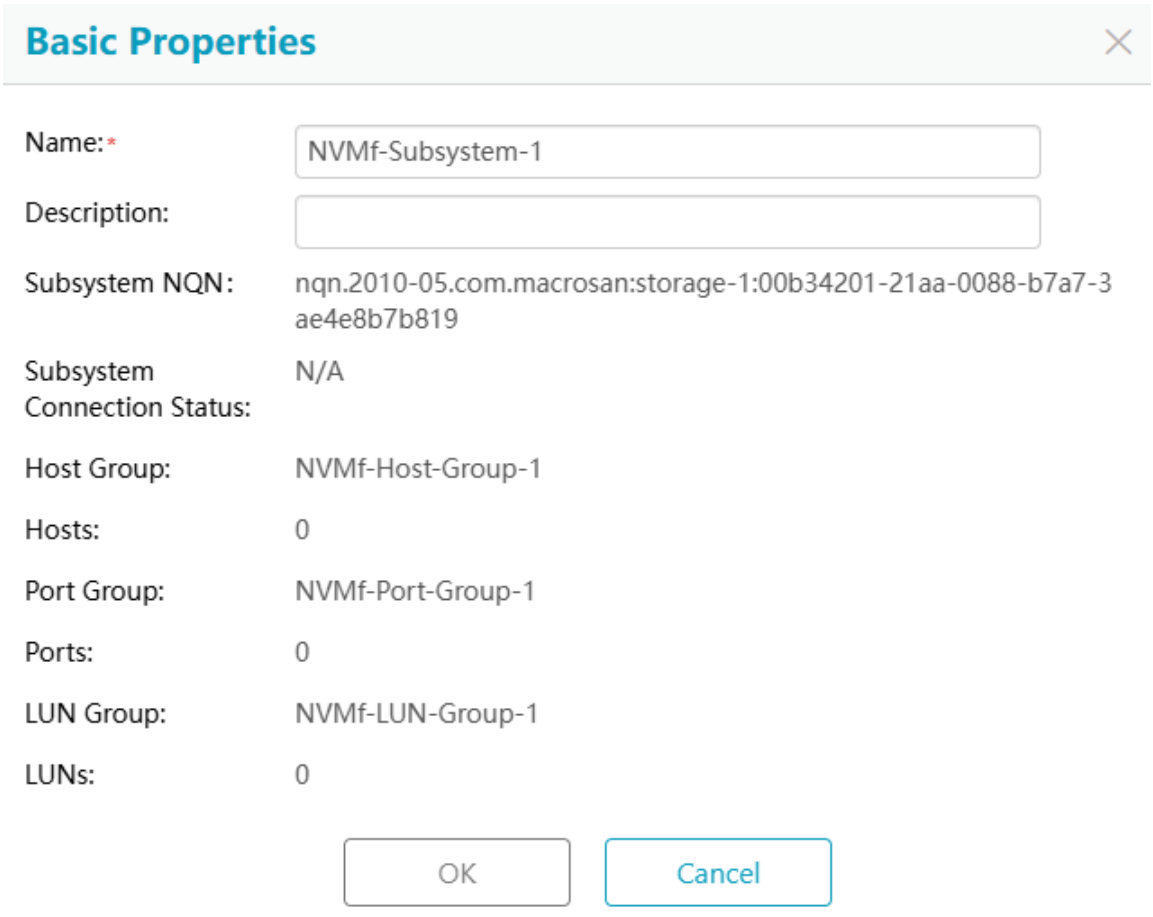

Figure 7-64 NVMf subsystem basic properties interface

7.6.8.5 Deleting NVMf Subsystem

This section explains how to delete NVMf Subsystem.

Prerequisites

The connection status of NVMf Subsystem is "Unconnected".

Steps

Step 1: Select "Client" -> "NVMf" on the navigation tree to open the NVMf interface.

Step 2: Select the desired NVMf Subsystem in the **NVMf Subsystems** tab of the information display area, click the <Delete> button, confirm the object and enter "yes" in the pop-up warning box, and click the <OK> button to complete the configuration.

8 System Managements

8.1 Managing User

8.1.1 Creating User

This section explains how to create user.

Prerequisites

Only admin user can create user.

Steps

Step 1: Select "System" -> "User" on the navigation tree to open the user interface.

Step 2: Click the <Create> button in the **Users** tab of the information display area to open the **Create User** window, as shown in Figure 8-1. Enter user parameters (see Table 8-1 for details) and click the <OK> button to complete the configuration.

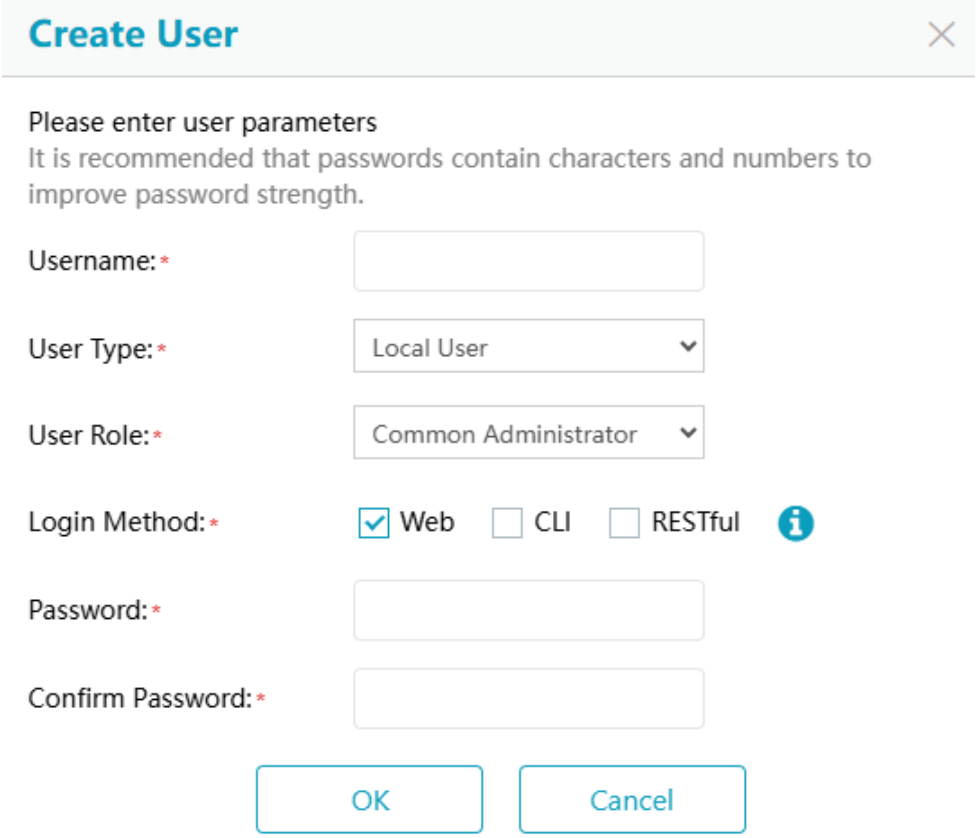

Figure 8-1 Create user interface

Table 8-1 Description of the parameters for creating user interface

Parameter	Description
Username	It refers to the name of user. • Length: 1-31 characters. • Valid character range: [a-zA-Z0-9.-_], it cannot be pure numbers or system reserved users (such as root, etc.).
User Type	It refers to the type of user, including local user, LDAP user and LDAP user group. • If the created user type is local user, please set the user password. • If the created user type is LDAP user or LDAP user group, please set the LDAP service in System Setting. For the setting method, see 8.4.3 Setting LDAP Service Parameters.
User Role	It refers to the role of user, including common administrator and monitor administrator.
Login Method	It refers to the login method of user, including WEB, CLI, and RESTful.
Password	It refers to the password of user. Please set password for local user. • Length: 1-31 characters. • Valid character range: [a-zA-Z0-9.-_:,!@#%&*()] and space is not supported.
Confirm Password	It refers to the confirmation of password, which must be the same as

	"Password".

8.1.2 Viewing User

8.1.2.1 Viewing User information

This section explains how to view user's information.

Steps

Step 1: Select "System" -> "User" on the navigation tree to open the user interface.

Step 2: You can view the user information in the **Users** tab of the information display area.

8.1.2.2 Viewing Current Login Session

This section explains how to view current login session.

Steps

Step 1: Select "System" -> "User" on the navigation tree to open the user interface.

Step 2: You can view the current login session in the extended area.

8.1.3 Modifying User

8.1.3.1 Modifying User Password

This section explains how to modify user's password.

ⓘNOTE

- Admin user can modify all users' password. You are required to enter the old password when modifying the password of the admin user.
- For non-admin user, please refer to 5.2.3.4 Modifying User Password to modify current password.

Steps

Step 1: Select "System" -> "User" on the navigation tree to open the user interface.

Step 2: Select the desired user in the **Users** tab of the information display area and click the <Change Password> button to open the **Change User Password** window, as shown in Figure 8-2. Enter relevant parameters and click the <OK> button to complete the configuration.

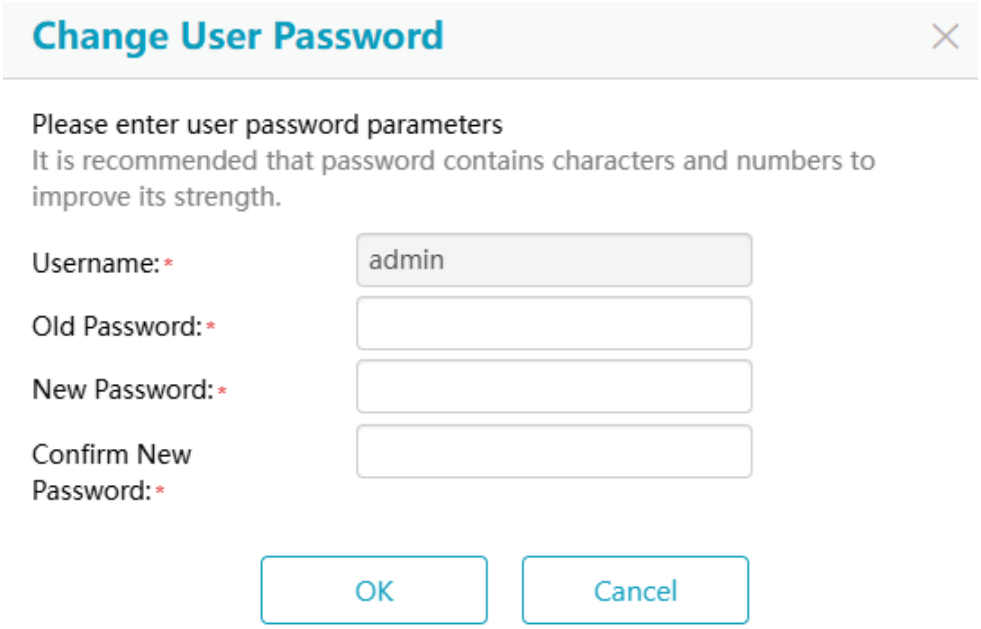

Figure 8-2 Change user password interface

8.1.3.2 Modifying User Login Method

This section explains how to modify user login method.

Prerequisites

Only admin user can modify user login method.

Steps

Step 1: Select "System" -> "User" on the navigation tree to open the user interface.

Step 2: Select the desired user in the **Users** tab of the information display area and click the <Modify Login Method> button to open the **Modify User Login Method** window, as shown in Figure 8-3. Modify user login method and click the <OK> button to complete the configuration.

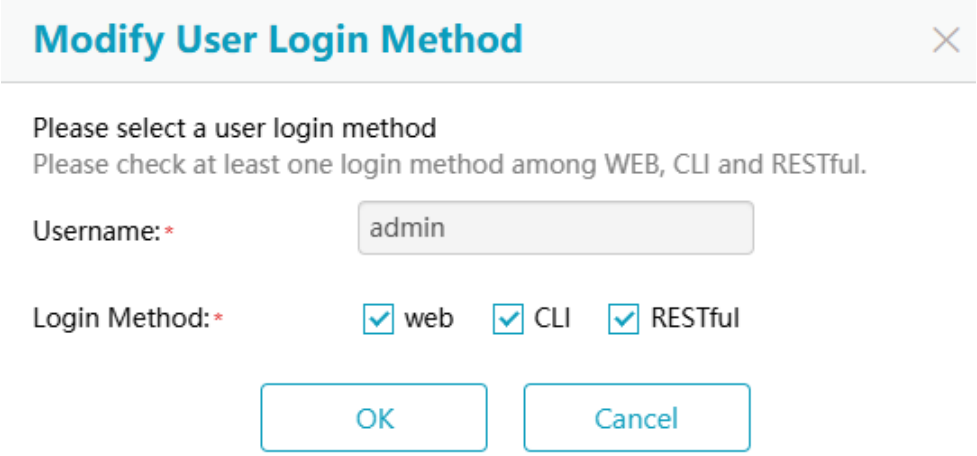

Figure 8-3 Modify user login method interface

8.1.4 Locking User

This section explains how to lock user manually.

Prerequisites

Only admin user can lock other users.

Steps

Step 1: Select "System" -> "User" on the navigation tree to open the user interface.

Step 2: Select the desired user in the **Users** tab of the information display area, click the <Lock> button, and click the <OK> button in the pop-up confirmation box to complete the configuration.

8.1.5 Unlocking User

This section explains how to unlock the locked user manually.

ⓘNOTE

If the admin user is locked, it will be automatically unlocked after the locked period.

Prerequisites

Only admin user can unlock other users.

Steps

Step 1: Select "System" -> "User" on the navigation tree to open the user interface.

Step 2: Select the desired user in the **Users** tab of the information display area, click the <Unlock> button, and click the <OK> button in the pop-up confirmation box to complete the configuration.

8.1.6 Deleting User

This section explains how to delete user.

Prerequisites

Admin user cannot be deleted.

Steps

Step 1: Select "System" -> "User" on the navigation tree to open the user interface.

Step 2: Select the desired user in the **Users** tab of the information display area, click the <Delete> button, confirm the object and enter "yes" in the pop-up warning box, and click the <OK> button to complete the configuration.

8.2 Managing Role

ⓘNOTE

Operation authority of ODSP storage device is controlled by roles. After joining a role, the user has the operation authority on it, which can be chosen from the inside roles first. A new role can be created if the inside role does not meet the requirements. There are three inside roles as follows:

- Super administrator: It is the admin user, who can log in to the storage device for management with all management rights.
- Common administrator: It can log in to the storage device for management, but cannot perform some restricted operations, such as user management, upgrade, one-click destruction, setting login security operations and usage security parameters, etc.
- Monitor administrator: It can log in to the storage device to view device configuration and running status and has no other management rights.
- Tenant administrator: It can log in to the tenant view interface for management and has all management rights on this tenant.
- Tenant read-only administrator: It can log in to the tenant view interface to view tenant configuration and running status and has no other management rights.

8.2.1 Creating Role

This section explains how to create role.

Steps

Step 1: Select "System" -> "User" on the navigation tree to open the user interface.

Step 2: Click the <Create> button in the **Roles** tab of the information display area to open the **Create Role** window, as shown in Figure 8-4. Enter relevant parameters (see Table 8-2 for details) and click the <OK> button to complete the configuration.

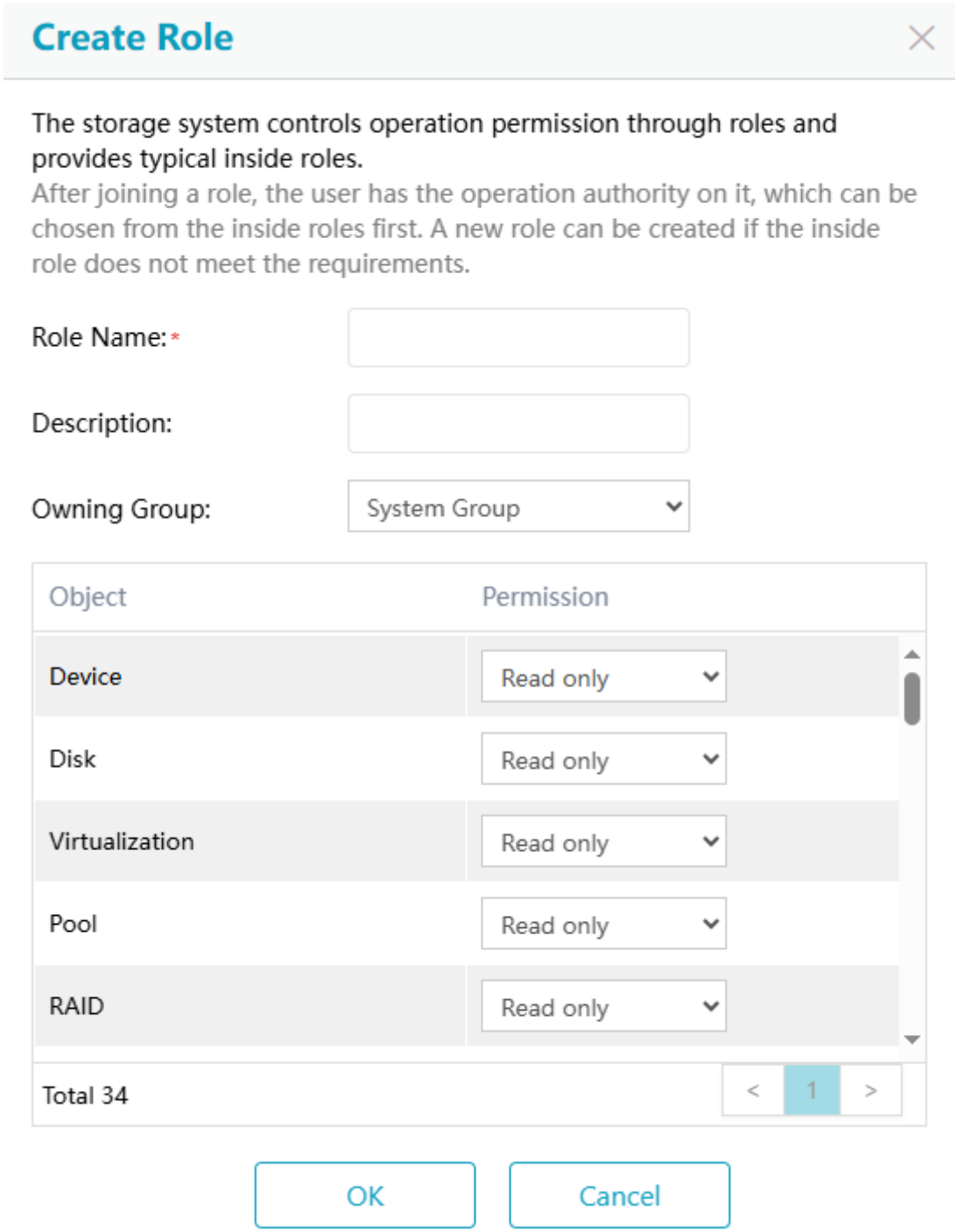

Figure 8-4 Create role interface

Table 8-2 Description of the parameters for creating role interface

Parameter	Description
Role Name	It refers to the name of role. • Length: 1-31 characters. • Valid character range: [a-zA-Z0-9.-_] and spaces are not supported.
Description	It refers to the description of role.

Owning Group	It refers to the owning group of role, including system group and tenant group.
Permission	It refers to the operating permission of role, including read and write, read only and invisible.

8.2.2 Viewing Role Properties

This section explains how to view role's basic properties.

Steps

Step 1: Select "System" -> "User" on the navigation tree to open the user interface.

Step 2: Select the desired role in the **Roles** tab of the information display area and click the <Properties> button to open the **Basic Properties** window. You can view the basic properties of the role.

8.2.3 Modifying Role Properties

This section explains how to modify role's name, description and permission.

Prerequisites

Inside roles' properties cannot be modified.

Steps

Step 1: Select "System" -> "User" on the navigation tree to open the user interface.

Step 2: Select the desired role in the **Roles** tab of the information display area and click the <Properties> button to open the **Basic Properties** window, as shown in Figure 8-5. Modify the properties of role (see Table 8-2 for details) and click the <OK> button to complete the configuration.

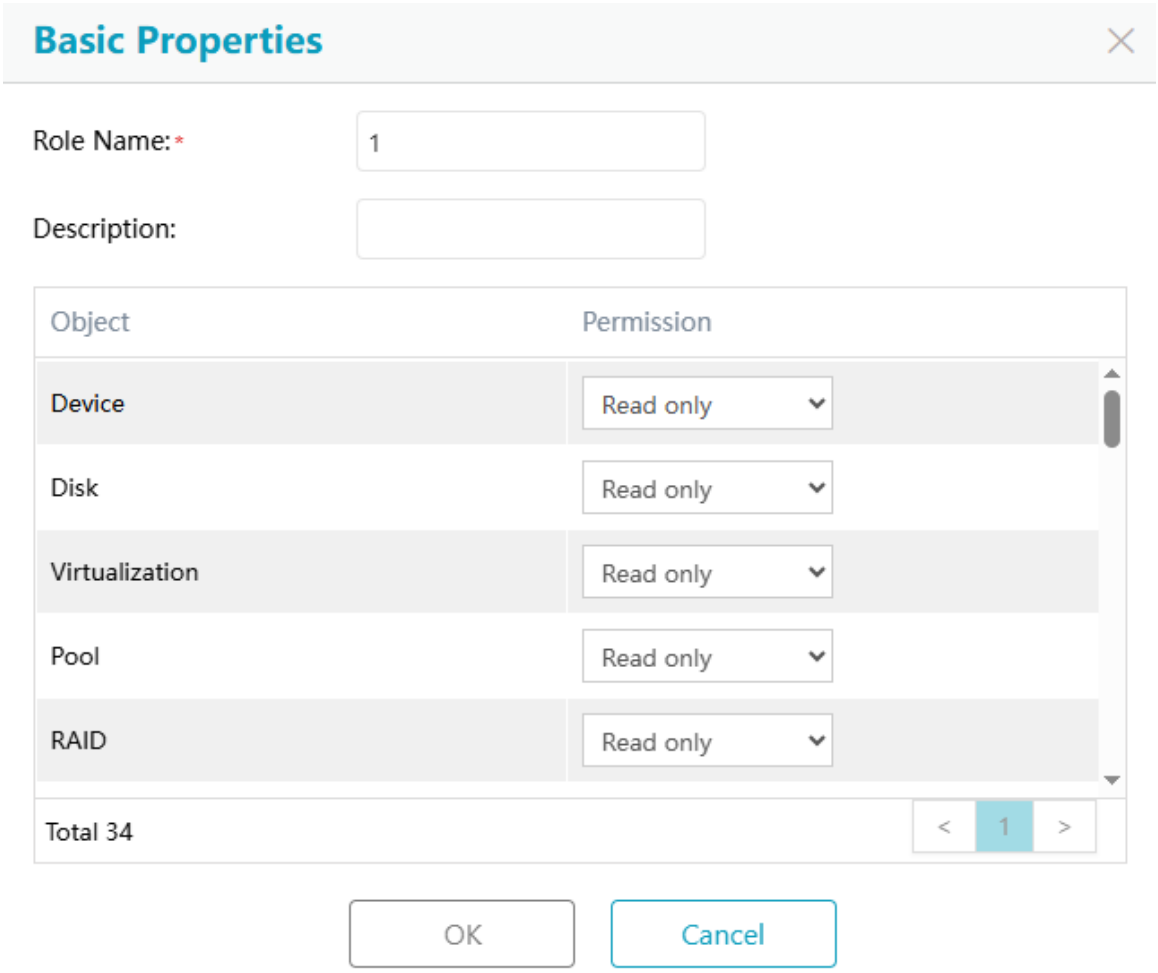

Figure 8-5 Role basic properties interface

8.2.4 Deleting Role

This section explains how to delete role.

Prerequisites

Inside roles cannot be deleted.

Steps

Step 1: Select "System" -> "User" on the navigation tree to open the user interface.

Step 2: Select the desired role in the **Roles** tab of the information display area, click the <Delete> button, and click the <OK> button in the pop-up confirmation box to complete the configuration.

8.3 Managing License

8.3.1 Activating License

This section explains how to activate license.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <License Setting> button to open the **License Setting** window, as shown in Figure 8-6. Enter valid license key and click the <Activate> button to complete the configuration.

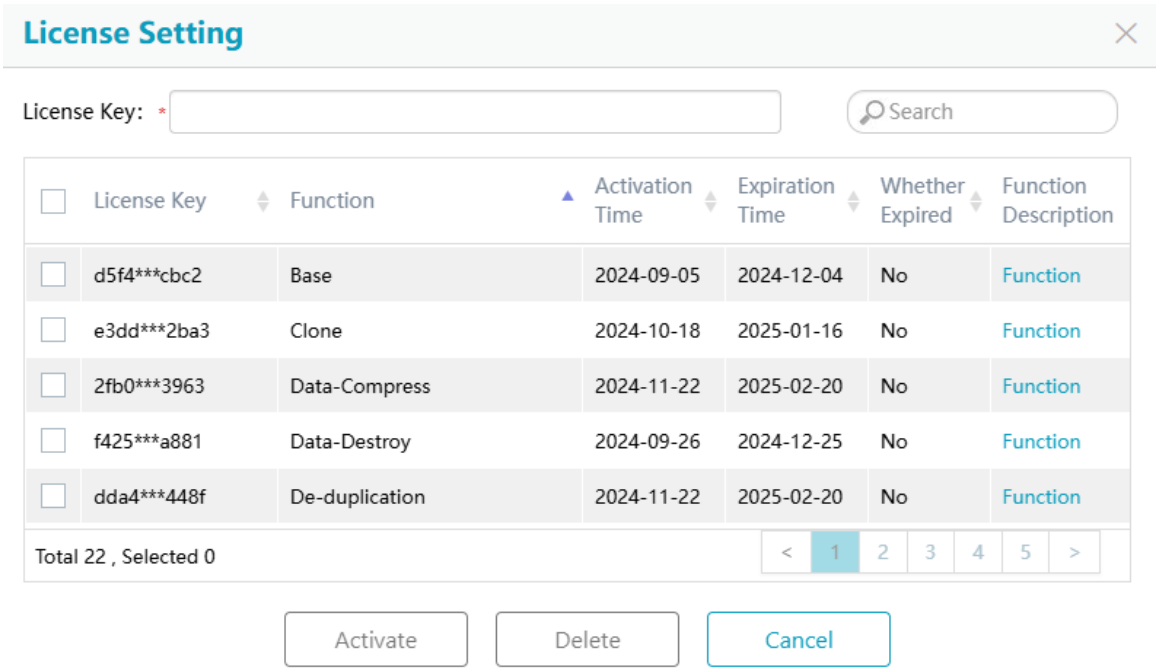

Figure 8-6 License setting interface

8.3.2 Viewing License Information

This section explains how view activated license and expiration information.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <License Setting> button to open the **License Setting** window and you can view the license information in the license list.

8.3.3 Deleting License

This section explains how to delete expired or unneeded license.

⚠CAUTION

Deleting licenses may cause corresponding functions work improperly. Please operate with caution.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <License Setting> button to open the **License Setting** window, as shown in Figure 8-6. Select the desired license key, click the <Delete> button, enter "yes" in the pop-up warning box, and click the <OK> button to complete the configuration.

8.4 System Settings

8.4.1 Setting Login Security Parameters

ⓘNOTE

Only admin user can set login security parameters.

8.4.1.1 Setting Login Password Validity Period

This section explains how to set login password validity period.

ⓘNOTE

- Password validity period is the effective time of the new password after the user is created or the password is modified by user.
- The user can no longer be logged in to the device when corresponding password is expired. You need to contact to admin user to reset new password.
- A new password of admin user need to be reset to continue to log in when corresponding password is expired.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <System Setting> button to open the **System Setting** window and select "Set Login Security" -> "Set the Login Password Validity Period", as shown in Figure 8-7. Set login password validity period and click the <Apply> button to complete the configuration.

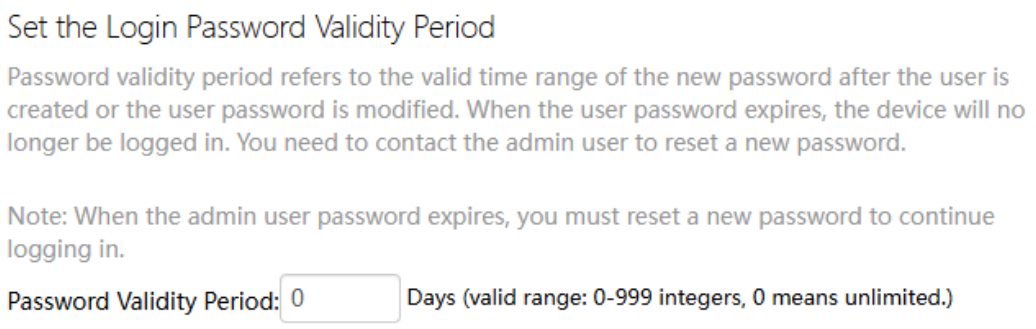

Figure 8-7 Set the login password validity period interface

8.4.1.2 Setting Login Failure Lockout Threshold

This section explains how to set login failure lockout threshold and admin user auto-unlocking time.

ⓘNOTE

- A wrong user password leads to a faulty login. When the number of consecutive login failures reaches the login failure threshold, the user will be locked and cannot log in to the device again. You need to contact to admin user to unlock it.
- The admin user will also be locked when the number of failed logins reaches the threshold, and will be automatically unlocked after the lock time period.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <System Setting> button to open the **System Setting** window and select "Set Login Security" -> "Set Login Failure Lockout Threshold", as shown in Figure 8-8. Set login failure lockout threshold and admin user auto-unlocking time and click the <Apply> button to complete the configuration.

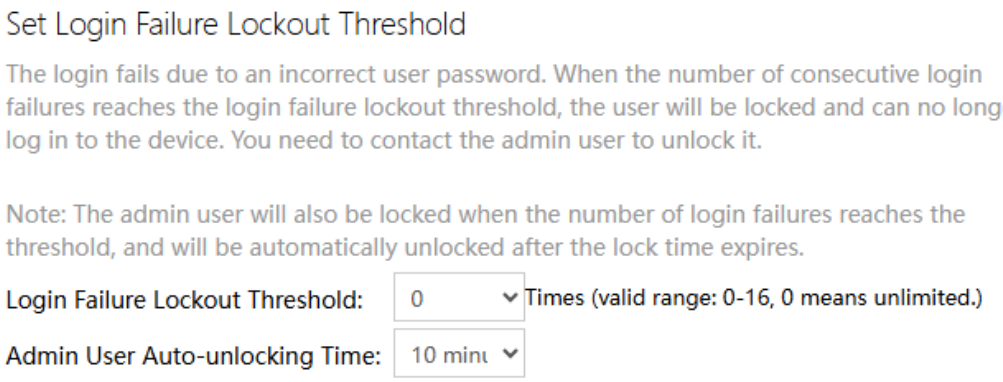

Figure 8-8 Set login failure lockout threshold interface

8.4.1.3 Setting Login Time Range

This section explains how to set login time range.

ⓘNOTE

- The user is allowed to log in during the set login time range only.
- The login time range is also judged for admin user.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <System Setting> button to open the **System Setting** window and select "Set Login Security" -> "Set Login Time Range", as shown in Figure 8-9. Set login time range and click the <Apply> button to complete the configuration.

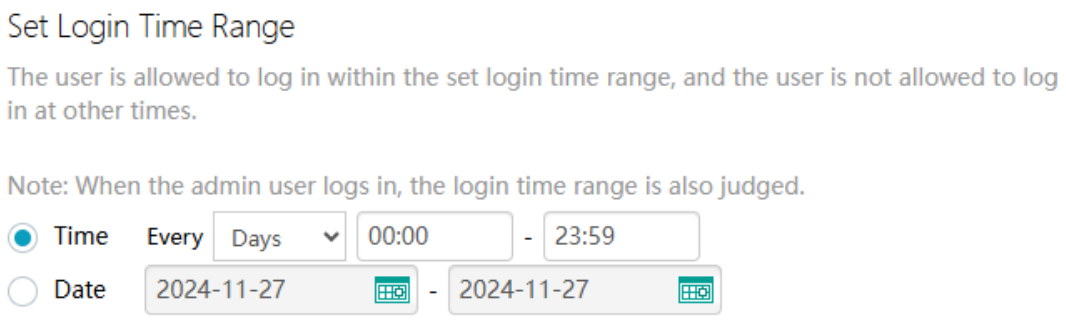

Figure 8-9 Set login time range interface

8.4.1.4 Setting Login Management PC ID

This section explains how to set login management PC ID.

ⓘNOTE

- User is allowed to log in only when the management PC ID is within the set range.
- Management PC ID is also judged for the login of admin user.
- The identifier 0.0.0.0/0.0.0.0 indicates the entire network segment.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <System Setting> button to open the **System Setting** window and select "Set Login Security" -> "Set Login Management PC ID", as shown in Figure 8-10. Click the <+> or <-> button to add or remove management PC ID and click the <Apply> button to complete the configuration.

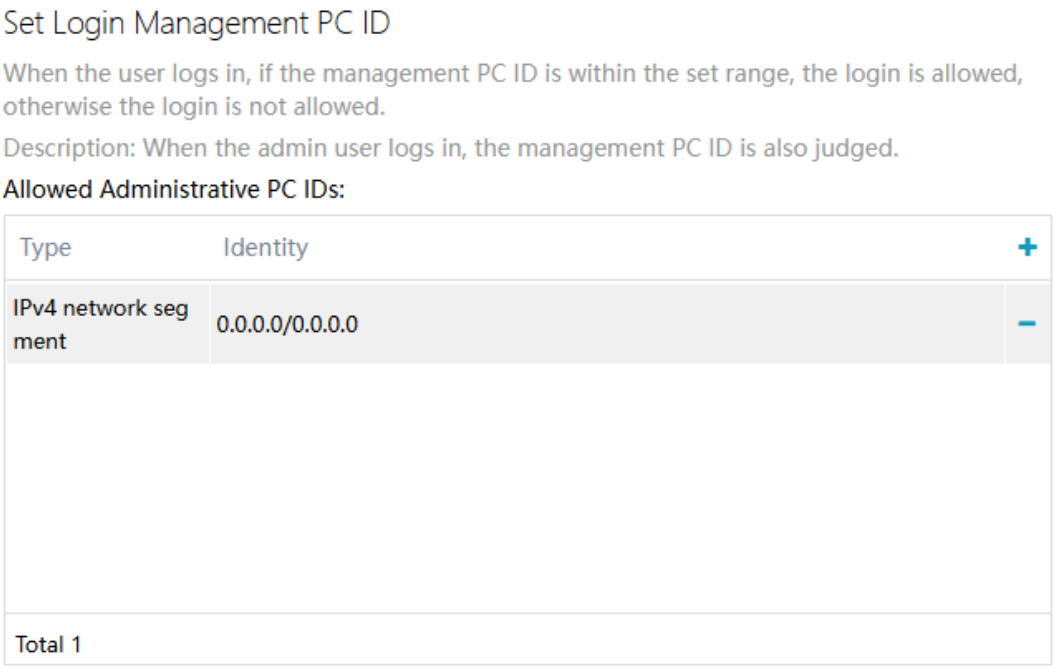

Figure 8-10 Set login management PC ID interface

8.4.1.5 Setting Business Port Login Switch

This section explains how to enable or disable business port switch.

ⓘNOTE

- If the business port login switch is disabled, you can only log in to the device through the management port.
- Business port login switch is also judged for admin user.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <System Setting> button to open the **System Setting** window and select "Set Login Security" -> "Set Business Port Login Switch", as shown in Figure 8-11. Enable or disable business port login switch and click the <Apply> button to complete the configuration.

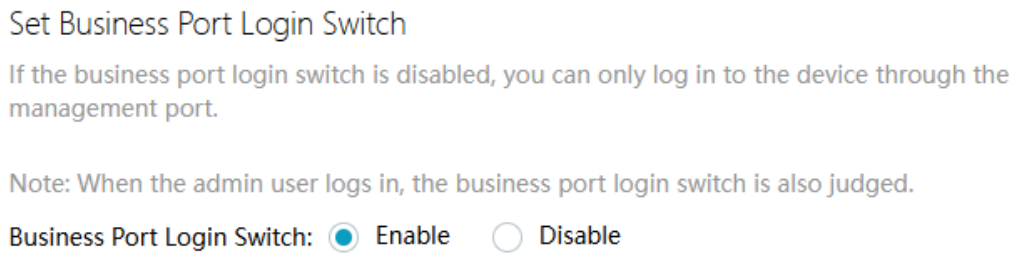

Figure 8-11 Set business port login switch interface

8.4.2 Setting Usage Security Parameters

ⓘNOTE

Only admin users can set usage security parameters.

8.4.2.1 Setting User Password Complexity Rules

This section explains how to set user password complexity rules,.

ⓘNOTE

The new password will be checked according to the specified user password complexity rules when creating a user or modifying a user password.

- Low complexity: The number of characters is 1-31 without special requirements.
- High complexity: The number of characters is 10-31, and it must include special characters, uppercase, lowercase and numbers.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <System Setting> button to open the **System Setting** window and select "Set Usage Security" -> "Set Password Complexity", as shown in Figure 8-12. Set password complexity and click the <Apply> button to complete the configuration.

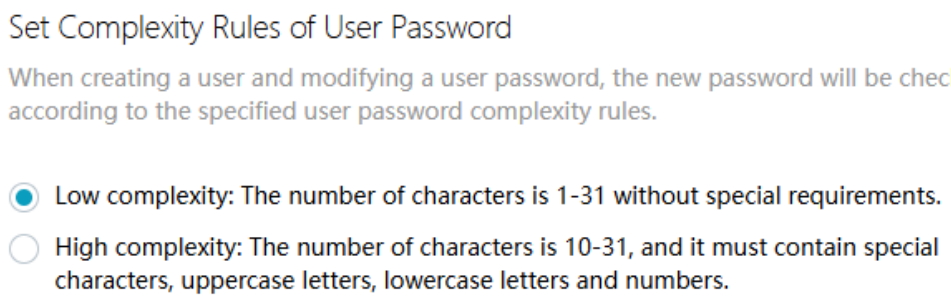

Figure 8-12 Set complexity rules of user password interface

8.4.2.2 Setting User Duplicate Password Check Range

This section explains how to set user duplicate password check range.

ⓘNOTE

If the user duplicate password check range value is n, the new password will be compared to see if it is the same as any of the n passwords recently used during modifying user password, and if yes, a new entry will be required.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <System Setting> button to open the **System Setting** window and select "Set Usage Security" -> "Set Password Duplicate Check", as shown in Figure 8-13. Set duplicate password check range and click the <Apply> button to complete the configuration.

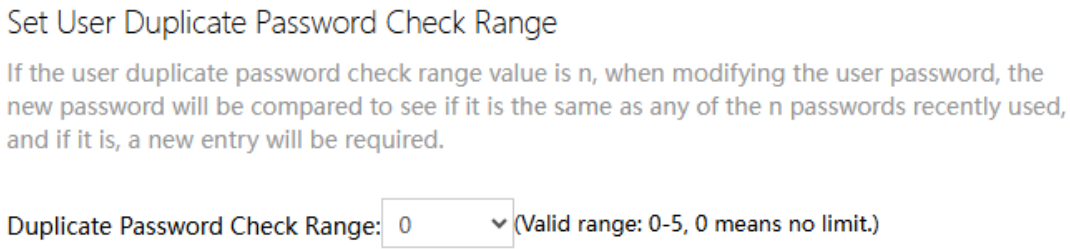

Figure 8-13 Set user duplicate password check range interface

8.4.2.3 Setting Audit Log Switch

This section explains how to enable or disable audit log switch.

ⓘNOTE

Configuration is performed by client after audit log switch is enabled, and the audit log will be recorded regardless of success or failure.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <System Setting> button to open the **System Setting** window and select "Set Usage Security" -> "Set Audit Log Switch", as shown in Figure 8-14. Set audit log switch and click the <Apply> button to complete the configuration.

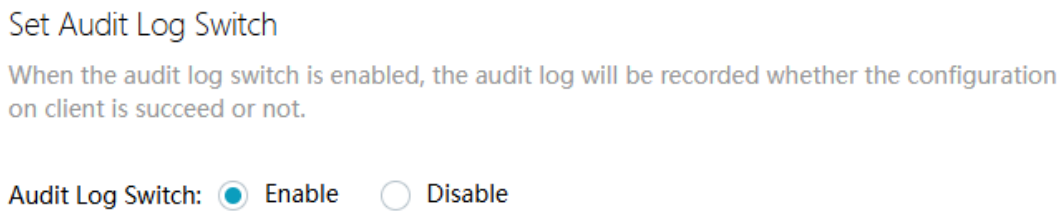

Figure 8-14 Set audit log switch interface

8.4.2.4 Setting the Switch for Auto Restart after Abnormal Power Failure

This section explains how to enable or disable the switch for auto restart after abnormal power failure.

⚠CAUTION

If the switch for auto restart after abnormal power failure is enabled in the case of abnormal power failure, deice will automatically be restarted after the power supply is restored.

Prerequisites

Before modifying the switch for auto restart after abnormal power failure, please ensure that all SPs are in place to avoid inconsistent configurations on multiple SPs.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <System Setting> button to open the **System Setting** window and select "Set Usage Security" -> "Set Power Failure Restart", as shown in Figure 8-15. Click the <Enable all> or <Disable all> button to enable or disable the switch and click the <Apply> button to complete the configuration.

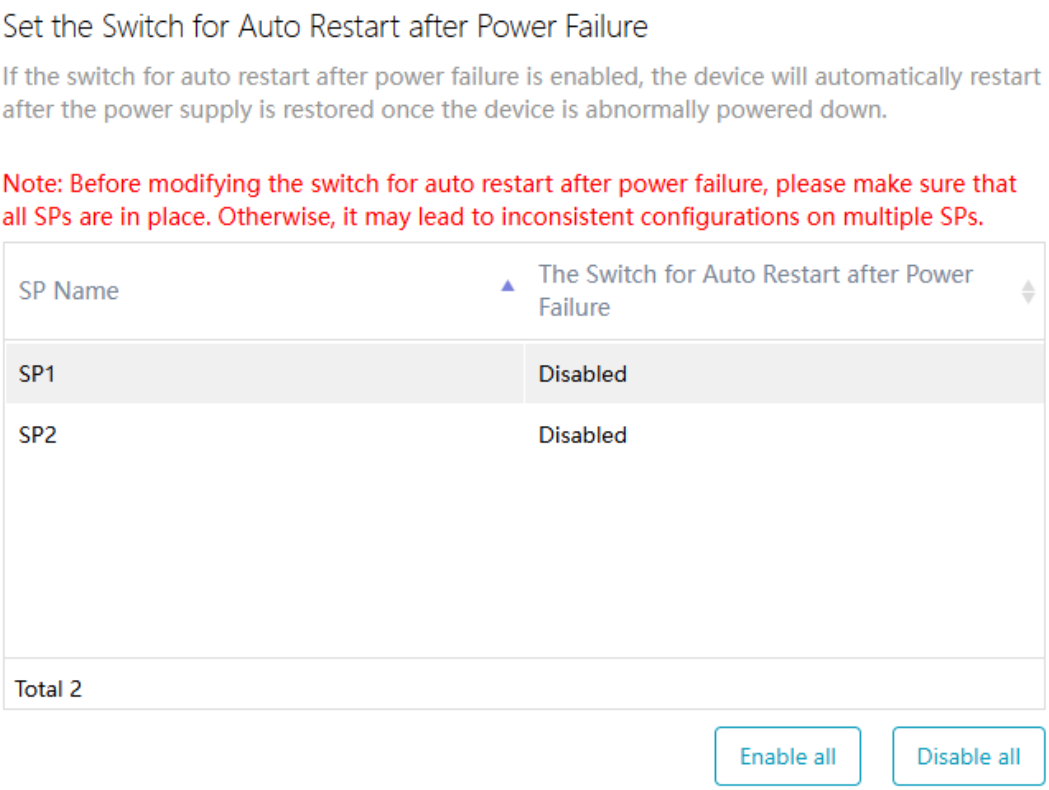

Figure 8-15 Set the switch for auto restart after power failure interface

8.4.2.5 Setting SSH Service Switch

This section explains how to enable or disable SSH service switch.

⚠CAUTION

After disabling the SSH service switch, the storage cannot be connected through SSH tools.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <System Setting> button to open the **System Setting** window and select "Set Usage Security" -> "Set SSH Service Switch", as shown in Figure 8-16. Enable or disable SSH service switch and click the <Apply> button to complete the configuration.

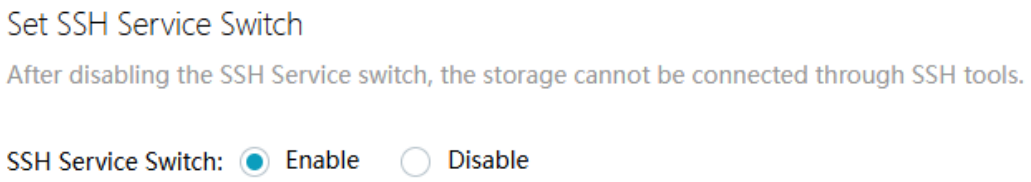

Figure 8-16 Set SSH service switch interface

8.4.3 Setting LDAP Service Parameters

This section explains how to set LDAP service parameters.

Prerequisites

Only admin user can set LDAP service parameters.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <System Setting> button to open the **System Setting** window and select "Set LDAP Service Parameters", as shown in Figure 8-17. Enter relevant parameters (see Table 8-3 for details) and click the <Apply> button to complete the configuration.

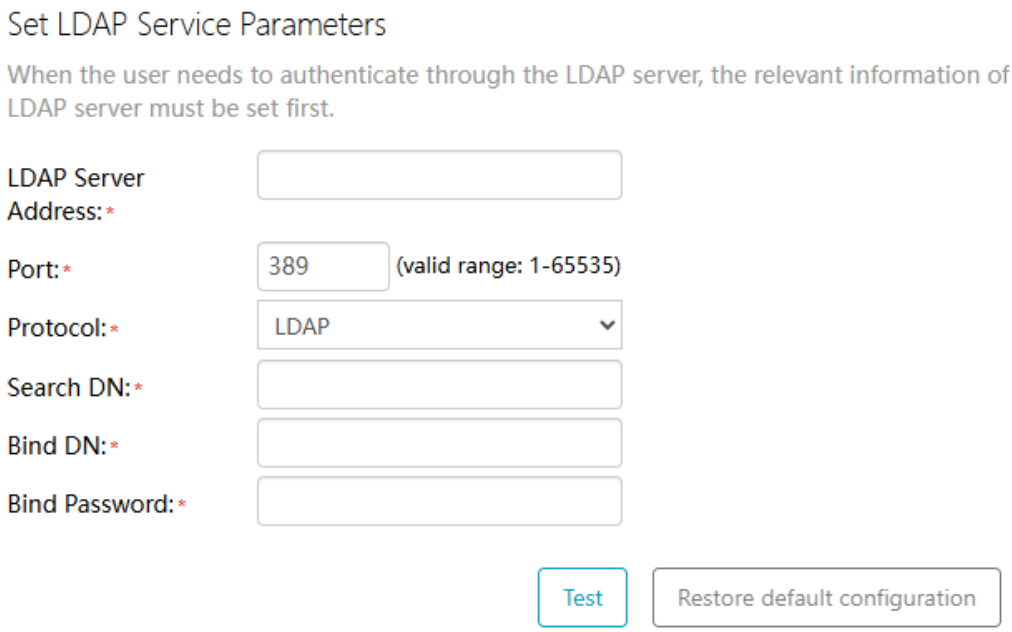

Figure 8-17 Set LDAP service parameters interface

Table 8-3 Description of the parameters for setting LDAP service

Parameter	Description
LDAP Server Address	It refers to the IP address of LDAP server.
Port	It refers to the port number of LDAP server. Valid range: 1-65535.
Protocol	It refers to the protocols adopted by LDAP server, including LDAP and LDAPS.
Import Certificate	The certificate is used to verify the identity of the LDAP server. Uploading an incorrect certificate file will result in the inability to connect to the LDAP server. When the protocol is LDAPS, certificates need to be imported.
Search DN	It refers to DN used for LDAP searches.
Bind DN	It refers to DN bind by LDAP searches..

Bind Password	It refers to the password of bind DN. Length: 1-64 characters.

8.4.4 Setting MO SSO Parameters

This section explains how to set MO SSO parameters.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <System Setting> button to open the **System Setting** window and select "Set MO SSO Parameters", as shown in Figure 8-17. Enter relevant parameters (see Table 8-3 for details) and click the <Apply> button to complete the configuration.

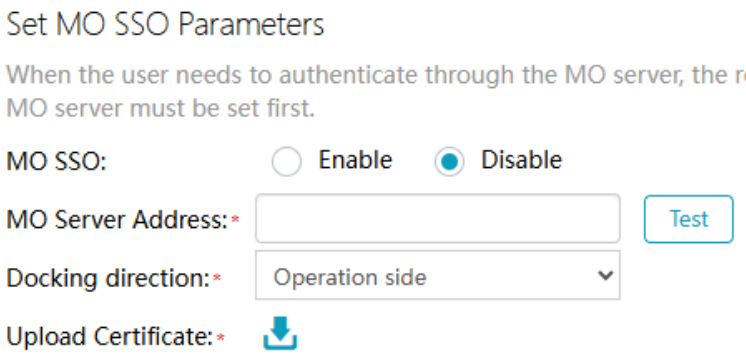

Figure 8-18 Set MO SSO parameters interface

Table 8-4 Description of the parameters for setting MO SSO

Parameter	Description
MO SSO	It refers to enabling or disabling MO SSO switch.
MO Server Address	It refers to the IP address of MO server.
Docking direction	It refers to the docking direction of MO server, including operation side and operation and maintenance surface.
Upload Certificate	The certificate is used to verify the identity of the MO server. Uploading an incorrect certificate file will result in a failure to connect to the MO server.

8.4.5 Setting Global Parameters of Hot Spare Disk

This section explains how to enable or disable blank disk hot spare switch.

ⓘNOTE

After enabling blank disk hot spare, if there is no available dedicated hot spare disk or global hot spare disk for RAID rebuild, the blank disk in the storage device that meets the requirements will be used and there is no need to manually set the disk as a hot spare disk.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <System Setting> button to open the **System Setting** window and select "Set Global Parameters of Hot Spare", as shown in Figure 8-19. Enable or disable blank disk hot spare and click the <Apply> button to complete the configuration.

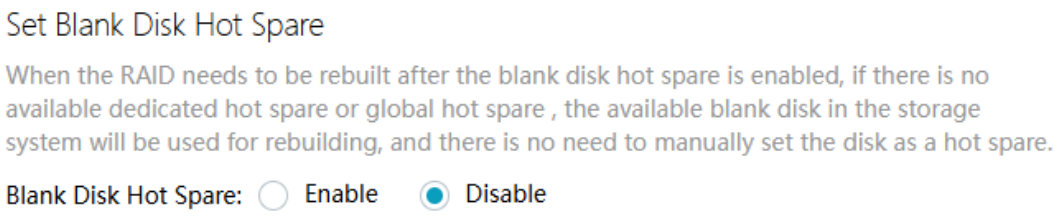

Figure 8-19 Set blank disk hot spare interface

8.4.6 Setting Global Cache Parameters

This section explains how to set global cache parameters.

ⓘNOTE

The actual status of the LUN write cache is jointly determined by the settings of LUN write cache, the global write cache, the status of the controller and the battery status:

- Enabling or disabling LUN write cache only affects the write cache status of a single LUN.
- If the global write cache is disabled, the write cache of all LUNs in the storage device will be automatically disabled.
- When a single controller is in place, opening the write cache indicates that the presence of a single controller does not affect the global write cache state. Closing the write cache for 24-hour indicates that the global write cache is automatically disabled after a single controller has been in place for 24 hours. Immediately closing the write cache indicates that the write cache is immediately disabled when a single controller is in place.
- When the battery is unavailable, opening write cache indicates that the unavailable battery module does not affect the global cache state. To close the write cache, it is necessary to determine whether the number of available battery modules is greater than or equal to the required number of battery modules. If so, it indicates that the unavailable battery module does not affect the global write cache status. Otherwise, the write cache should be disabled immediately.

⚠CAUTION

Disabling global write cache will disable the write cache of all LUNs in the storage device. Please set the global write cache to "Enable" unless there are special requirements.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <System Setting> button to open the **System Setting** window and select "Set Global Cache Parameters", as shown in Figure 8-20. Set global cache parameters and click the <Apply> button to complete the configuration.

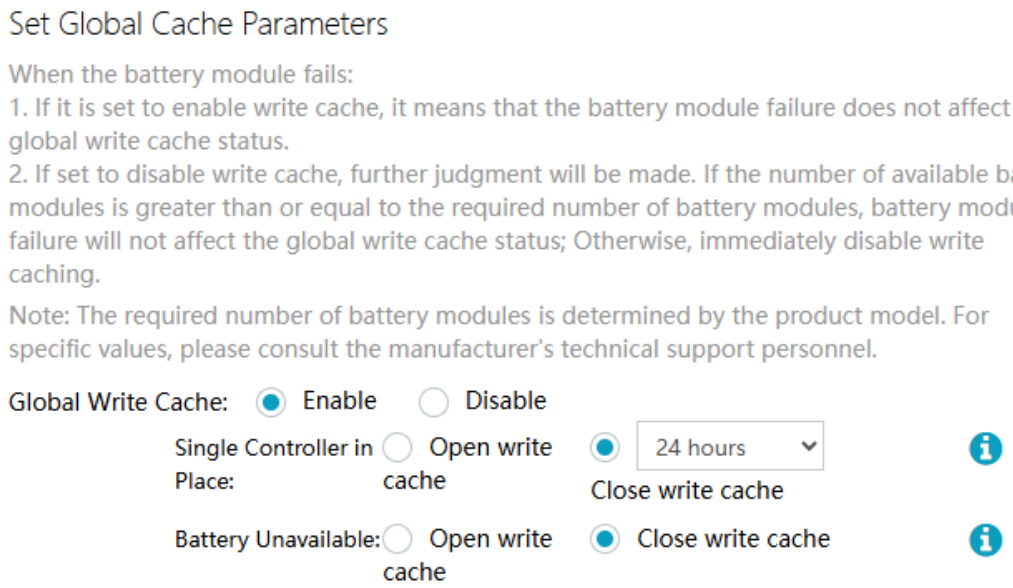

Figure 8-20 Set global cache parameters interface

8.4.7 Setting SMI-S

This section explains how to enable or disable SMI-S.

ⓘNOTE

If you need to query device information through SMI-S service, please enable SMI-S function first.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <System Setting> button to open the **System Setting** window and select "Configure SMI-S", as shown in Figure 8-21. Enable or disable SMI-S and click the <Apply> button to complete the configuration.

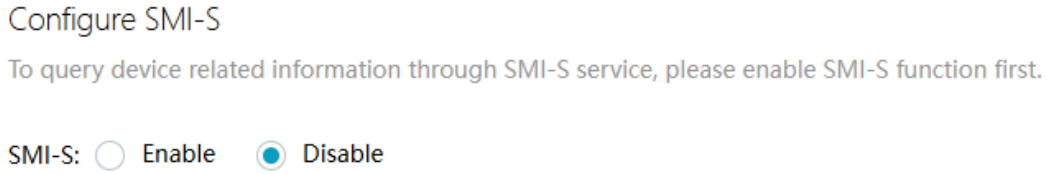

Figure 8-21 Configure SMI-S interface

8.4.8 Setting IDSM

This section explains how to enable or disable IDSM.

ⓘNOTE

If devices need to be monitored by the IDSM in a unified manner, enable the IDSM function first so that the IDSM server can receive alarms from devices in real time.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <System Setting> button to open the **System Setting** window and select "Configure IDSM", as shown in Figure 8-22. Enable or disable IDSM and click the <Apply> button to complete the configuration.

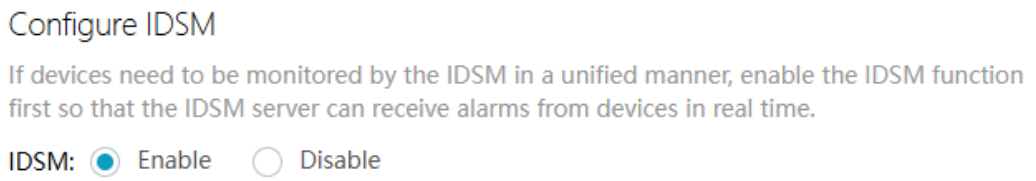

Figure 8-22 Configure IDSM interface

8.4.9 Configuring Network

8.4.9.1 Configuring Default Gateway

This section explains how to configure default gateway address.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <System Setting> button to open the **System Setting** window and select "Configure Network" -> "Configure Default Gateway", as shown in Figure 8-23. Enter default gateway address and click the <Apply> button to complete the configuration.

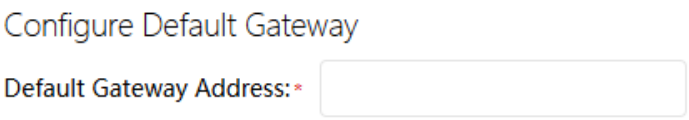

Figure 8-23 Configure default gateway interface

8.4.9.2 Configuring Aggregate Port Mode

This section explains how to modify aggregate port mode.

⚠CAUTION

All aggregate ports will be restarted automatically after modifying aggregation mode, which will cause connection interruption of the client server. Please operate with caution.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <System Setting> button to open the **System Setting** window and select "Configure Network" -> "Configure Aggregate Port Mode", as shown in Figure 8-24. Select the aggregate port mode that meets the requirements (see Table 8-5 for details) and click the <Apply> button to complete the configuration.

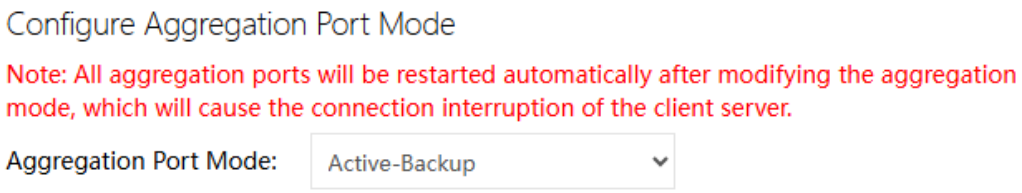

Figure 8-24 Configure aggregate port mode interface

Table 8-5 Aggregate port mode description

Aggregate port mode	Description
Active-Backup	It refers that one of the members in the aggregate port is in the active state, and the other members are in the hot standby state. The business runs only in the active members. When the link of the active member fails, a hot standby member is automatically converted to the active member to continue running the business.
Balance-RR	It refers that the business runs in all members of the aggregate port, and network packets are transmitted on multiple members in a cyclic manner.
802.3ad	It refers to the aggregation mode that complies with the IEEE 802.3ad specification. **⚠CAUTION** If the aggregate port of the storage device adopts the 802.3ad mode, the corresponding port on the switch must also be configured in the 802.3ad mode.

8.4.9.3 Configuring DNS

This section explains how to configure DNS IP address.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <System Setting> button to open the **System Setting** window and select "Configure Network" -> "Configure DNS", as shown in Figure 8-25. Enter DNS IP address, click the <Test> or <Test all> button to test the network connectivity, and click the <Apply> button to complete the configuration.

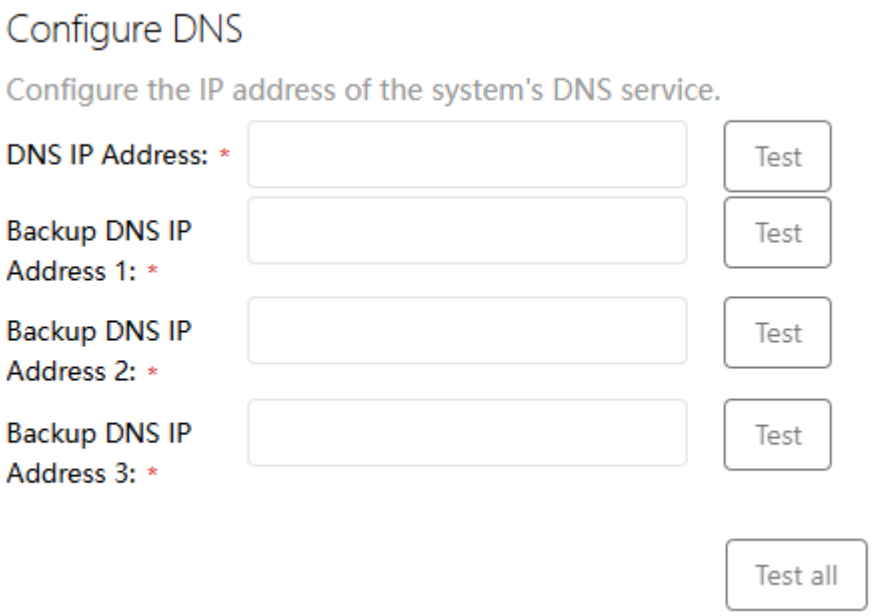

Figure 8-25 Configure DNS interface

8.5 Alarm Settings

8.5.1 Indicators Notification

When a preset alarm event occurs on a storage device, the alarm indicator of the device will be on or blinking. At this time, please log in to GUI to view the detailed information of the device, so as to accurately locate the problem.

8.5.2 Buzzer Notification

This section explains how to enable or disable buzzer notification.

ⓘNOTE

When buzzer notification is enabled, the storage device will be prompted by the buzzer when a preset event occurs.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <Alarm Setting> button to open the **Alarm Setting** window and select "Buzzer Notification", as shown in Figure 8-26. Enable or disable the buzzer notification and click the <Apply> button to complete the configuration.

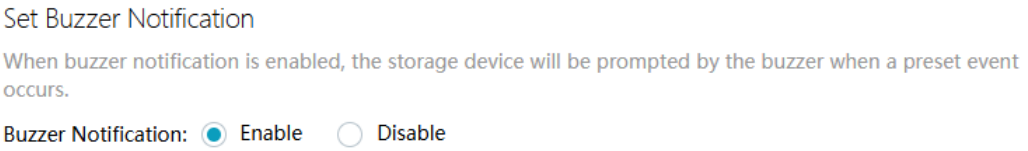

Figure 8-26 Set buzzer notification interface

8.5.3 Email Notification

8.5.3.1 Setting Email Notification

This section explains how to set email notification.

ⓘNOTE

After enabling email notification, when a preset event occurs on the storage device, an email will be sent to the recipient's email account.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <Alarm Setting> button to open the **Alarm Setting** window and select "Email Notification" -> "Set Email Notification", as shown in Figure 8-27. Enter relevant parameters (see Table 8-6 for details) and click the <Apply> button to complete the configuration.

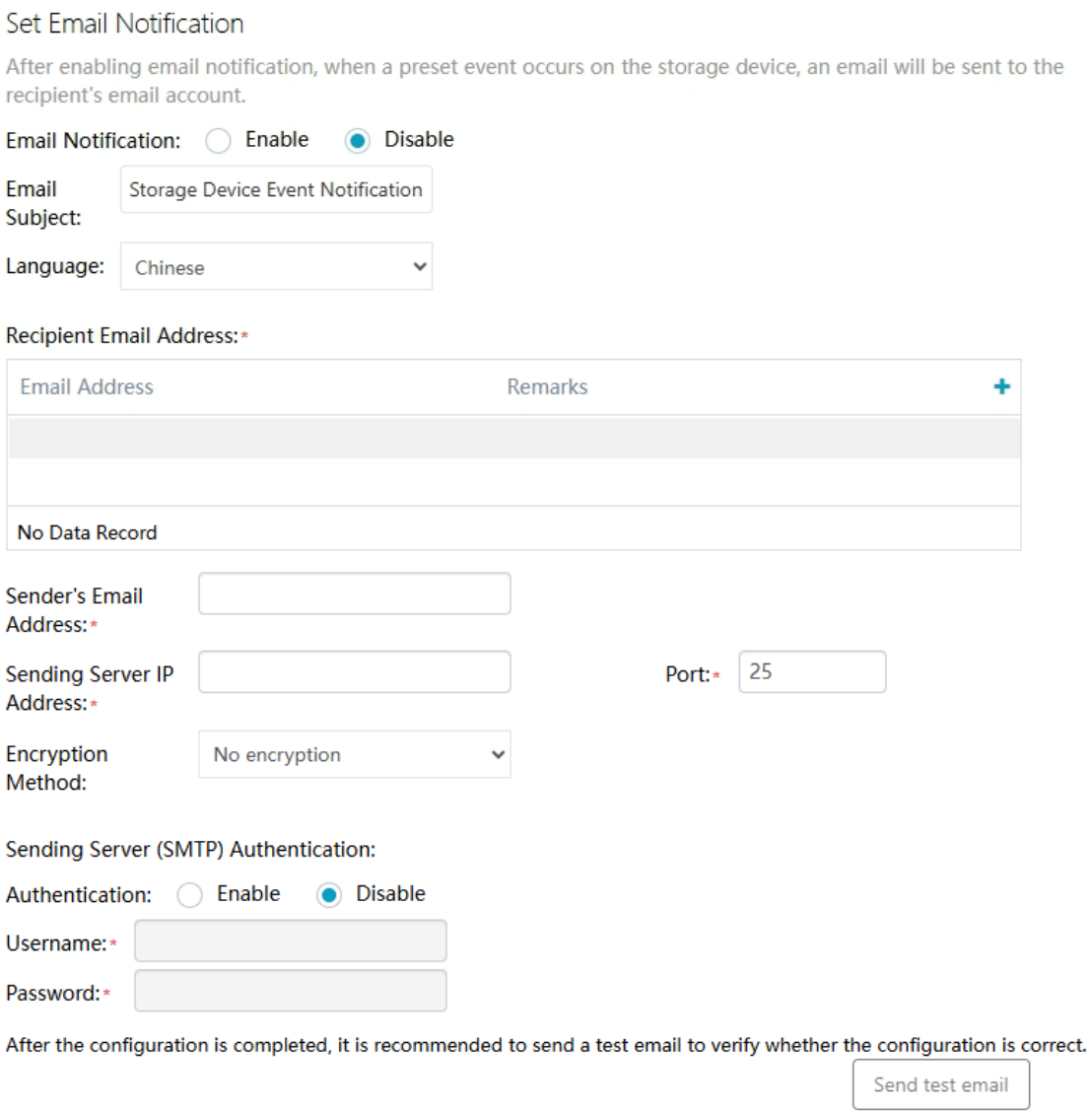

Figure 8-27 Set email notification interface

Table 8-6 Description of the parameters for setting email notification

Parameter	Description
Email Notification	It refers to enabling or disabling email notifications.
Email Subject	It refers to the subject of email. Length: 1-127 characters.
Language	It refers to the language of email, including Chinese and English.
Recipient Email Address	It refers to the recipient's email address • Add: Click the <+> button to add email address. • Delete: Click the <-> button to delete email address.
Sender's Email Address	It refers to the sender's email address.
Sending Server IP Address	It refers to the address of IP or domain name of the sending server.
Port	It refers to the port number of the sending server.

Encryption Method	It refers to whether the message is sent encrypted, which includes no encryption, SSL/TLS and STARTTLS.
Sending Server (SMTP) Authentication	It refers to whether the sender is required by the sending server for authentication. If yes, please set the user name and password for authentication. **ⓘNOTE** If an identity authentication is required for sending server, the username may be either itself or the user name + @ + suffix of Email address (such as xxx@yyy.com). Please set according to the specific requirements of the sending server. Otherwise, the emails may fail to be sent.
Username	It refers to the username used for authentication. • Length: 1-127 characters. • Valid character range: [a-zA-Z0-9,._-].
Password	It refers to the password used for authentication.

Step 3: After the configuration is completed, click the <Send test email> button, and the system will automatically send a test email to the set recipient's email account. Log in to the mailbox and check the inbox through recipient's email address. If you receive the test email, the email alarm is set correctly. Otherwise, please check whether the parameters are set correctly and the network is normal and so on.

8.5.3.2 Setting Periodic Notification Policy

This section explains how to set periodic notification policy.

Prerequisites

The email notification is enabled.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <Alarm Setting> button to open the **Alarm Setting** window and elect "Email Notification" -> "Set Periodic Notification Policy", as shown in Figure 8-28. Set periodic notification policy (see Table 8-7 for details) and click the <Apply> button to complete the configuration.

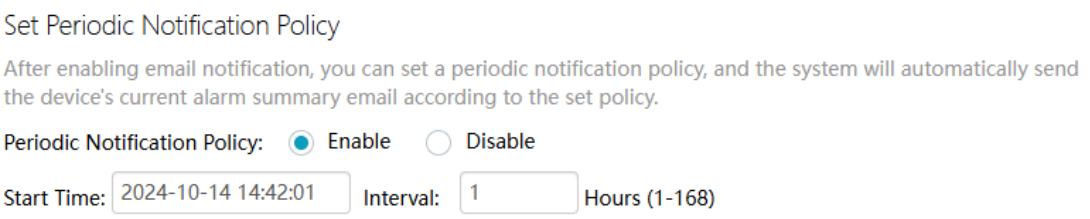

Figure 8-28 Set periodic notification policy interface

Table 8-7 Description of the parameters for setting periodic notification policy interface

Parameters	Description
Periodic Notification Policy	It refers to enable or disable periodic notification policy.
Start Time	It refers to the start time of periodic notification policy.
Interval	It refers to the interval time of periodic notification policy. Valid range: 1-168. Unit: Hour.

8.5.4 SNMP Trap Notification

8.5.4.1 Setting SNMP Trap Notification

This section explains how to set SNMP Trap notification.

ⓘNOTE

After enabling SNMPT Trap notification, when a preset event occurs on the storage device, a trap will be sent to the server.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <Alarm Setting> button to open the **Alarm Setting** window and select "SNMP Trap Notification" -> "Set SNMP Trap Notification", as shown in Figure 8-29. Enter relevant parameters (see Table 8-8 for details) and click the <Apply> button to complete the configuration.

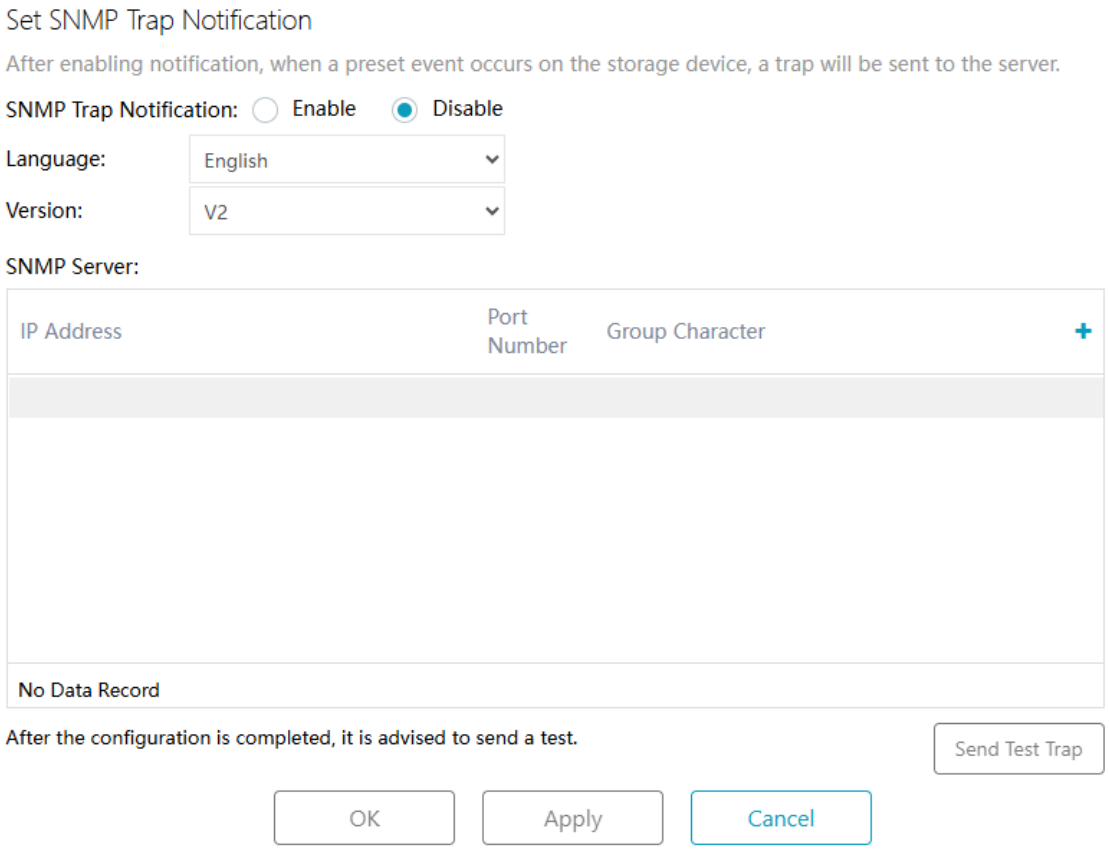

Figure 8-29 Set SNMP Trap notification interface

Table 8-8 Description of the parameters for setting SNMP Trap notification

Parameter	Description
SNMP Trap Notification	It refers to enabling or disabling SNMP Trap notification.
Language	It refers to the language of the alarm, including Chinese and English.
Version	It refers to the version number of the SNMP protocol, including V1, V2 and V3.
Receiver IP Address list	It refers to the list of IP addresses of SNMP servers for receiving SNMP Trap information: • Add: Click the <+> button to add IP address and group character. • Delete: Click the <-> button to delete the IP address and group character.
IP Address	It refers to the IP address to receive SNMP server.
Port Number	It refers to the port number used by the SNMP receiving server to monitor Traps.
Group Character	It refers to the group character used by the SNMP receiving server. (It is different from the group character of SNMP Get/Set)

Step 3: After the configuration is completed, click the <Send Test Trap> button, and the system will automatically send a test trap to the SNMP server. Log in to the SNMP server and check whether

you have received the test trap. If yes, the SNMP trap is set correctly. Otherwise, please check whether the parameters are set correctly, the network is reachable and the SNMP server is normal and so on.

8.5.4.2 Adding SNMP User

This section explains how to add SNMP user.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <Alarm Setting> button to open the **Alarm Setting** window and select "SNMP Trap Notification" -> "Set SNMP User", as shown in Figure 8-30.

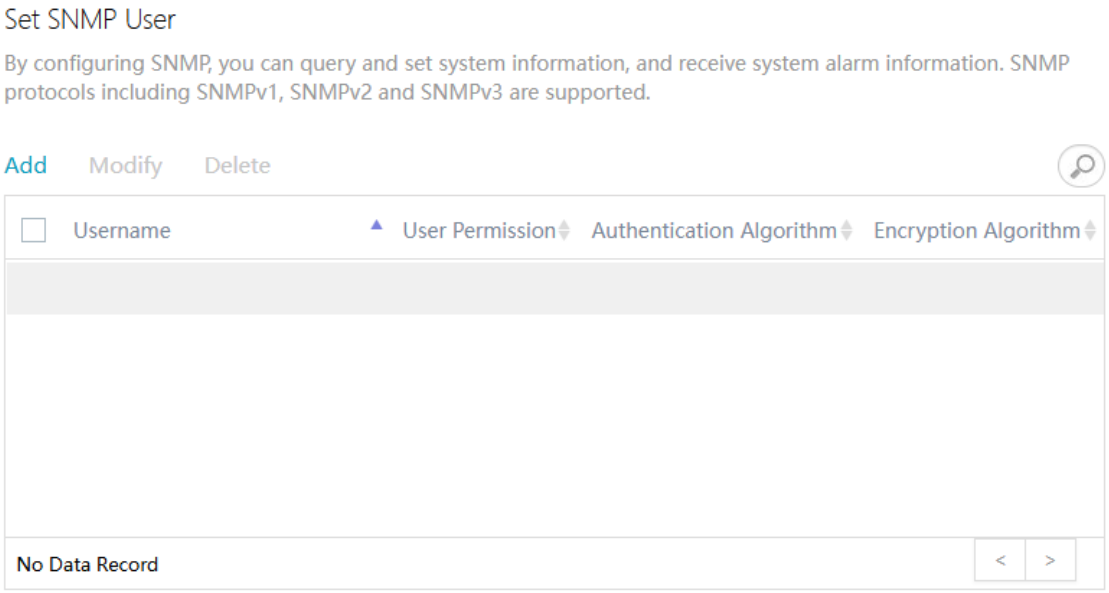

Figure 8-30 Set SNMP user interface

Step 3: Click the <Add> button to open the **Create SNMP User** window, as shown in Figure 8-31. Enter relevant parameters (see Table 8-9 for details) and click the <OK> button to complete the configuration.

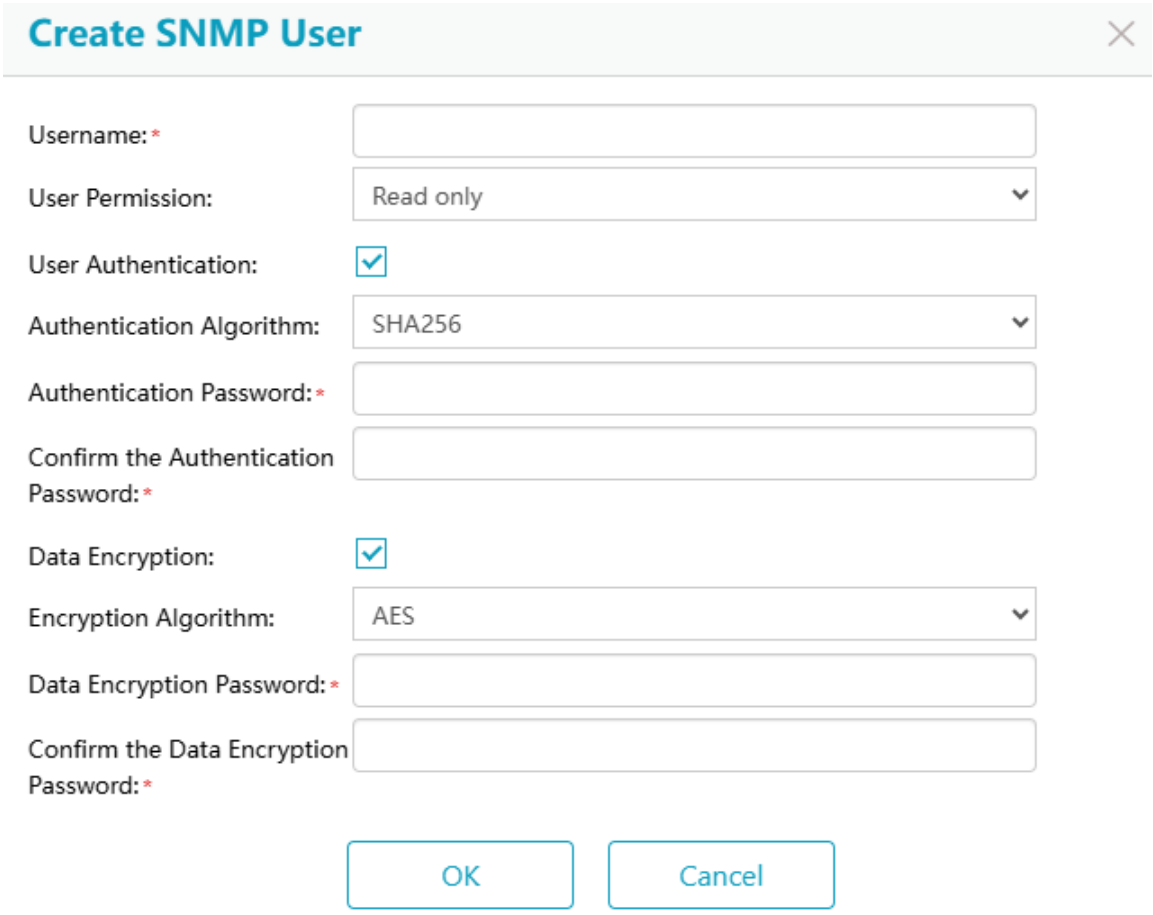

Figure 8-31 Create SNMP user interface

Table 8-9 Description of the parameters for creating SNMP user interface

Parameters	Description
Username	It refers to the name of SNMP user. • Length: 4-32 characters. • Valid character range: [A-Za-Z0-9_ -], which cannot be a pure number or a reserved user (such as root, admin), and must start with a letter.
User Permission	It refers to the permission of SNMP user, including read only and read and write.
User Authentication	It refers to whether enabling user authentication, which is enabled by default.
Authentication Algorithm	It refers to the authentication algorithm of SNMP user, including MD5, SHA, SHA224, SHA256, SHA384 and SHA512.
Authentication Password	It refers to the authentication password of SNMP user. • Length: 8-32 characters. • Valid character range: [a-zA-Z0-9.-_:,!@#%&*()] without spaces, and must contain special characters [.-_:,!@#%&*()].
Confirm the Authentication Password	It refers to the confirmation of SNMP user's authentication password, which must be the same as "authentication password".

Data Encryption	It refers to whether enabling data encryption, which is enabled by default.
Encryption Algorithm	It refers to the encryption algorithm of SNMP user, including AES and DES. The default value is AES.
Data Encryption Password	It refers to the data encryption password of SNMP user. • Length: 8-32 characters. • Valid character range: [a-zA-Z0-9.-_:,!@#%&*()] without spaces, and must contain special characters [.-_:,!@#%&*()].
Confirm the Data Encryption Password	It refers to the confirmation of SNMP user's data encryption password, which must be the same as "data encryption password".

8.5.4.3 Modifying SNMP User

This section explains how to modify SNMP user permission, user authentication, authentication algorithm, authentication password, data encryption, encryption algorithm, data encryption password and so on.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <Alarm Setting> button to open the **Alarm Setting** window and select "SNMP Trap Notification" -> "Set SNMP User", as shown in Figure 8-32.

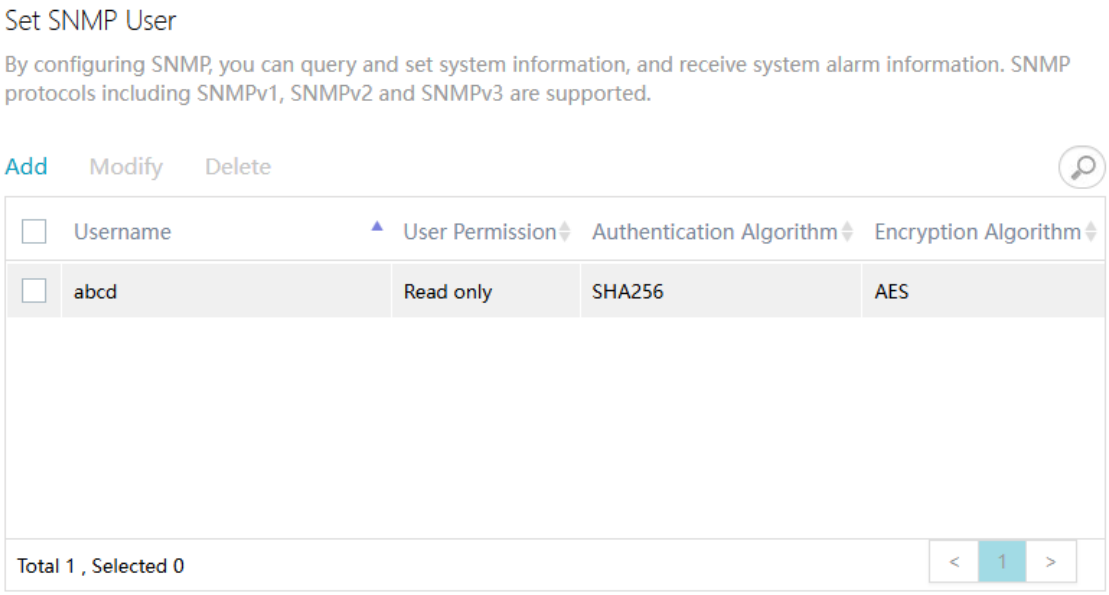

Figure 8-32 Set SNMP User interface

Step 3: Select the desired SNMP user and click the <Modify> button to open the **Basic Properties** window, as shown in Figure 8-33. Modify SNMP user's parameters (see Table 8-9 for details) and click the <OK> button to complete the configuration.

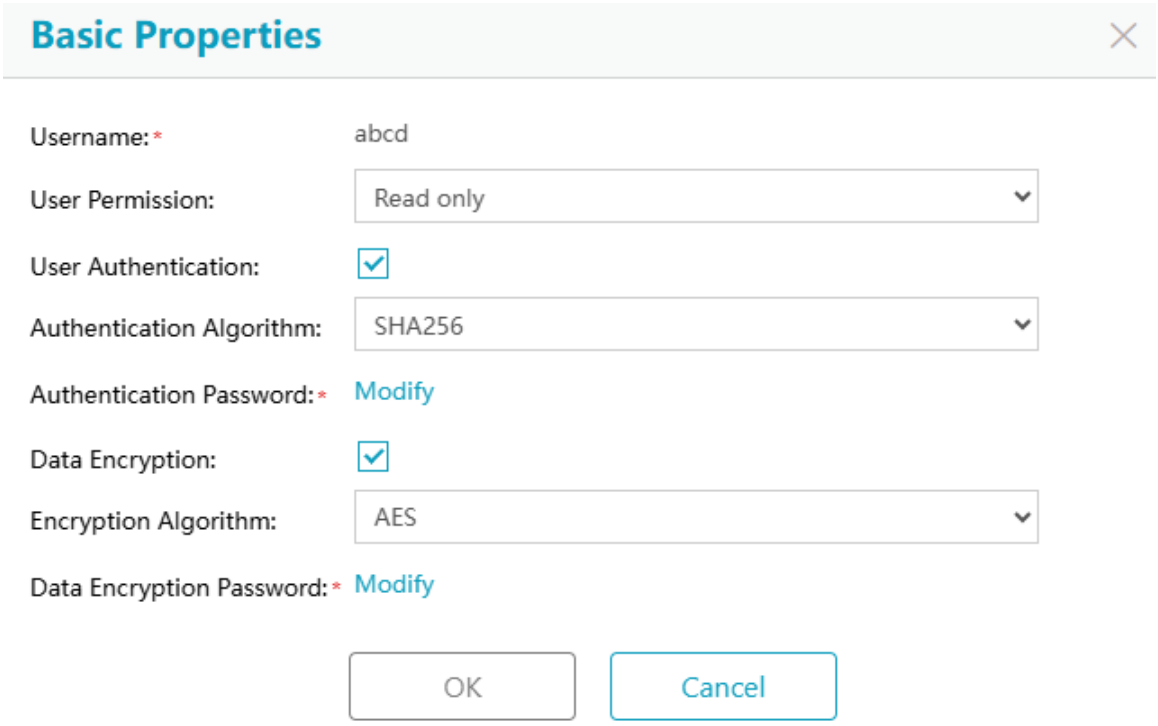

Figure 8-33 SNMP user basic properties interface

8.5.4.4 Deleting SNMP User

This section explains how to delete SNMP user.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <Alarm Setting> button to open the **Alarm Setting** window and select "SNMP Trap Notification" -> "Set SNMP User", as shown in Figure 8-32. Select the desired SNMP user, click the <Delete> button, and click the <OK> button in the pop-up confirmation box to complete the configuration.

8.5.5 Events and Notifications

This section explains how to set event level and notification switch.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <Alarm Setting> button to open the **Alarm Setting** window and select "Events and Notifications", as shown in Figure 8-34. Set event level or switch and click the <Apply> button to complete the configuration.

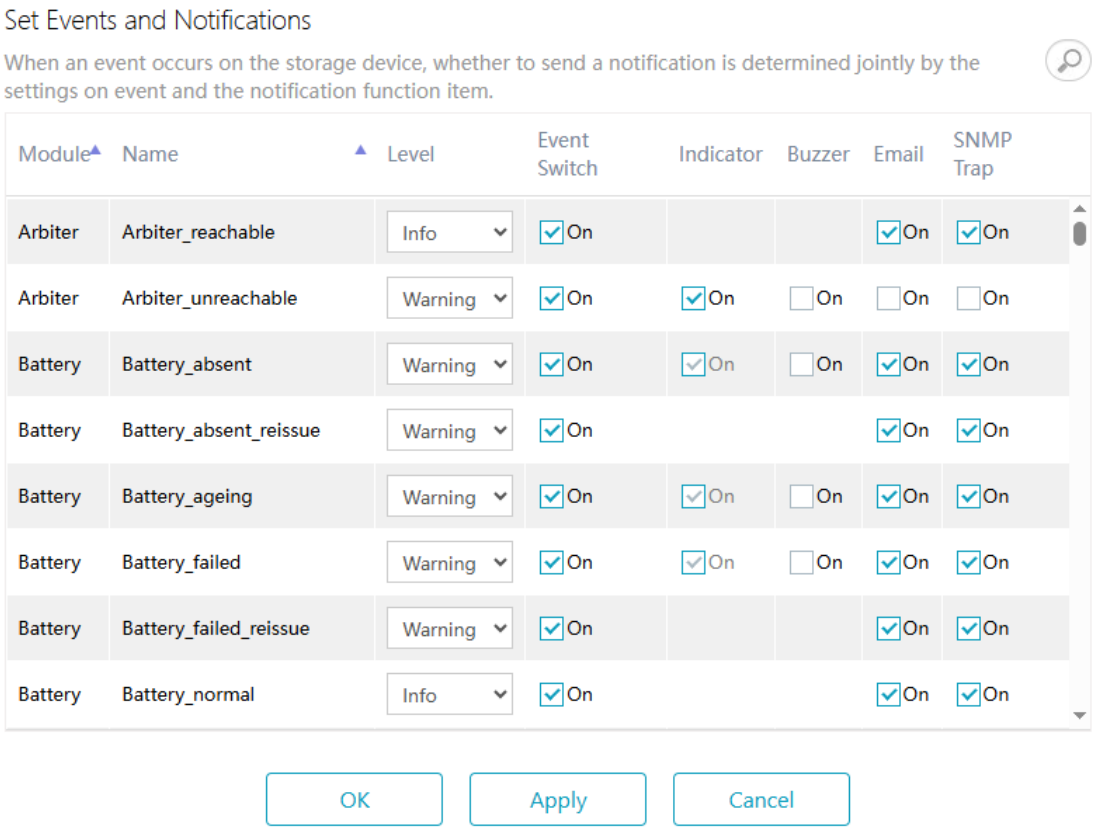

Figure 8-34 Set events and notifications interface

ⓘNOTE

ODSP software supports hundreds of events. The screenshot in Figure 8-34 only includes some events. You can also drag the scroll bar on the right to view and modify all event configurations. Gray check box of the alarm mode in the event list means the default configuration is adapted and cannot be modified.

8.5.6 Alarm Exception Object

8.5.6.1 Adding Alarm Exception Object

This section explains how to add alarm exception object.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <Alarm Setting> button to open the **Alarm Setting** window and select "Alarm Exception Object", as shown in Figure 8-35.

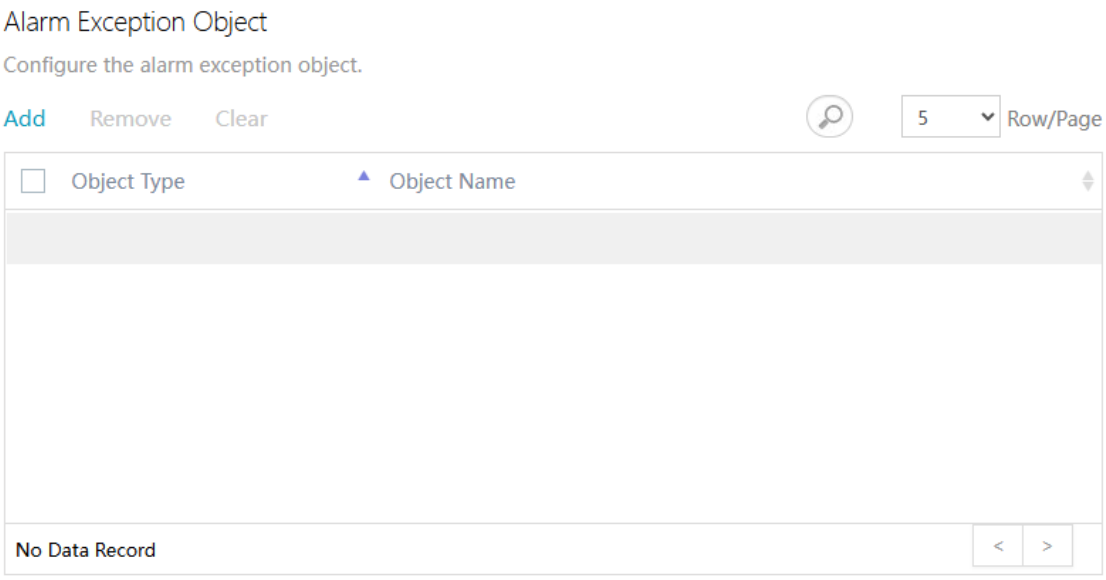

Figure 8-35 Set alarm exception object interface

Step 3: Click the <Add> button to open the **Add Exception Object** window, as shown in Figure 8-36. Select object type and object name and click the <OK> button to complete the configuration.

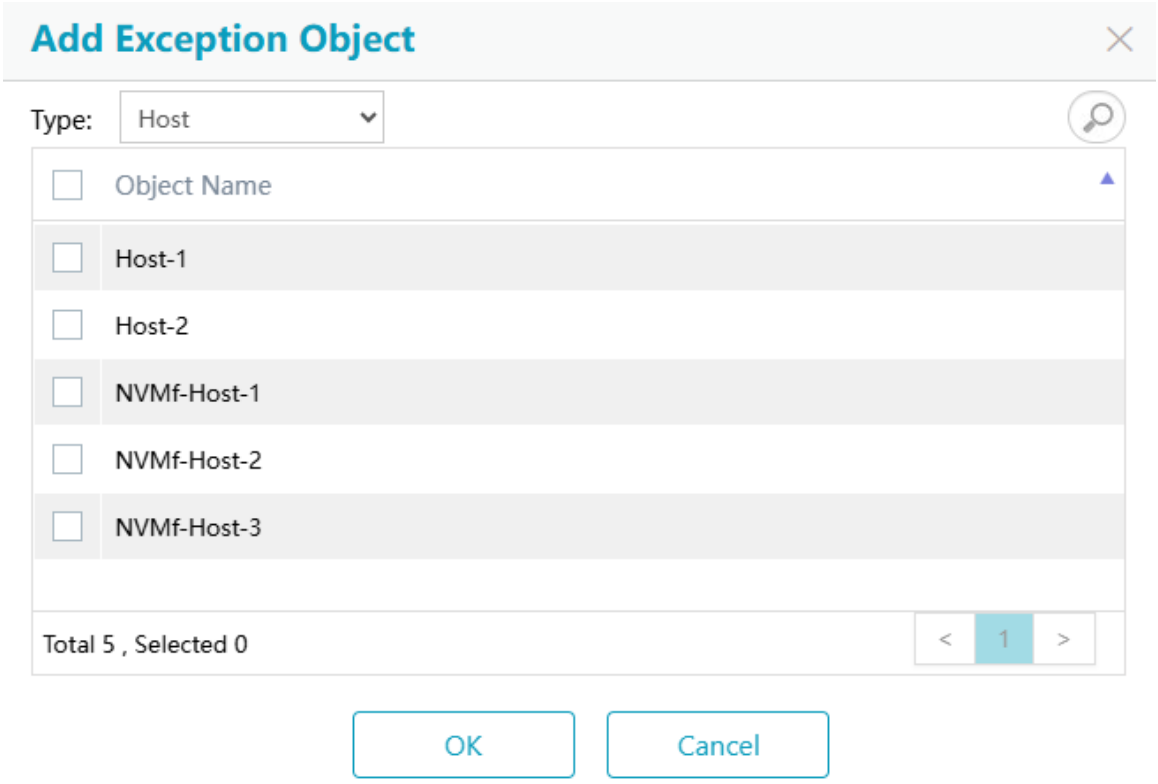

Figure 8-36 Add alarm exception object interface

8.5.6.2 Removing Alarm Exception Object

This section explains how to remove alarm exception object.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <Alarm Setting> button to open the **Alarm Setting** window and select "Alarm Exception Object", as shown in Figure 8-37. Select the desired object, click the <Remove> button, and click the <OK> button in the pop-up confirmation box to complete the configuration.

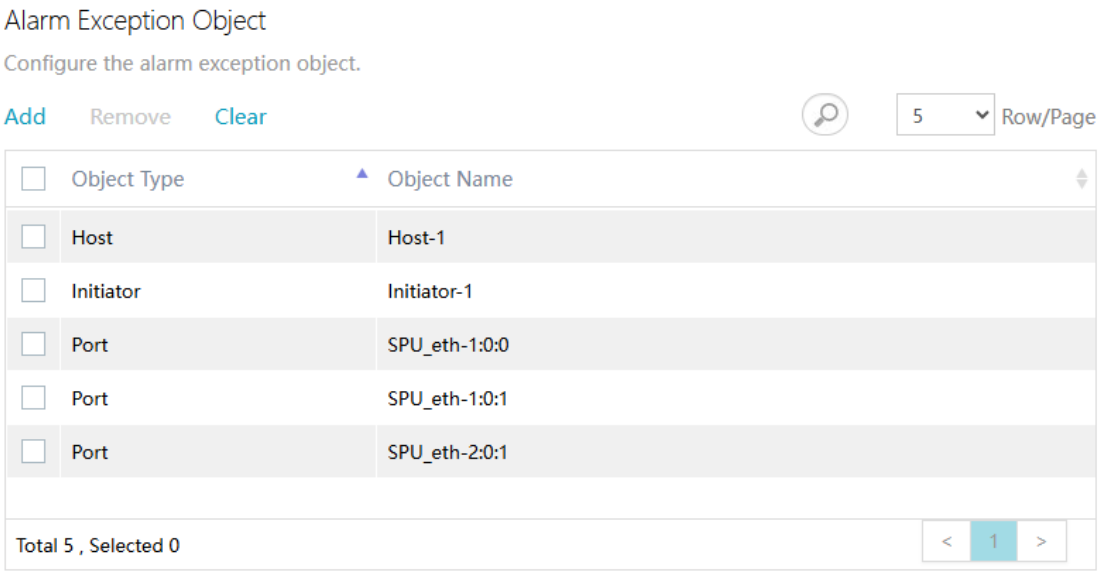

Figure 8-37 Remove alarm exception object interface

8.5.6.3 Clearing Alarm Exception Object

This section explains how to clear alarm exception object.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <Alarm Setting> button to open the **Alarm Setting** window and select "Alarm Exception Object", as shown in Figure 8-37. Click the <Clear> button and click the <OK> button in the pop-up confirmation box to complete the configuration.

8.5.7 Alarm Threshold

8.5.7.1 Setting Performance Threshold

This section explains how to configure delay alarm threshold, IOPS and bandwidth alarm threshold and cache hit rate alarm threshold.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <Alarm Setting> button to open the **Alarm Setting** window and select "Alarm Threshold" -> "Set Performance Threshold", as shown in Figure 8-38. Set performance threshold and click the <Apply> button to complete the configuration.

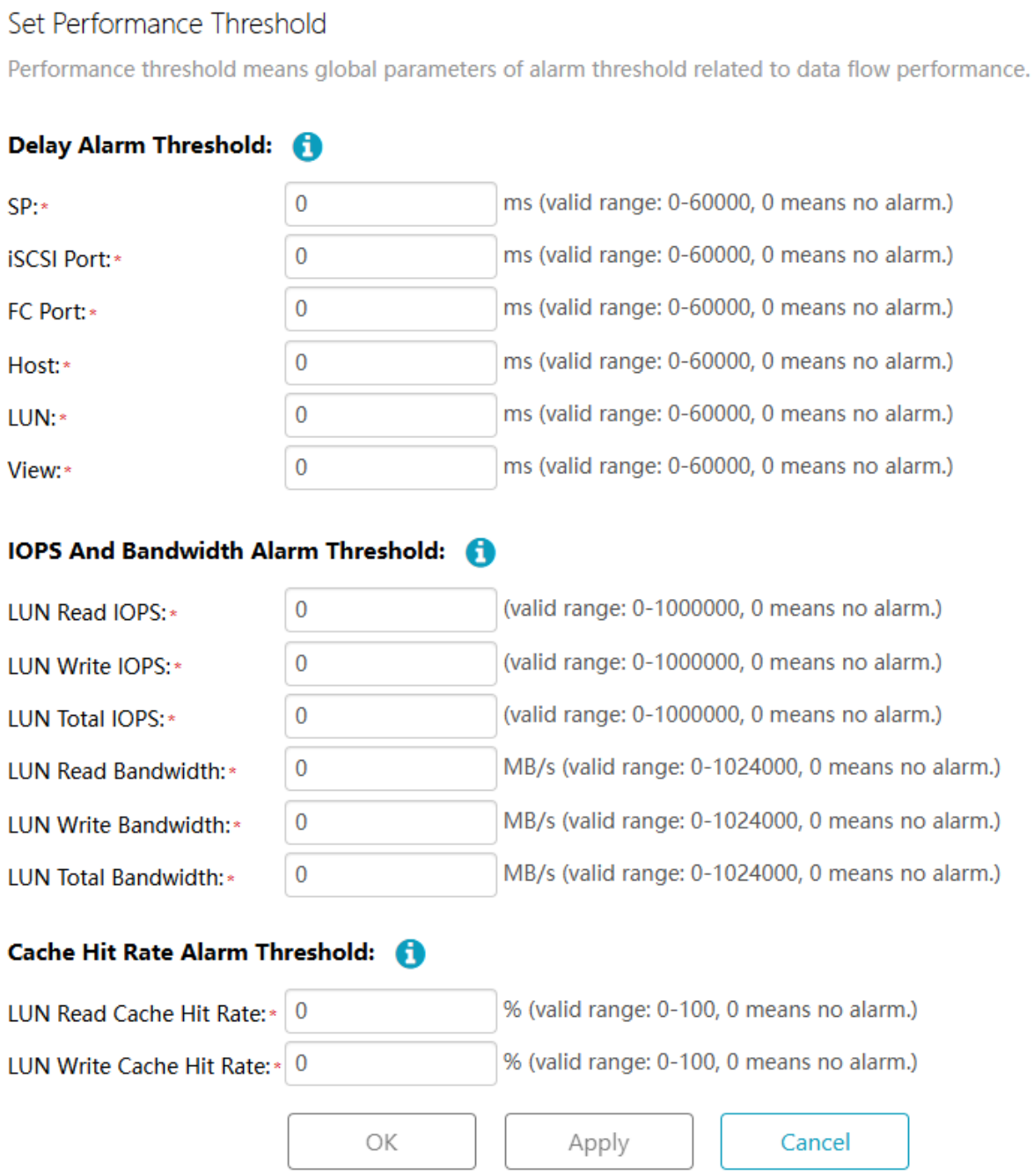

Figure 8-38 Set performance threshold interface

8.5.7.2 Setting Capacity Threshold

This section explains how to configure capacity alarm threshold for Thin-LUN.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <Alarm Setting> button to open the **Alarm Setting** window and select "Alarm Threshold" -> "Set Capacity Threshold", as shown in Figure 8-39. Set Thin-LUN usage alarm threshold and click the <Apply> button to complete the configuration.

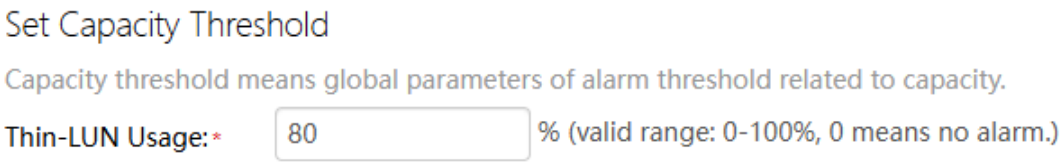

Figure 8-39 Configure capacity threshold interface

8.6 Maintenance Center

8.6.1 Importing File

This section explains how to import file.

⚠CAUTION

Importing mismatched configuration files will cause system configuration confusion, please operate with caution.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <Import File> button to open the **Import File** window, as shown in Figure 8-40. Select desired file and click the <OK> button to complete the configuration.

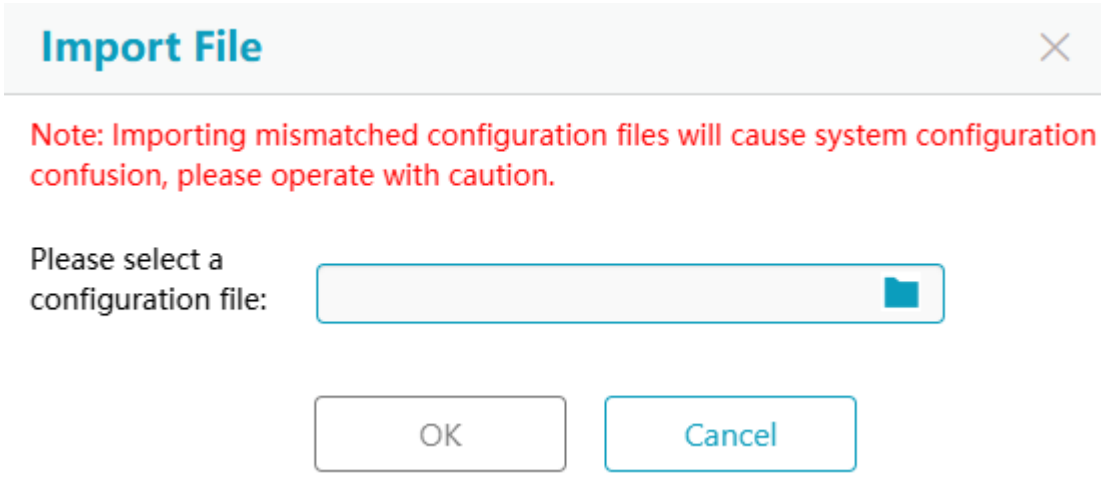

Figure 8-40 Import file interface

8.6.2 Exporting File

This section explains how to export file.

ⓘNOTE

- Diagnosis information, MIB file, all events and DSU COM port information are mainly used by maintenance personnel to locate problems.
- Device log and audit log are mainly used to check running status and configuration changes of storage devices.
- Configuration file is mainly used to save the current configuration of storage devices.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <Export File> button to open the **Export File** window, as shown in Figure 8-41. Select desired content and time range and click the <OK> button to complete the configuration.

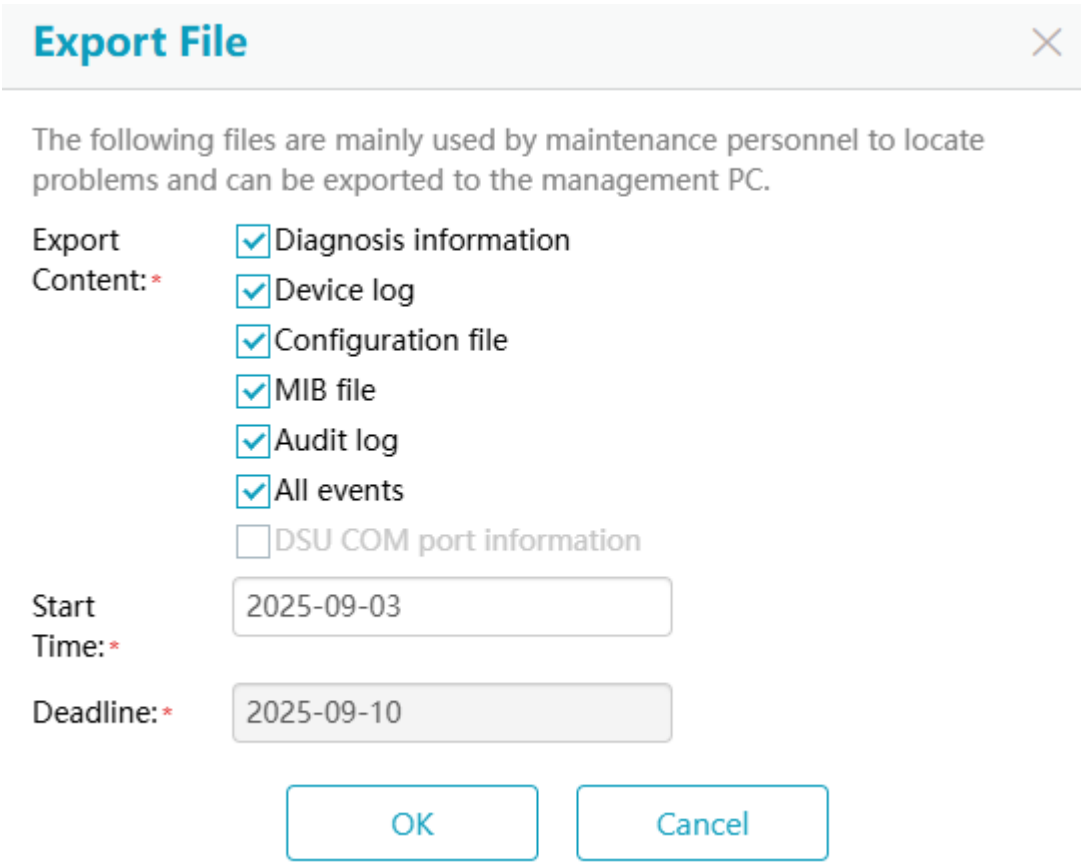

Figure 8-41 Export file interface

8.6.3 Viewing Version

This section explains how to view version information of SPU, DSU and NAS, etc.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <View Version> button to open the **View Version** window and you can view the version information.

8.6.4 Online Upgrade

For steps and precautions of system upgrade, please consult manufacturer's technical supporters.

8.6.5 Hotfix Upgrade

For steps and precautions of quick upgrade, please consult manufacturer's technical supporters.

8.6.6 Online Expansion

For steps and precautions of physical memory expansion, please consult manufacturer's technical supporters.

8.6.7 Uploading Image

This section explains how to upload image.

Steps

Step 1: Select "System" -> "Setting" on the navigation tree to open the system setting interface.

Step 2: Click the <Upload Image> button to open the **Upload Image File** window, as shown in Figure 8-42. Select image file and click <Upload> button to upload the image file.

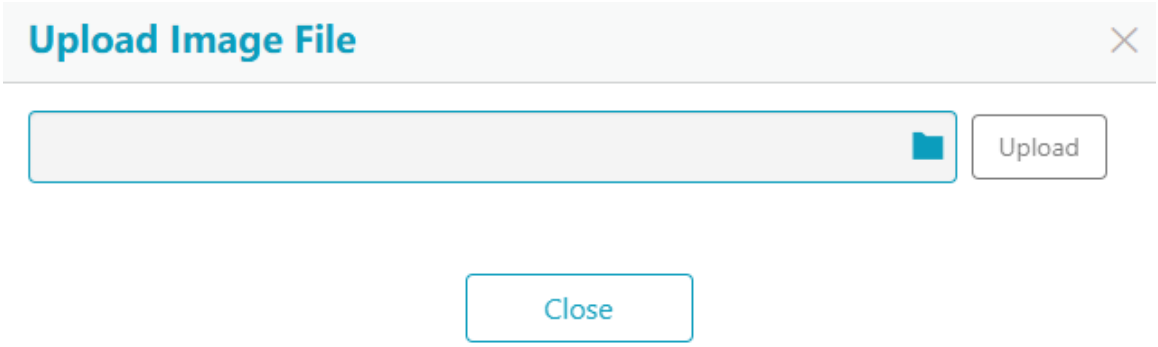

Figure 8-42 Upload image file interface

9 Monitoring Center

9.1 Managing Alarms and Events

9.1.1 Managing Current Alarms

9.1.1.1 Viewing Current Alarms

This section explains how to view current alarms and handling suggestions.

Steps

Step 1: Select "Monitor" -> "Alarm & Event" on the navigation tree to open the alarm and event interface.

Step 2: You can view current alarms and handling suggestions in the **Current Alarms** tab of the information display area.

9.1.1.2 Manually Recovering Alarms

This section explains how to manually recover alarms.

Steps

Step 1: Select "Monitor" -> "Alarm & Event" on the navigation tree to open the alarm and event interface.

Step 2: Select the desired alarm in the **Current Alarms** tab of the information display area, click the <Recovery> button, and click the <OK> button in the pop-up confirmation box to complete the configuration.

9.1.1.3 Refreshing Current Alarms

This section explains how to refresh current alarms.

Steps

Step 1: Select "Monitor" -> "Alarm & Event" on the navigation tree to open the alarm and event interface.

Step 2: Click the <Refresh> button in the **Current Alarms** tab of the information display area to complete the configuration.

9.1.2 Managing All Events

9.1.2.1 Viewing All Events

This section explains how to view all events.

Steps

Step 1: Select "Monitor" -> "Alarm & Event" on the navigation tree to open the alarm and event interface.

Step 2: You can view all events in the **All Events** tab of the information display area.

9.1.2.2 Confirming Recovered Alarms

This section explains how to confirm recovered alarm.

Steps

Step 1: Select "Monitor" -> "Alarm & Event" on the navigation tree to open the alarm and event interface.

Step 2: Select the recovered alarm in the **All Events** tab of the information display area, click the <Confirm> button, and click the <OK> button in the pop-up confirmation box to complete the configuration.

9.1.2.3 Resending Events Notifications

This section explains how to resend events notifications.

Steps

Step 1: Select "Monitor" -> "Alarm & Event" on the navigation tree to open the alarm and event interface.

Step 2: Select the desired event in the **All Events** tab of the information display area, click the <Resend> button, and click the <OK> button in the pop-up confirmation box to complete the configuration.

9.1.2.4 Refreshing All Events

This section explains how to refresh all events.

Steps

Step 1: Select "Monitor" -> "Alarm & Event" on the navigation tree to open the alarm and event interface.

Step 2: Click the <Refresh> button in the **All Alarms** tab of the information display area to complete the configuration.

9.1.3 Managing Concerns

9.1.3.1 Viewing Concerns

This section rxplains how to view concerns.

Steps

Step 1: Select "Monitor" -> "Alarm & Event" on the navigation tree to open the alarm and event interface.

Step 2: You can view the concerns in the **Concerns** tab of the information display area.

9.1.3.2 Refreshing Concerns

This section explains how to refresh concerns.

Steps

Step 1: Select "Monitor" -> "Alarm & Event" on the navigation tree to open the alarm and event interface.

Step 2: Click the <Refresh> button in the **Concerns** tab of the information display area to complete the configuration.

9.2 Managing Logs

9.2.1 Managing Device Logs

ⓘNOTE

The system supports four levels of logs, which are Info, Warning, Error, and Critical from low to high according to the severity.

9.2.1.1 Viewing Device Logs

This section explains how to view deice logs.

Steps

Step 1: Select "Monitor" -> "Log" on the navigation tree to open the log interface.

Step 2: You can view the device log in the **Device Logs** tab of the information display area.

9.2.1.2 Dumping Device Logs

This section explains how to dump device logs.

ⓘNOTE

Logs meeting the dump level requirements will be forwarded to the specified log server after the log dump function is enabled.

Prerequisites

Only admin user can dump device logs.

Steps

Step 1: Select "Monitor" -> "Log" on the navigation tree to open the log interface.

Step 2: Click the <Dump> button in the **Device Logs** tab of the information display area to open the **Configure Log Dump** window, as shown in Figure 9-1. Enter relevant parameters (see Table 9-1 for details) and click the <OK> button to complete the configuration.

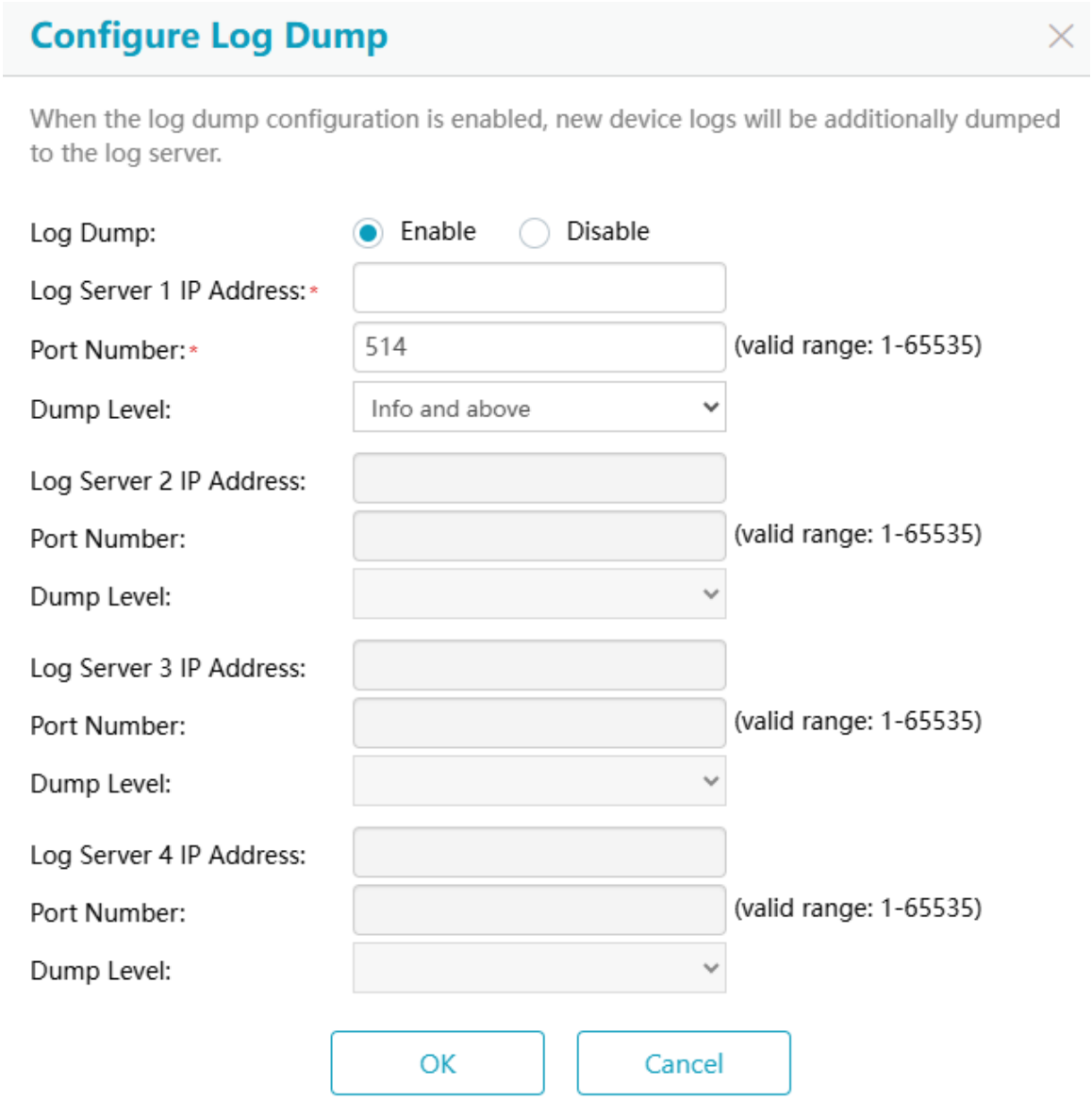

Figure 9-1 Configure log dump interface

Table 9-1 Description of the parameters for configuring log dump interface

Parameter	Description
Log Dump	It refers to enabling or disabling log dump, the following parameters need to be set when it is enabled.
Log Server IP Address	It refers to the IP address of log server.
Port Number	It refers to the port number of log server. Valid range: 1-65535.
Dump Level	It refers to the log level of dump. • Info and above • Warning and above • Error and above • Critical

9.2.1.3 Deleting Device Logs

This section explains how to delete device logs.

Prerequisites

Only admin user can delete device logs.

Steps

Step 1: Select "Monitor" -> "Log" on the navigation tree to open the log interface.

Step 2: Click the <Delete> button in the **Device Logs** tab of the information display area to open the **Delete Device Logs** window, as shown in Figure 9-2. Select the start time and end time and click the <OK> button to complete the configuration.

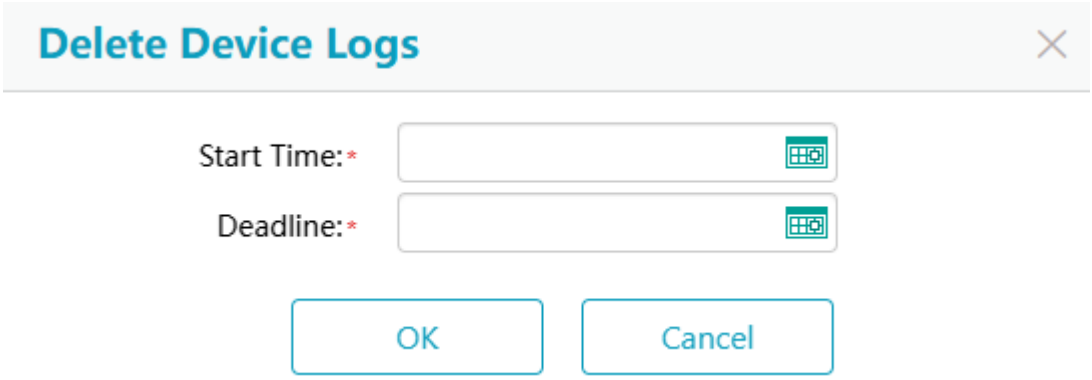

Figure 9-2 Delete device logs interface

9.2.1.4 Clearing Device Logs

This section explains how to clear device logs.

Prerequisites

Only admin user can clear device logs.

Steps

Step 1: Select "Monitor" -> "Log" on the navigation tree to open the log interface.

Step 2: Click the <Clear> button in the **Device Logs** tab of the information display area and click the <OK> button in the pop-up confirmation box to complete the configuration.

9.2.1.5 Refreshing Device Logs

This section explains how to refresh device logs.

Steps

Step 1: Select "Monitor" -> "Log" on the navigation tree to open the log interface.

Step 2: Click the <Refresh> button in the **Device Logs** tab of the information display area to complete the configuration.

9.2.2 Managing Audit Logs

9.2.2.1 Viewing Audit Logs

This section explains how to view audit logs.

Steps

Step 1: Select "Monitor" -> "Log" on the navigation tree to open the log interface.

Step 2: You can view the audit log in the **Audit Logs** tab of the information display area.

9.2.2.2 Refreshing Audit Logs

This section explains how to refresh audit logs.

Steps

Step 1: Select "Monitor" -> "Log" on the navigation tree to open the log interface.

Step 2: Click the <Refresh> button in the **Device Logs** tab of the information display area to complete the configuration.

9.3 Viewing Recent Tasks

This section explains how to view recent tasks.

Steps

Step 1: Select "Monitor" -> "Recent Task" on the navigation tree to open the recent task interface.

Step 2: You can view the recent tasks in the information display area.

9.4 Managing Topology

9.4.1 Viewing Topology

This section explains how to view topology.

Steps

Step 1: Select "Monitor" -> "Manage Topology" on the navigation tree to open the manage topology interface.

Step 2: You can view the topology in the **Manage Topology** tab of the information display area.

9.4.2 Managing Device

9.4.2.1 Adding Device

This section explains how to add remote device.

Steps

Step 1: Select "Monitor" -> "Manage Topology" on the navigation tree to open the manage topology interface.

Step 2: Click the <Add> button in the **Devices** tab of the information display area to open the **Add Device** window, as shown in Figure 9-3 and Figure 9-4. Enter relevant parameters (see Table 9-2 and Table 9-3 for details) and click the <OK> button to complete the configuration.

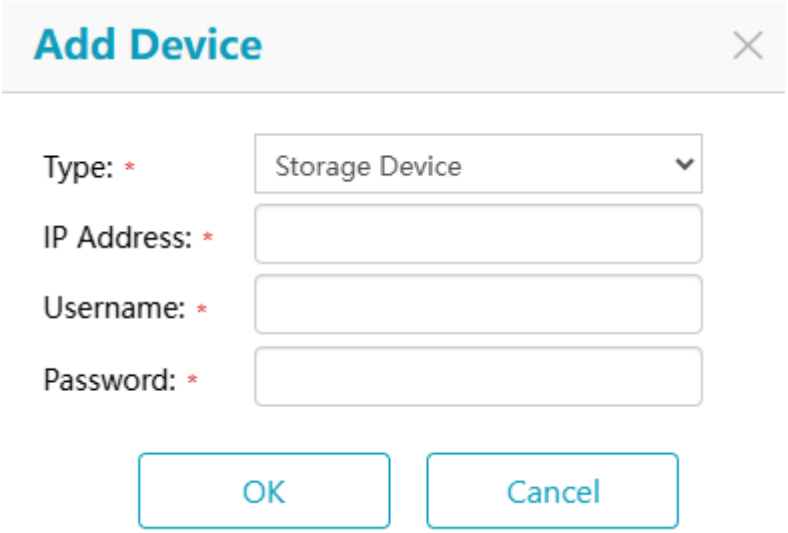

Figure 9-3 Add device (storage device) interface

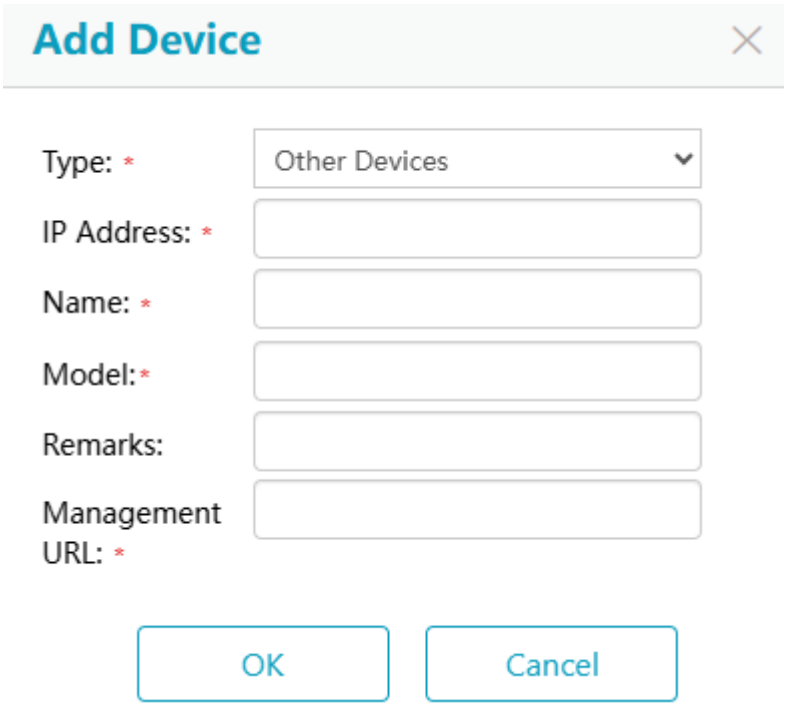

Figure 9-4 Add device (other device) interface

Table 9-2 Description of the parameters for adding device (storage device) interface

Parameter	Description
Type	It refers to the type of device. Please select storage device in this scenario.
IP Address	It refers to the IP address of device.
Username	It refers to the username of device. Length: 1-31 characters.
Password	It refers to the password of device's username. Length: 1-31 characters.

Table 9-3 Description of the parameters for adding device (other devices) interface

Parameter	Description
Type	It refers to the types of device except for storage device, including NAS gateway, MOSS systems, etc.
IP Address	It refers to the IP address of device.
Name	It refers to the name of device.
Model	It refers to the model of device.
Remarks	It refers to the description of device.
Management URL	It refers to the URL that can open the device management interface.

9.4.2.2 Viewing Device Properties

This section explains how to view device's basic properties.

Steps

Step 1: Select "Monitor" -> "Manage Topology" on the navigation tree to open the manage topology interface.

Step 2: Select the desired device in the **Devices** tab of the information display area and click the <Properties> button to open the **Basic Properties** window. You can view the basic properties of the device.

9.4.2.3 Deleting Device

This section explains how to delete remote device.

Steps

Step 1: Select "Monitor" -> "Manage Topology" on the navigation tree to open the manage topology interface.

Step 2: Select the desired device in the **Devices** tab of the information display area, click the <Delete> button, enter "yes" in the pop-up warning box, and click the <OK> button to complete the configuration.

9.4.2.4 Refreshing Device

This section explains how to refresh devices.

Steps

Step 1: Select "Monitor" -> "Manage Topology" on the navigation tree to open the manage topology interface.

Step 2: Click the <Refresh> button in the **Devices** tab of the information display area and click the <OK> button to in the pop-up confirmation box to complete the configuration.

10 Operational Cases

ⓘNOTE

- This chapter only describes the typical configuration process. The operation sequence of each step is marked by a serial number in the illustration to familiarize you with the resource configuration process. For detailed steps, please refer to the specific chapter.

- There may be slight differences between different storage versions or models, and the actual product interface shall prevail.

10.1 Creating LUN (Based on CRAID-P)

Step 1: Creating CRAID-P Pool

Create a CRAID-P pool and enter pool's name (eg, "Pool-1"), select "CRAID-P" RAID type and click the <Next> button to continue. For details, refer to 6.2.1.1 Creating CRAID-P Pool.

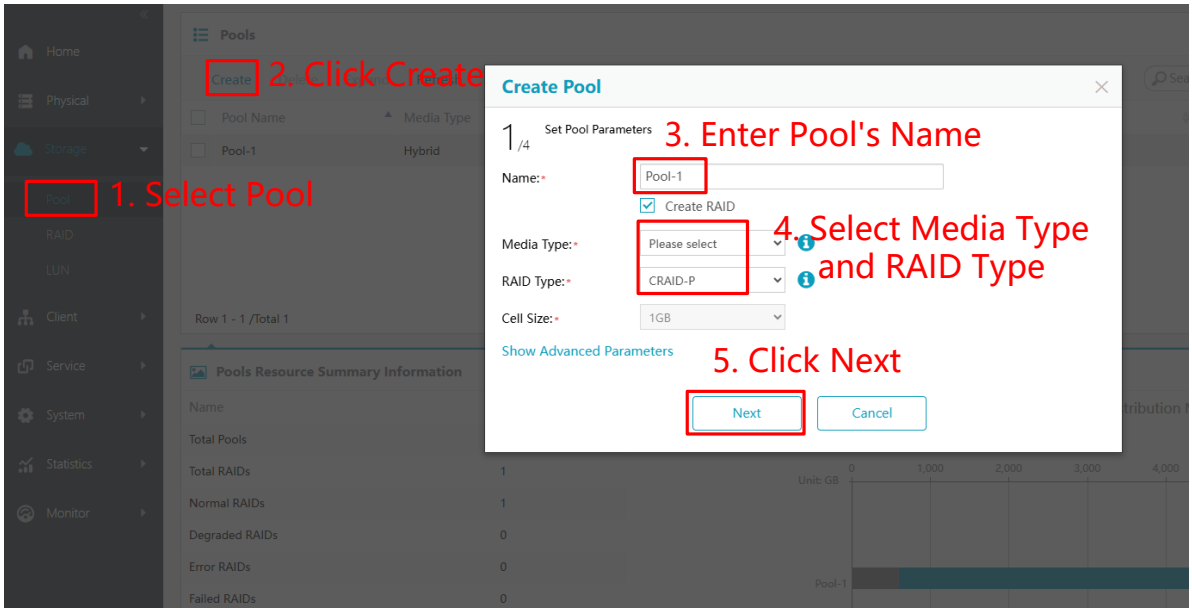

Figure 10-1 Creating CRAID-P pool wizard diagram

Step 2: Creating LUN

Create a LUN, select thin provisioning according to actual demands, and click the <Next> button to continue. For details, refer to 6.4.1 Creating LUN.

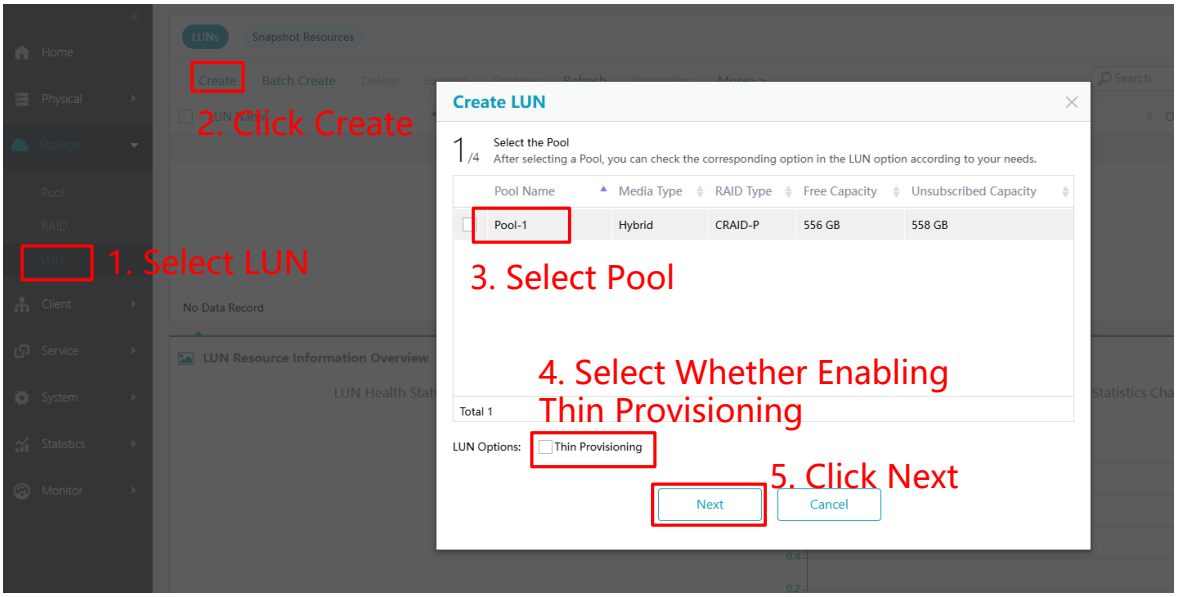

Figure 10-2 Creating LUN wizard diagram

10.2 Creating LUN (Based on CRAID-V)

Step 1: Creating CRAID-V Pool

Create a CRAID-V pool and enter pool's name (eg, "Pool-2"), select "CRAID-V" RAID type and click the <Next> button to continue. For details, refer to 6.2.1.2 Creating CRAID-V Pool.

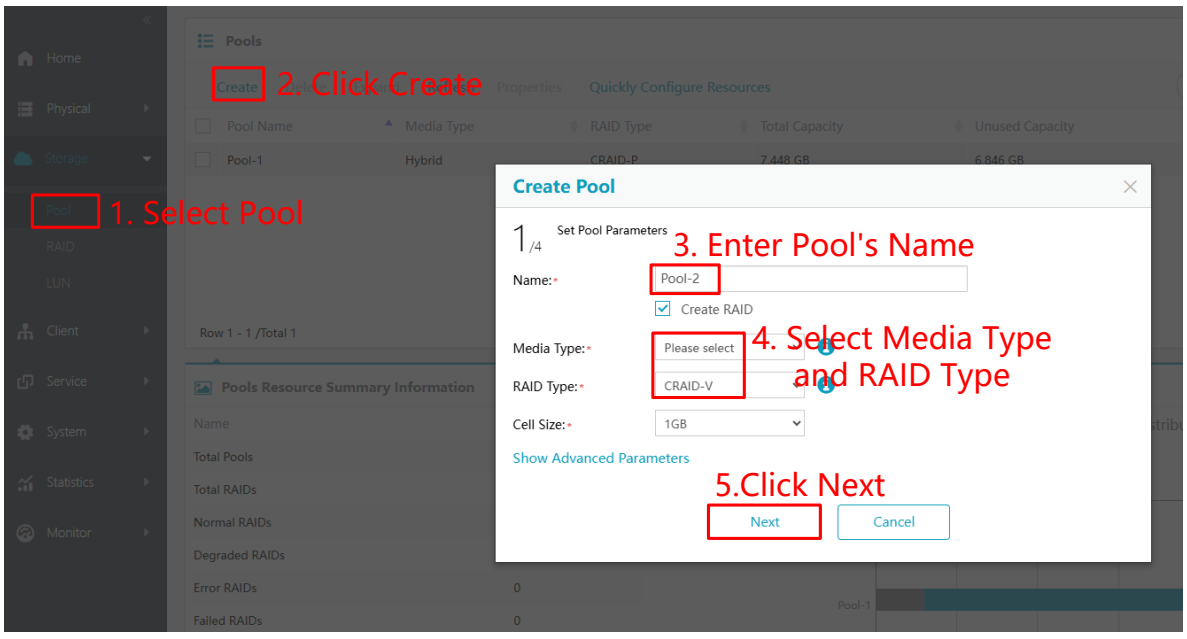

Figure 10-3 Creating CRAID-V pool wizard diagram

Step 2: Creating LUN

Create a LUN, select thin provisioning according to actual demands, and click the <Next> button to continue. For details, refer to 6.4.1 Creating LUN.

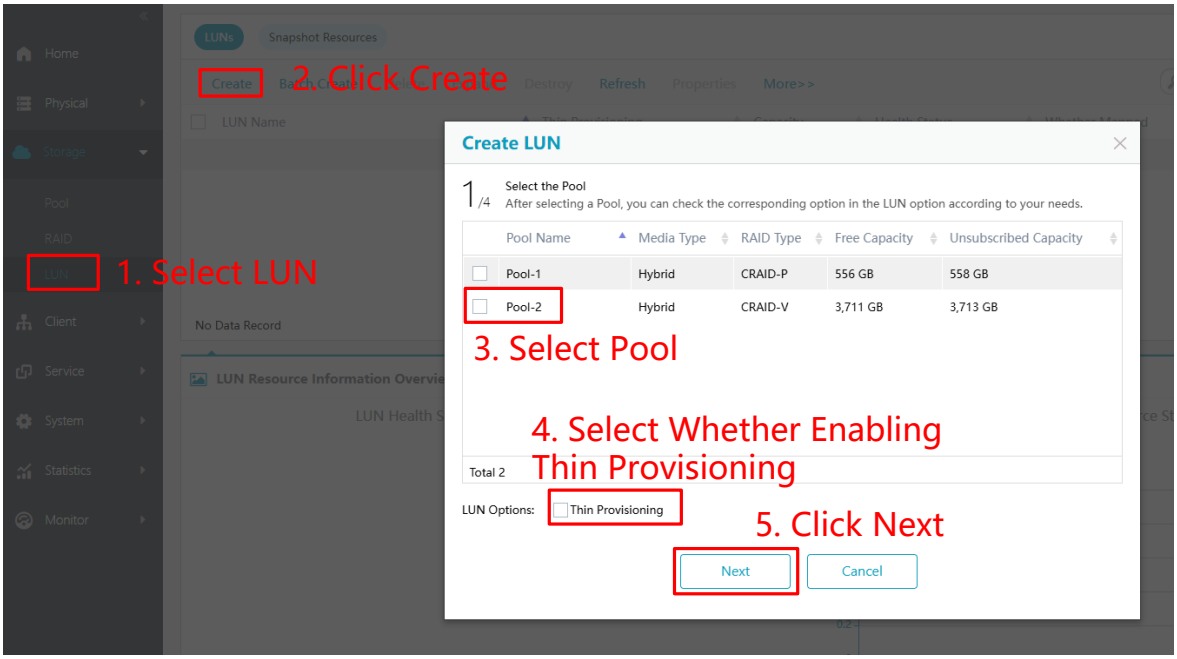

Figure 10-4 Creating LUN wizard diagram

10.3 Configuring I_T_L

This section introduces a whole process of configuring I_T_L resources, as shown in Figure 10-5.

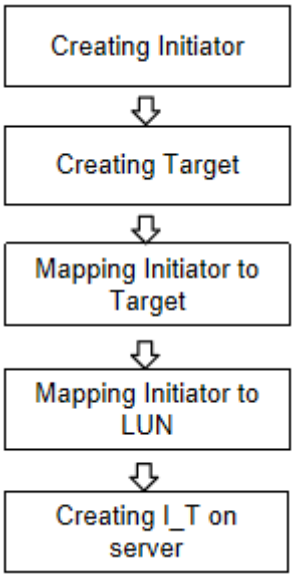

Figure 10-5 Flowchart for configuring I_T_L resource

ⓘNOTE

This operation example describes the resource configuration process in FC environment, including the required steps and parameters. The configuration process in iSCSI environment is similar and will not be introduced separately.

Step 1: Creating Initiator

ⓘNOTE

Please log in to the corresponding client server and record the WWN before creating an Initiator.

Create an Initiator, select "FC" type, enter name and WWN, and click the <OK> button to complete. For details, refer to 7.2.2 Creating Initiator.

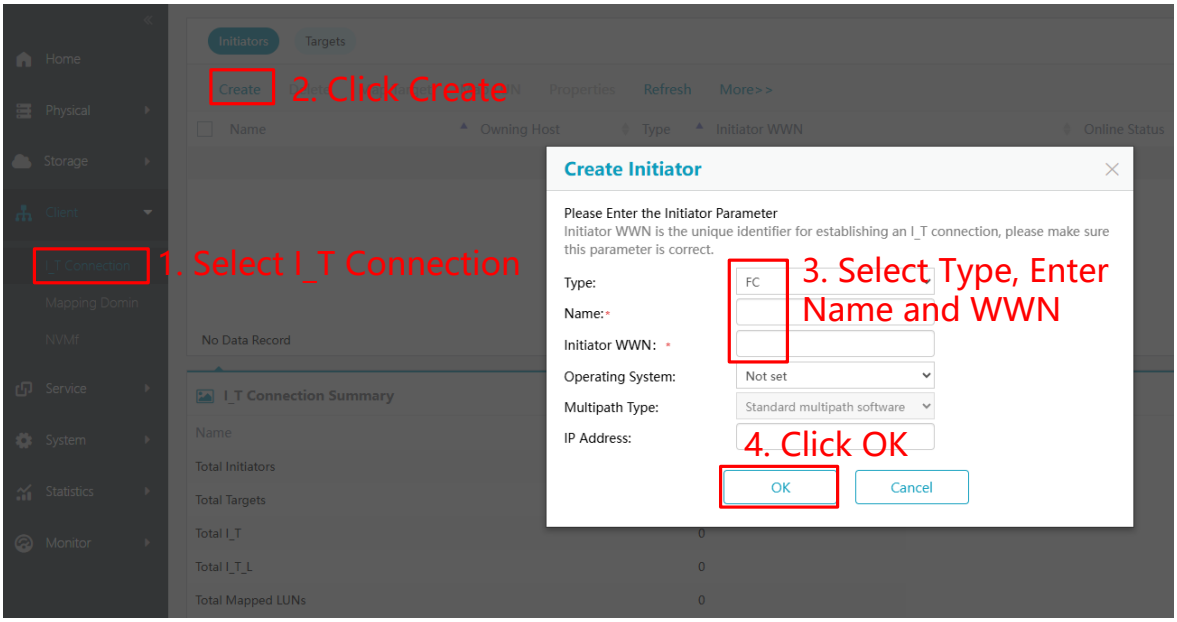

Figure 10-6 Create FC Initiator diagram

Step 2: Creating Target

Create a Target according to actual networking, select "EC" type and IP protocol version, and click the <Next> button to continue. For details, refers to 7.3.2 Creating Target.

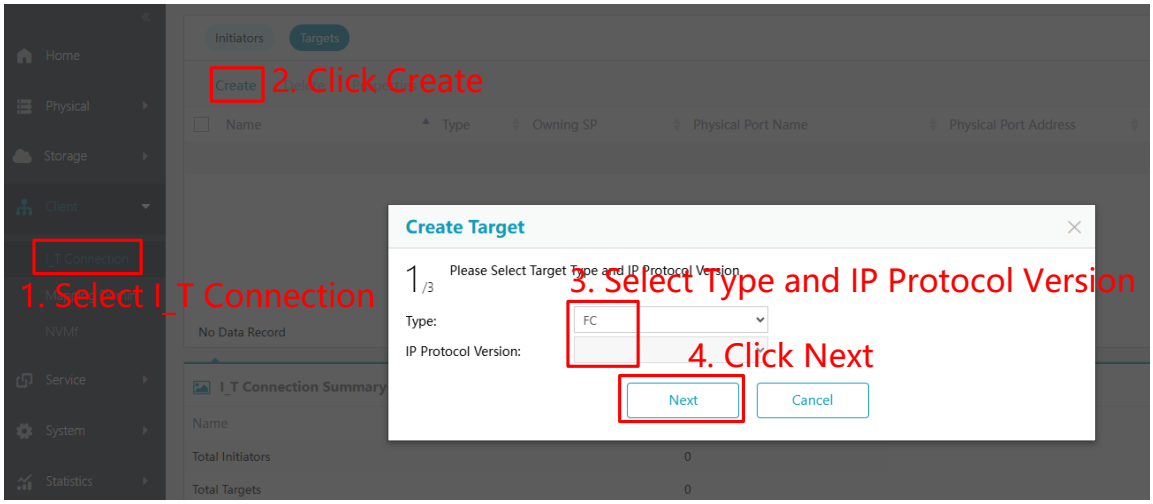

Figure 10-7 Create Target wizard diagram

Step 3: Mapping Initiator to Target

Map Initiator to Target, select Target according to actual networking, and click the <OK>button to configure I_T. For details, refer to 7.4.2.1 Mapping Initiator to Target.

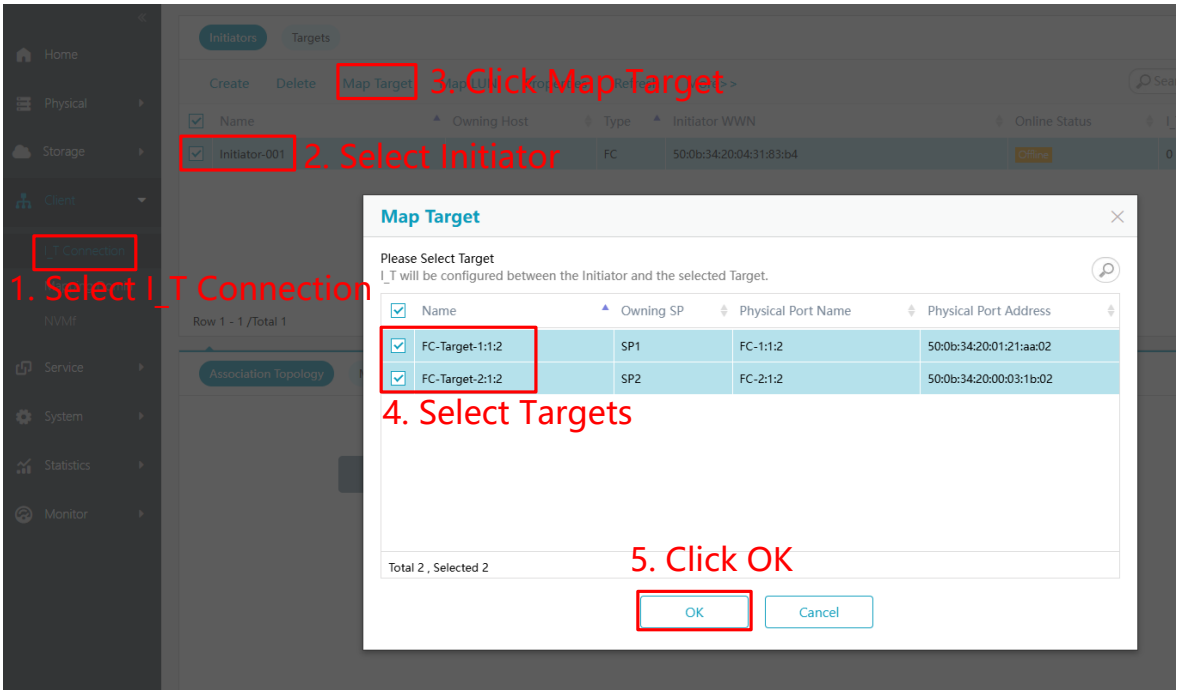

Figure 10-8 Map Initiator to Target diagram

Step 4: Mapping Initiator to LUN

Map Initiator to LUN, select I_T according to actual demands, and click the <Next> button to continue. For details, refer to 7.4.2.3 Mapping Initiator to LUN.

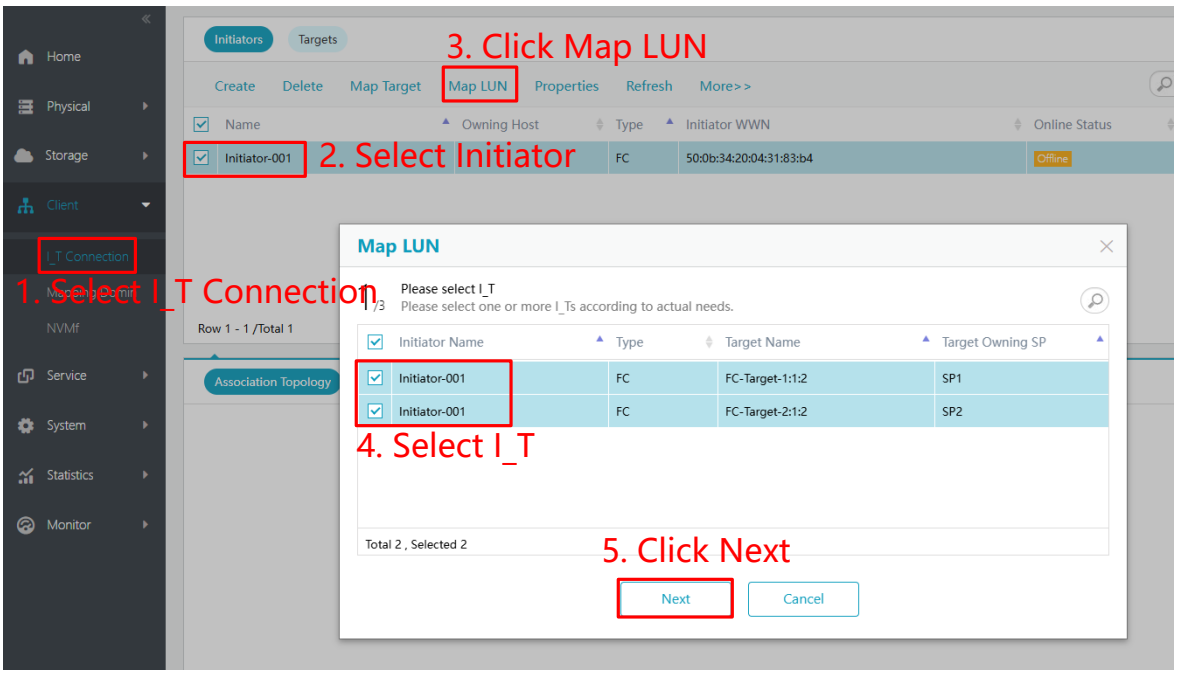

Figure 10-9 Map Initiator to LUN diagram

Step 5: Creating I_T on Server

After creating resource on the storage device and configuring the I-T-L association relationship through the above operation, log in to the client server corresponding to the Initiator:

- For an iSCSI environment, run the iSCS Iinitiator software to establish an iSCSI session, scan the LUNs, and check if all associated LUNs to the initiator are correctly discovered. For details, refer to relevant Initiator software document.
- For an FC environment, after completing the configuration on the storage device, an FC connection will be created automatically on the corresponding client server. Please log in to the client server, scan the LUNs, and check if all associated LUNs to the FC ports on the client server are correctly discovered.

10.4 Configuring Mapping Domain

This section introduces a whole process of configuring mapping domain resources, as shown in Figure 10-10.

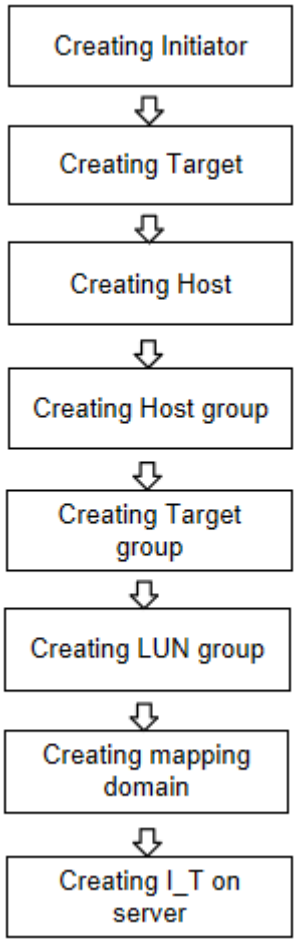

Figure 10-10 Flowchart for configuring mapping domain resource

ⓘNOTE

This operation example describes the resource configuration process in FC environment, only including the required steps and parameters. The configuration process in iSCSI environment is similar and will not be introduced separately.

Step 1: Creating Initiator

ⓘNOTE

Please log in to the corresponding client server and record the WWN before creating an Initiator.

Create an Initiator, select "FC" type, enter name and WWN, and click the <OK> button to complete. For details, refer to 7.2.2 Creating Initiator.

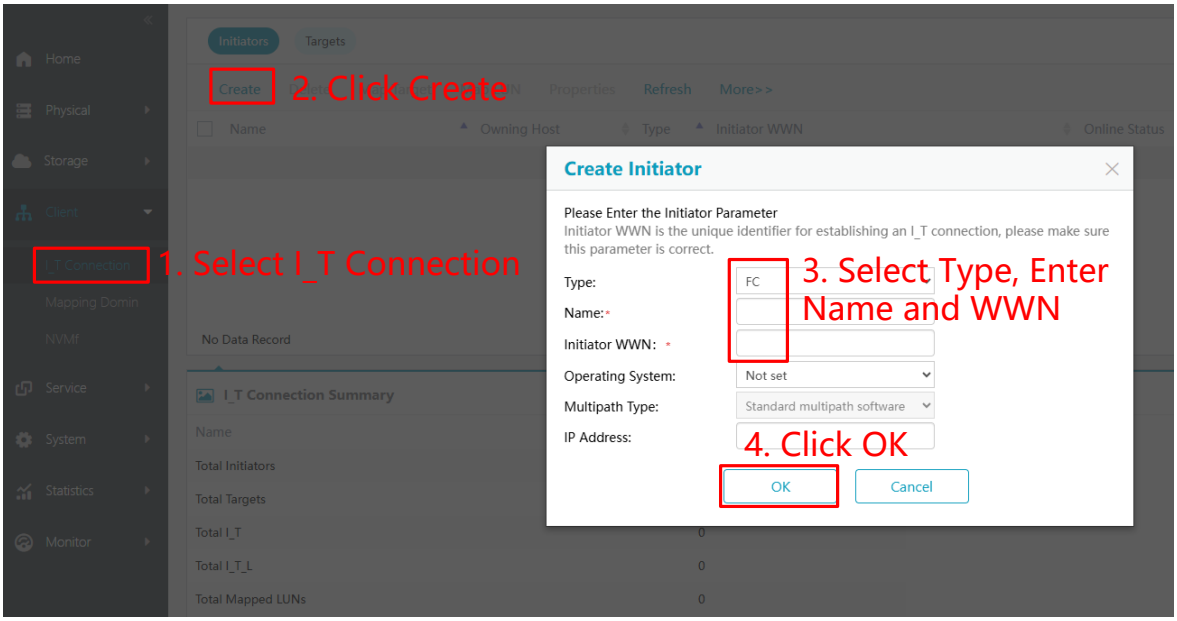

Figure 10-11 Create FC Initiator diagram

Step 2: Creating Target

Create a Target according to actual networking, select "FC" type and IP protocol version, and click the <Next> button to continue. For details, refers to 7.3.2 Creating Target.

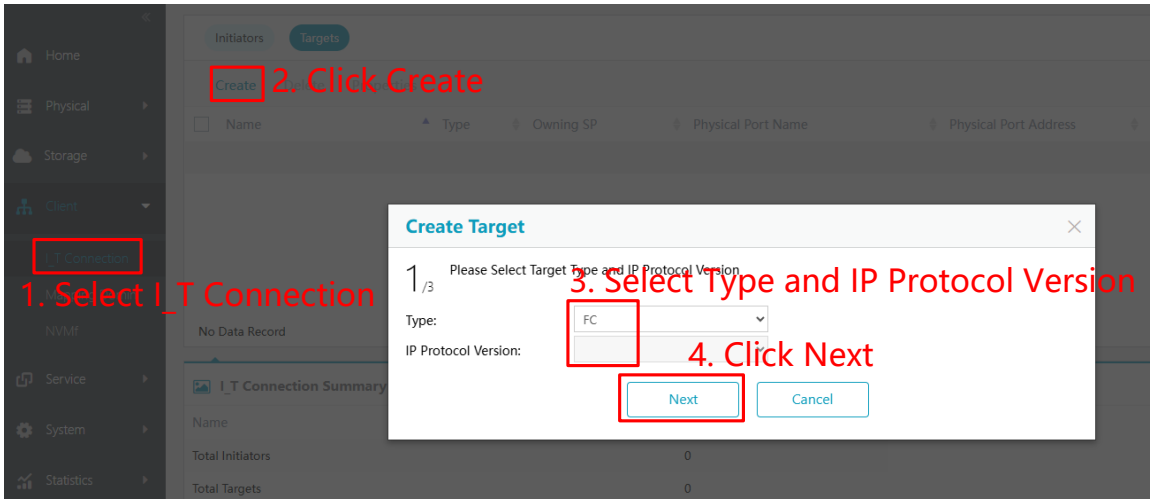

Figure 10-12 Create Target wizard diagram

Step 3: Creating Host

Creat a Host, enter Host's name (eg, "Host-1"), and click the <Next> button to continue. For details, refer to 7.5.2.1 Creating Host.

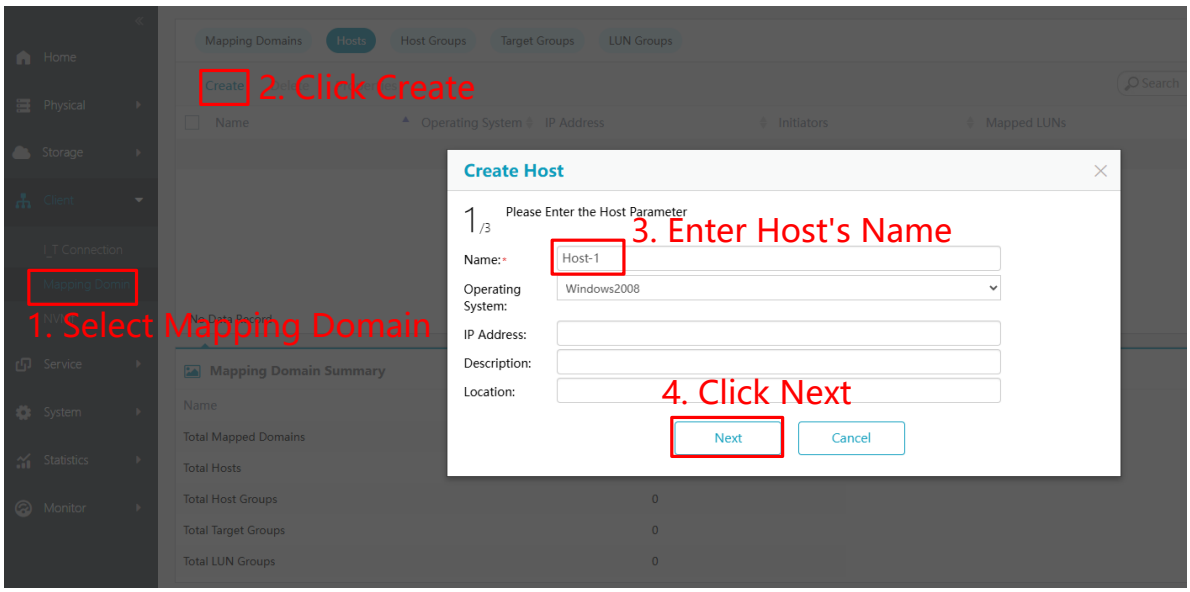

Figure 10-13 Creating Host wizard diagram

Step 4: Creating Host Group

Creat a Host group, enter Host group's name (eg, "Host-Group-1"), and click the <Next> button to continue. For details, refer to 7.5.3.1 Creating Host Group.

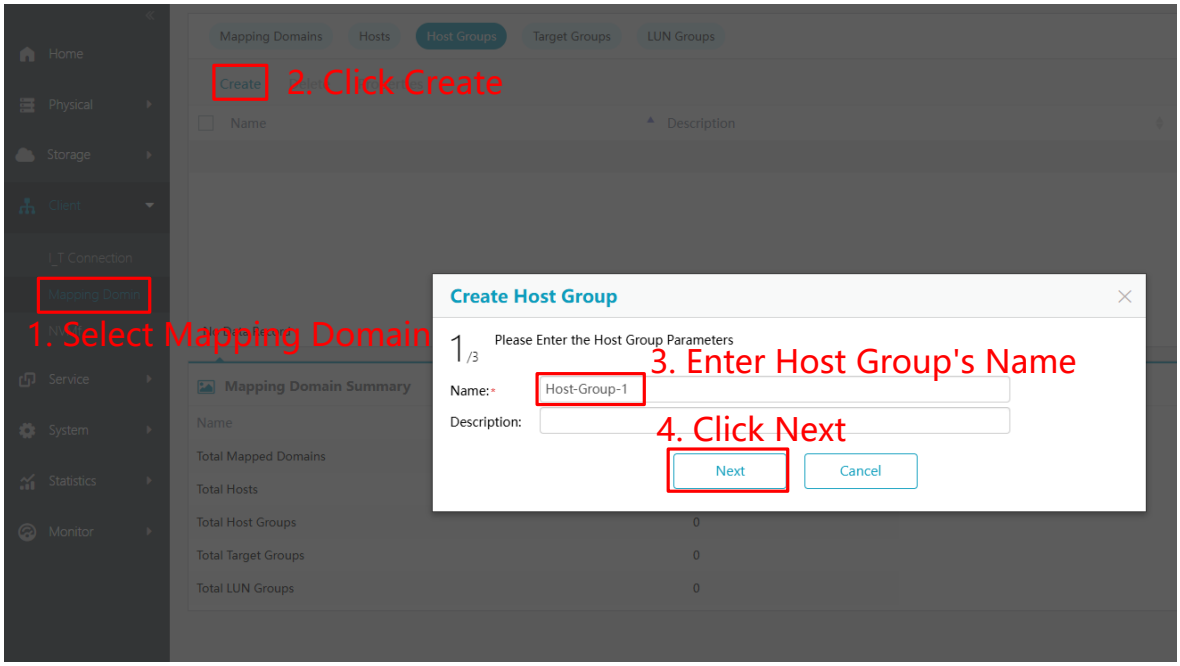

Figure 10-14 Creating Host group wizard diagram

Step 5: Creating Target Group

Creat a Target group, enter Target group's name (eg, "Target -Group-1"), and click the <Next> button to continue. For details, refer to 7.5.4.1 Creating Target Group.

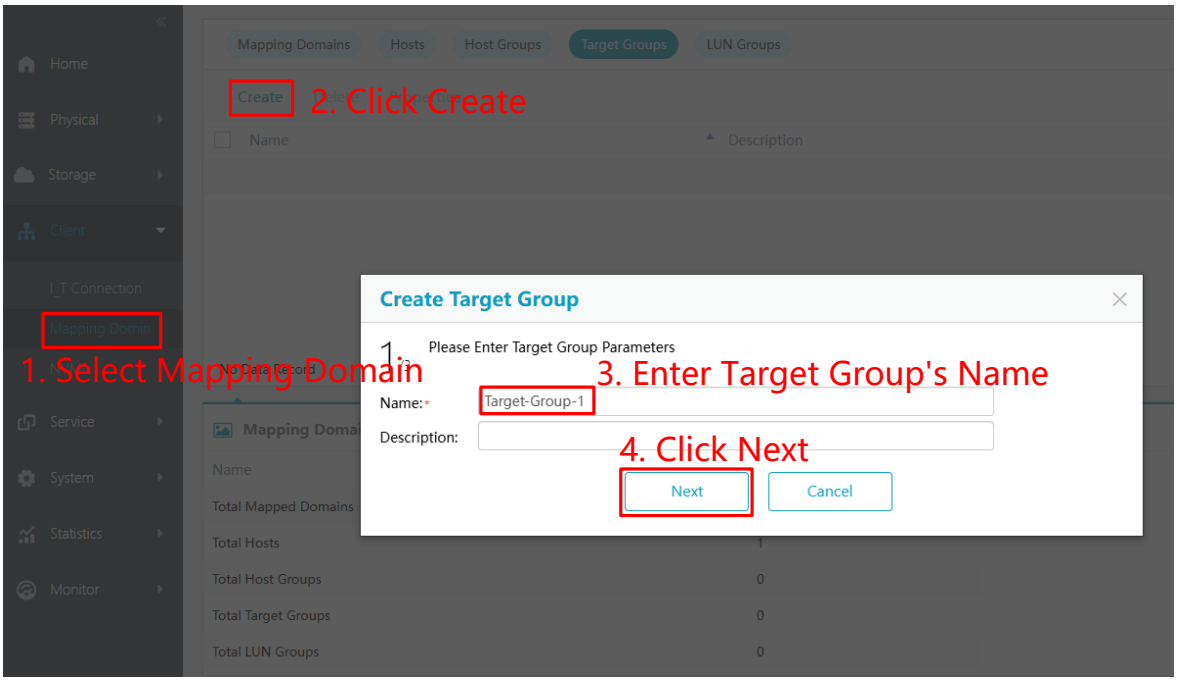

Figure 10-15 Creating Target group wizard diagram

Step 6: Creating LUN Group

Creat a LUN group, enter LUN group's name (eg, "LUN-Group-1"), and click the <Next> button to continue. For details, refer to 7.5.5.1 Creating LUN Group.

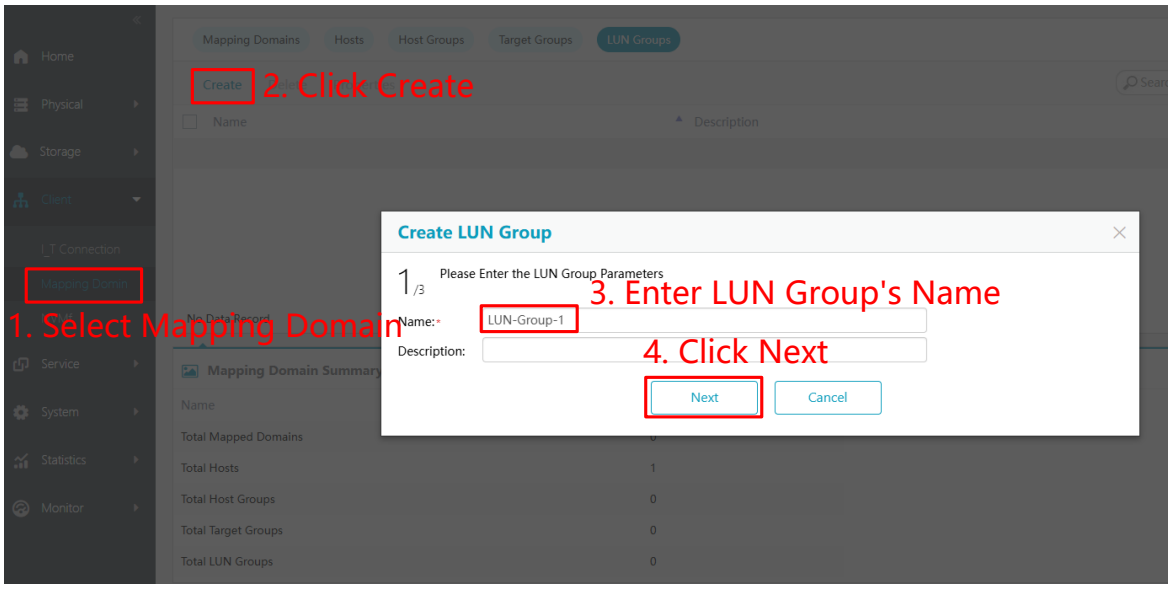

Figure 10-16 Creating LUN group wizard diagram

Step 7: Creating Mapping Domain

Creat a mapping domain, enter mapping domain's name (eg, "Mapview-1"), and click the <Next> button to continue. For details, refer to 7.5.6.1 Creating Mapping Domain.

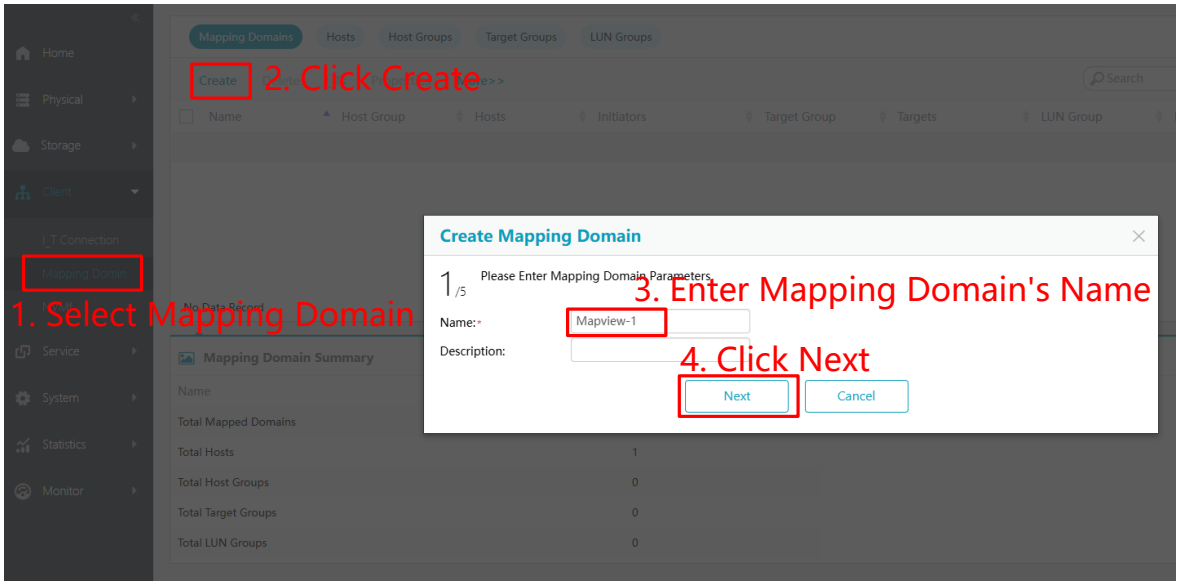

Figure 10-17 Creating mapping domain wizard diagram

Step 8: Creating I_T on Server

After creating resource on the storage device and configuring the mapping domain association relationship through the above operation, log in to the client server corresponding to the Host:

- For an iSCSI environment, run the iSCS Iinitiator software to establish an iSCSI session, scan the LUNs, and check if all associated LUNs to the initiator are correctly discovered. For details, refer to relevant Initiator software document.
- For an FC environment, after completing the configuration on the storage device, an FC connection will be created automatically on the corresponding client server. Please log in to the client server, scan the LUNs, and check if all associated LUNs to the FC ports on the client server are correctly discovered.

10.5 Configuring NVMf

This section introduces a whole process of configuring NVMf resources, as shown in Figure 10-18.

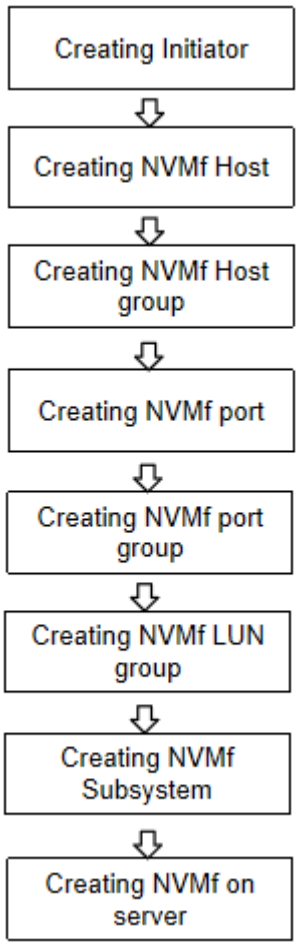

Figure 10-18 Flowchart for configuring NVMf resource

ⓘNOTE

This operation example describes the resource configuration process in FC environment, only including the required steps and parameters. The configuration process in iSCSI environment is similar and will not be introduced separately.

Step 1: Creating Initiator

ⓘNOTE

Please log in to the corresponding client server and record the WWN before creating an Initiator.

Create an Initiator, select "FC" type, enter name and WWN, and click the <OK> button to complete. For details, refer to 7.2.2 Creating Initiator.

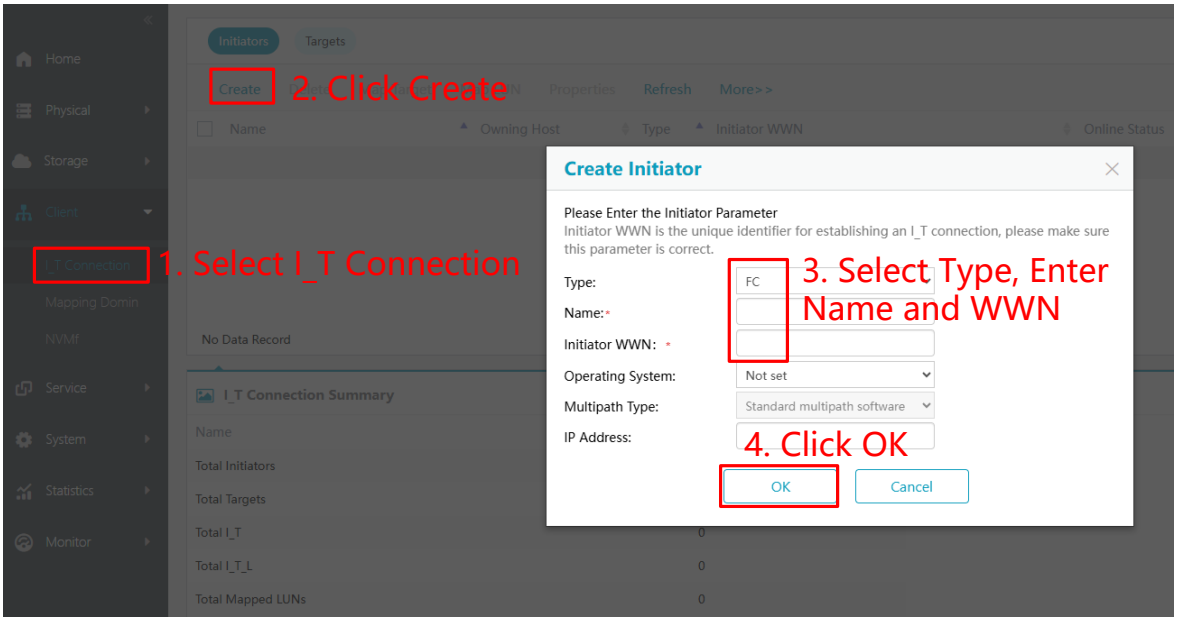

Figure 10-19 Create FC Initiator diagram

Step 2: Creating NVMf Host

Creat an NVMf Host, enter NVMf Host's name (eg, "NVMf-Host-1"), and click the <Next> button to continue. For details, refer to 7.6.3.1 Creating NVMf Host.

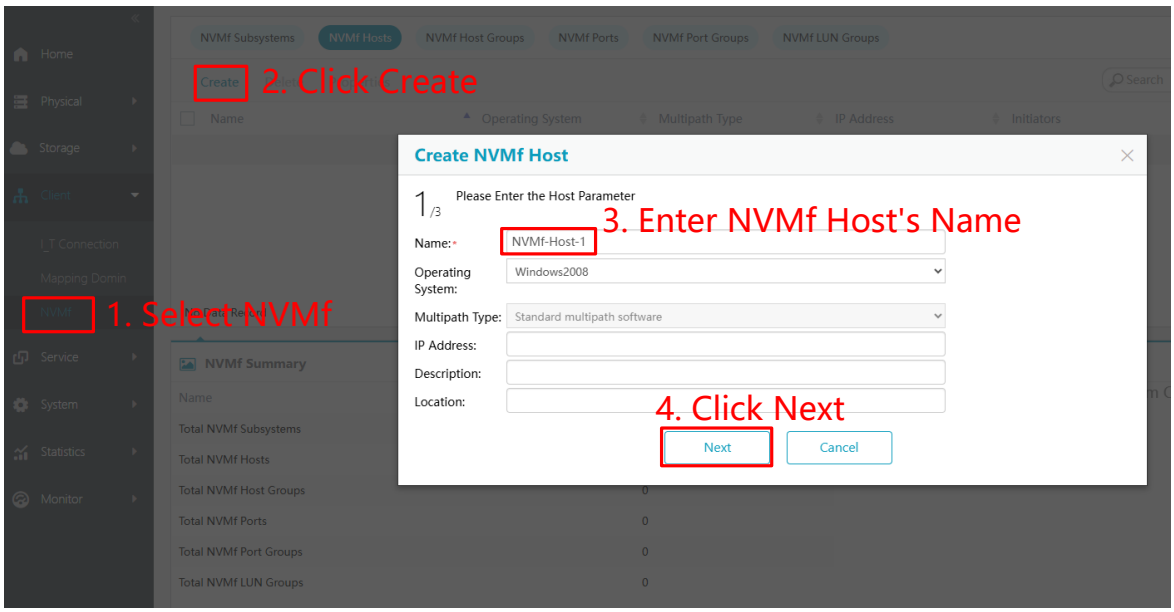

Figure 10-20 Creating NVMf Host wizard diagram

Step 3: Creating NVMf Host Group

Creat an NVMf Host group, enter NVMf Host group's name (eg, "NVMf-Host-Group-1"), and click the <Next> button to continue. For details, refer to 7.6.4.1 Creating NVMf Host Group.

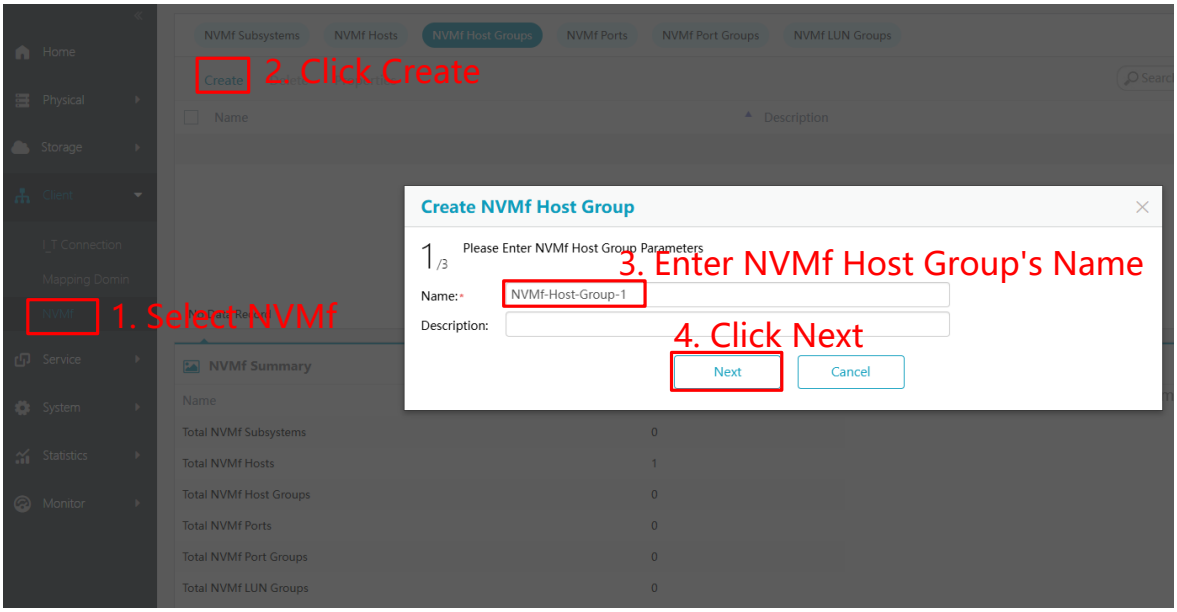

Figure 10-21 Creating NVMf Host group wizard diagram

Step 4: Creating NVMf Port

Create an NVMf port, select "FC" type and NVMf port according to actual networking, and click the <Next> button to continue. For details, refer to 7.6.5.1 Creating NVMf Port.

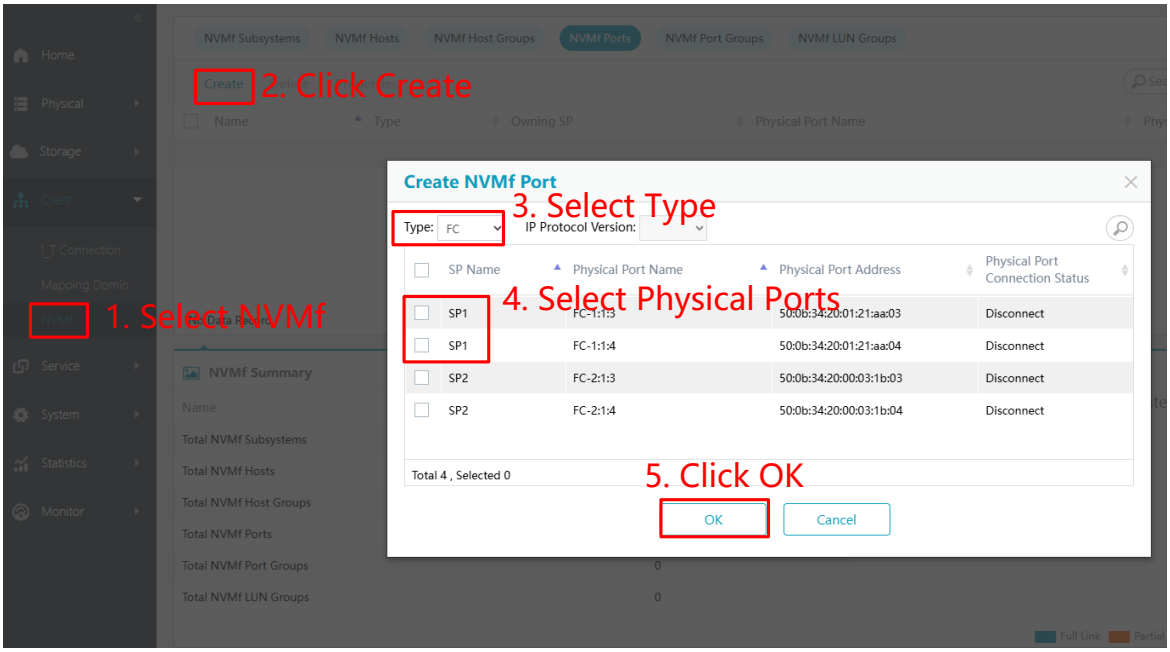

Figure 10-22 Creating NVMf port wizard diagram

Step 5: Creating NVMf Port Group

Create an NVMf port group, enter NVMf port group's name (eg, "NVMf-Port-Group-1"), and click the <Next> button to continue. For details, refer to 7.6.6.1 Creating NVMf Port Group.

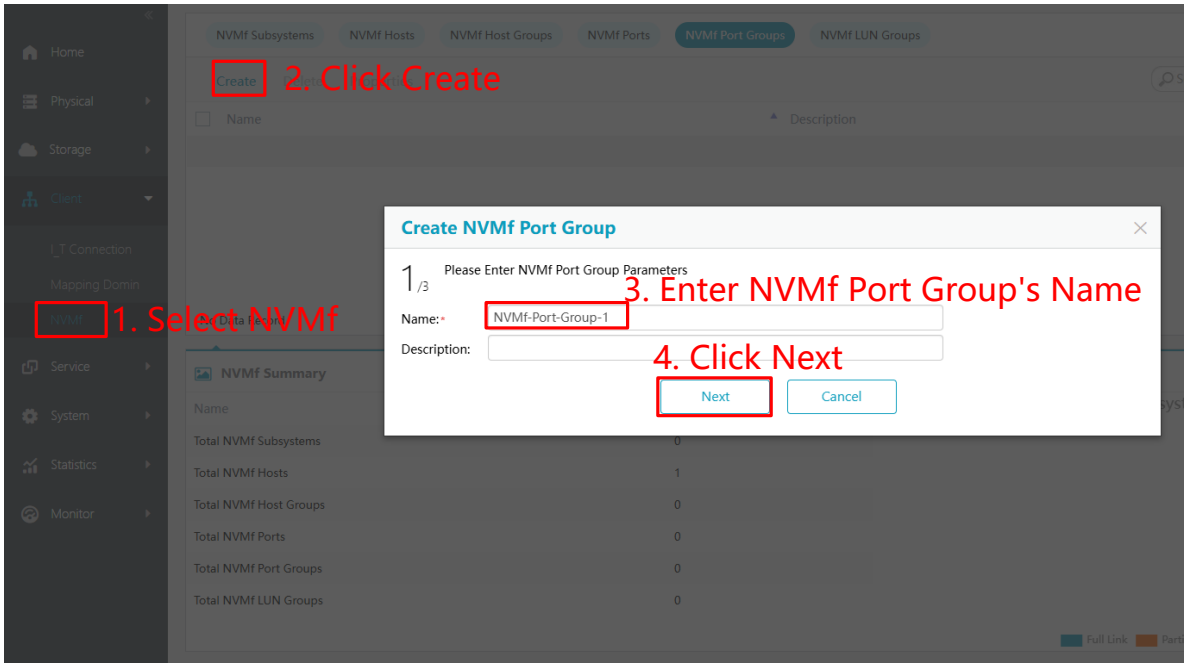

Figure 10-23 Creating NVMf port group wizard diagram

Step 6: Creating NVMf LUN Group

Create an NVMf LUN group, enter NVMf LUN group's name (eg, "NVMf-LUN-Group-1"), and click the <Next> button to continue. For details, refer to 7.6.7.1 Creating NVMf LUN Group.

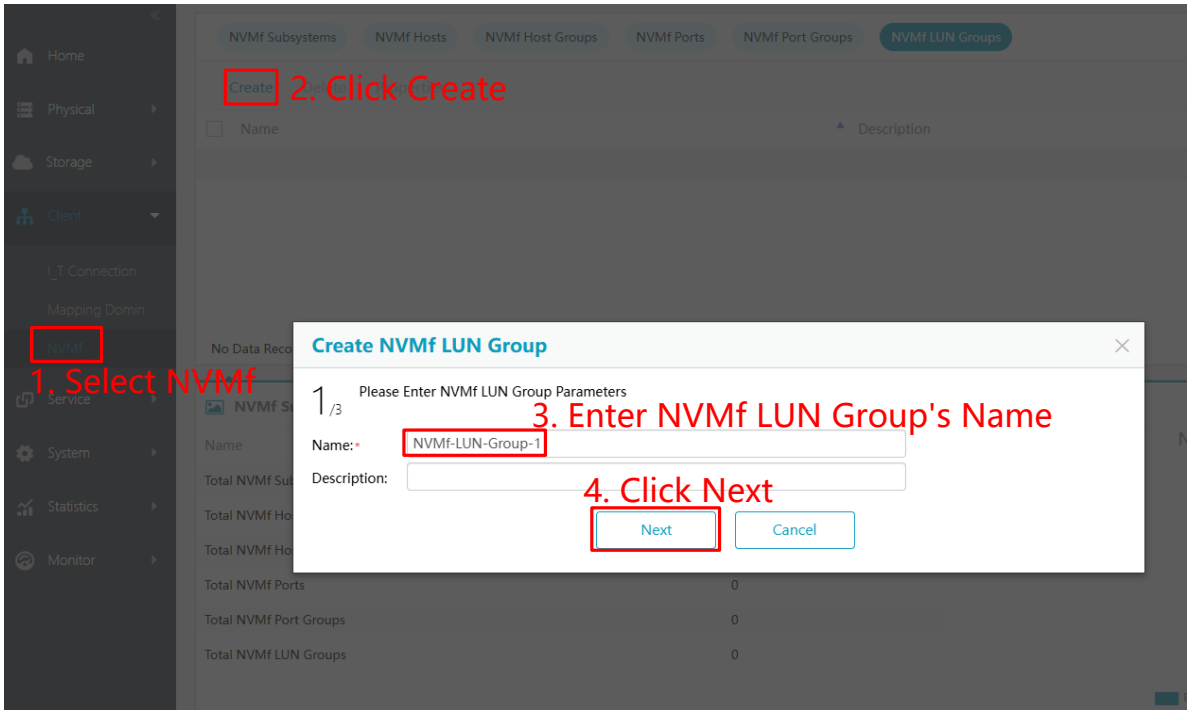

Figure 10-24 Creating NVMf LUN group wizard diagram

Step 7: Creating NVMf Subsystem

Create an NVMf Subsystem, enter NVMf Subsystem's name (eg, "NVMf- Subsystem-1"), and click the <Next> button to continue. For details, refer to 7.6.8.1 Creating NVMf Subsystem.

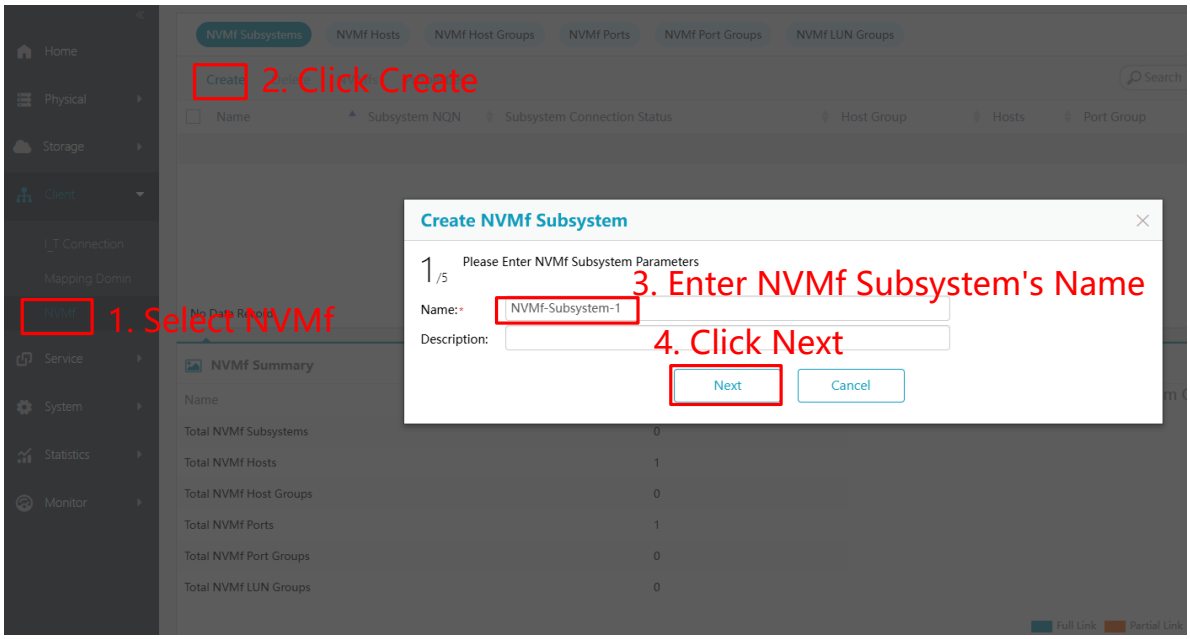

Figure 10-25 Creating NVMf Subsystem wizard diagram

Step 8: Creating NVMf on Server

After creating resource on the storage device and configuring NVMf Subsystem association relationship through the above operation, log in to the client server corresponding to the NVMf Host. Run related commands to discover and connect to the target Subsystem, and check whether LUNs are correctly discovered on the target Subsystem. For details, refer to relevant NVMf connection document.

Appendix A. **Device Default Configurations**

The default configurations of the device are shown in Table 10-1.

Table 10-1 Device default configuration

Item	Default
Device name	Storage-1
IP address of the SP1 management network port	192.168.0.210
IP address of the SP2 management network port	192.168.0.220
IP address of the SP3 management network port	192.168.0.230
IP address of the SP4 management network port	192.168.0.240
Administrator	admin
Password	admin

Appendix B. **Device External Ports Summary**

Device external ports list is shown in Table 10-2.

Table 10-2 Device external ports summary

Port name	Port number	Protocol	Switch	Description
FTP listen port	21	TCP	On by default	Files cannot be uploaded/downloaded through GUI when it is off.
SSH listen port	22	TCP	On by default	SSH cannot be logged in when it is off.
DNS port	53	TCP/UDP	On by default	DNS cannot be used when it is off.
SNMP listen port	161	UDP	On by default	SNMP function on Get and Set cannot be used when it is off.
iSCSI listen port	3260	TCP	On by default	iSCSI cannot be used when it is off.
Universal VM Console port	8081	TCP	On by default	VM cannot be used when it is off.
【VVOL】HTTPS listen port	8443	TCP	On by default	GUI cannot be used when it is off.
【VVOL】HTTPS service listen port	8448	TCP	On by default	VVOL cannot be used when it is off.
Smart enclosure Internet configuration port	8888	TCP	On by default	Smart enclosure Internet auto configuration cannot be used when it is off.
Webservice listen port	9090	TCP	On by default	Cannot off.
	10100	TCP	On by default	Cannot off.
replication listen port	15500	TCP	On by default	Replication cannot be used when it is off.
	15510	TCP	On by default	Replication cannot be used when it is off.
mirror listen port	15550	TCP	On by default	Dual-active or mirror cannot be used when it is off.
mirror link detection port	16666	UDP	On by default	Dual-active or mirror cannot be used when it is off.
XAN Internet listen port	15775	TCP	On by default	Functions related to XAN cannot be used when it is off.

Appendix C. **Glossaries**

A

Active-Backup	It is a port aggregation mode. The traffic model between member ports is active/standby mode.

B

Balance-RR	It is a port aggregation mode. The traffic model between member ports is load balance mode.

C

Cache	Cache is one of the important performance optimizations for storage devices. It improves storage read/write performance by storing frequently accessed data in high-speed physical memory. At the same time, it identifies hotspots in advance and pre-reads corresponding data into high-speed physical memory, further improving storage read performance.
Cache--Dirty Data	It refers to the reserved data in the write cache yet has not been flushed to disks.
Cache--Dynamic Allocation	It means that the system dynamically adjusts the cache space occupied by each LUN in accordance with the corresponding traffic in the current statistical cycle to optimize overall utilization of the system cache.
Cache--Frozen Cache	It means that the dirty data in the cache cannot be successfully down-flushed to the disk and is temporarily stored in the cache because of RAID failure or other reasons.
Cache--Fixed Allocation	It means that the system allocates cache space for LUNs based on the set percentage.
Cache--Read-ahead	In the read cache field, the read-ahead function can be used to identify hotspots in advance and pre-read the corresponding data from the disk to the read cache, further improving the read performance of the storage. It is suitable for situations where the traffic model is sequential reads.
CLI	One of the management interfaces of the storage device, which manages the device through the command line interface.
Console ETH Port	The network ports designed for management.

D

Data Reduction	It refers to the technology of reducing data storage space. In this manual, data reduction mainly means data deduplication and data compression.
Data Reduction--Compression	Data compression is a data reduction technology that re-encodes data by a specific algorithm to reduce storage space.
Data Reduction--DDSR	A data copy shared resource that used to store all data of reduction LUN and deduplication metadata.

Data Reduction--Deduplication	Data deduplication is a data reduction technology that reduces the physical storage capacity occupied by data through deleting redundant data blocks in the storage system.
Data Reduction--Reduction Ratio	It refers to the ratio of the amount of data written by the user to the amount of data actually written to the disk.
DSU	Disk Shelf Unit (DSU), commonly refers to a disk enclosure, which consists of Expander Processors (EP), fan modules, battery modules, power supply modules and disk modules, so as to achieve storage device expansion. DSU can be divided into SAS disk enclosure and NVMe disk enclosure according to the protocol types they supported.
Dual-Active LUN	It consists of two LUNs, which are primary LUN and mirror LUN.
Dual-Active--Mirror Role	It refers to the role of the LUN in dual-active LUNs, which includes primary LUN and mirror LUN.
Dual-Active--Primary LUN and Mirror LUN	It refers to the two LUNs in dual-active LUN. The primary LUN is always synchronized to mirror LUN when the data in the two LUNs are different.
Dual-Active--Reverse	It refers to reversing the mirror role of two LUNs in the dual-active LUNs.
Dual-Active--Synchronize	It refers to the process of synchronizing the data in primary LUN to mirror LUN when the data in the two LUNs are different.

E

EP	Expander Processor (EP) commonly refers to a disk enclosure controller, which can be installed in a Disk Shelf Unit (DSU) to achieve back-end data processing and distribution of storage devices.

F

Fabric	A network topology structure in which nodes transmit data to each other through interconnection switches, such as InfiniBand, Ethernet (RoCE, iWARP), FC, etc. Fabrics in this manual are based on RDMA standards.
FC Adapter	It refers to the FC port that is set to Initiator mode.
FC Port Working Mode	It refers to the usage of the FC port, including Initiator mode, Target mode and NVMf mode, and the default mode is Target.
FP	Fabric Processor (FP) commonly refers to smart switch enclosure controller, which can be installed in an FSU (Fabric Switch Unit) to achieve back-end data processing and distribution of storage devices.
Front-End Application Server	It refers to the servers that use the storage space provided by the storage device.
FSU	FSU (Fabric Switch Unit) commonly refers to smart switch enclosure and consists of FPs (Fabric Processors), fan modules, battery modules, power supply modules and disk modules, so as to achieve business processing, disk swap, storage device capacity expansion and other functions.

G

Gateway	A gateway refers to a network that serves as an entry node to another network.
GUI	Graphical User Interface (GUI) is one of the management interfaces of storage devices, which is used to manage the devices through words and figures.

H

HA	The storage device includes dual-controller or quad-controller, and each controller is set to Active mode by default, providing external business. If one controller fails, the others will automatically take over its business to ensure business continuity. Once the faulty controller is fixed, it will resume its original tasks and all controllers will be back in Active mode.
HA--Recovery	It refers to the process of reloading the original business of the faulty controller after it recovers.
HA--Takeover	It refers to the process in which when one controller in a storage device fails, another controller automatically takes over its business.
HotCache	It is an important performance optimization for storage devices. SSDs are used as the second-level cache of storage devices based on their high-speed access feature, improving the overall read performance of storage devices.
HotCache--LUN	It refers to the LUN created based on HotCache-RAID and dedicated by HotCache function.
HotCache--Pool	It refers to the pool to which HotCache-RAID and HotCache-LUN belong.
HotCache--RAID	It refers to the RAID created through SSD and dedicated by HotCache function.
Hot Spare Disk	It refers to disks that can be used for rebuilding after redundant RAID degradation.
Hot Spare Disk--Blank Hot Spare Disk	When RAID needs to be rebuilt in the case of blank disk hot spare is enabled, if there is no dedicated hot spare or available global hot spare, a blank disk that meets the requirements in the storage device will be used for rebuilding, and there is no need to manually set the disk as a hot spare, greatly simplifying the operations of the storage administrator.
Hot Spare Disk--Dedicated Hot Spare Disk	Dedicated hot spare disk can only be used by corresponding RAID.
Hot Spare Disk--Global Hot Spare Disk	A global hot spare can be used by all RAIDs in the system, provided that the type and capacity of the global hot spare meet the requirements of the RAID that needs to be rebuilt.

I

Initiator	It usually means the application server, which is the Initiator of commands and requests in SCSI protocol.
iSCSI	It is a standard network protocol for high-speed data transmission based on Ethernet.

iSCSI--Bi-directional CHAP Authentication	It means Initiator and Target can authenticate each other. Bi-directional CHAP authentication is enabled on the base of uni-directional CHAP authentication. Set specified authentication username and password for the Initiator on the application server; Enable bi-directional CHAP authentication for iSCSI Target on the storage device, and enter this user name and password; When the application server initiates an iSCSI connection request, it will determine whether the CHAP authentication information returned by the storage device is consistent with the authentication information preset by the Initiator, if yes, the connection can be established; if not, the establishment fails.
iSCSI--CHAP Authentication	It is a password-based query response authentication protocol.
iSCSI--Uni-directional CHAP Authentication	It means authentication of Target on Initiator. Enable CHAP authentication for Initiator on the storage device, and set username and password; When using the Initiator on the application server to connect to the storage device, enter the corresponding username and password; When the storage device receives the iSCSI connection request, it checks whether the authentication information carried in the iSCSI connection request is consistent with the preset authentication information in the storage device. If yes, the connection can be established. If not, the connection establishment fails.

L

LUN	It refers to logical storage space accessible to client servers.
LUN--Owing SP	The default ownership of a LUN is set by the user, which means that the created LUN is assigned to a certain controller. When HA switches, it will be automatically switched to the peer controller for management, and the current ownership will change; When the HA status returns to normal, it will be automatically switched back to the local controller for management.

M

Management PC	It refers to the laptop, PC or server that is used to run ODSP Scope.
Multi-Tenant	Multi-tenant is a new resource management technology, the core of which is to provide shared storage resources for multiple branches or departments based on the same physical storage system.

N

NDM	Non-interrupt Data Migration.
NVMe	Non-Volatile Memory express, which is an interface specification for logical device. It is used to access to non-volatile storage media through PCIe bus, greatly improving the storage performance.
NVMf	NVMe over fabrics, which is a technology that access to NVMe through the fabric such as RDMA or optical fiber channel architecture on the base of NVMe protocol.

O

ODSP

Open Data Storage Platform (ODSP) is a special storage software platform developed by MacroSAN Technologies Co., Ltd independently. It is applicable to all series of MacroSAN storage devices, providing advanced data security, business continuity, flexible scalability, open customization and rich storage features for storage devices.

ODSP Scope

Open Data Storage Platform Scope (ODSP Scope) is a GUI management tool for storage devices based on MacroSAN ODSP software platform. It adopts CS architectures and provides a Java-based management interface.

ODSP Scope+

Open Data Storage Platform Scope+ (ODSP Scope+) is an upgraded version of ODSP Scope featured by BS architectures with web-based management interface, providing easier management of the entire system for administrators.

P

Pool

A pool is a resource zone, which contains a group of disks, RAIDs and LUNs. The data can flow within the pool by Cell to implement dynamic allocation and management of storage resources.

Port Aggregation

It refers to binding two or more physical network ports into one aggregated port, where any member port disconnection does not affect business continuity.

Power Off Disk Safely

The sudden power failure of the disk may cause the magnetic head to scratch the disk surface, resulting in disk media errors. Therefore, software is used to stop and power off the disk normally, and then prompt the user to manually remove the disk to protect the disk.

R

R3DC

It refers to create XANs between three data centers, and then enabling dual-active/synchronous + asynchronous replication to achieve a multi data center disaster recovery. The coexistence of three data centers ensures the continuity of business in the event of a disaster in any two data centers, greatly improving the availability of disaster recovery solutions.

RAID

RAID is a protection mechanism that combines multiple independent physical disks in different ways to form a disk group, providing higher storage performance than a single disk and supporting data redundancy.

RAID Level

It refers to different data organization ways, commonly including RAID0, RAID1, RAID5, RAID6, RAID10, RAIDx-3, etc.

RAID--Non-redundant

Non-redundancy means that there is no redundancy protection for data in a RAID array. If a member disk of the RAID array fails or is removed, some or all data in the RAID array becomes inaccessible.

RAID Rebuild

It refers to the process of using a hot spare to rebuild and restore RAID redundancy after a redundant RAID is downgraded.

RAID--Redundant

Redundancy means that data in a RAID array is redundant. If a member disk fails or is removed from the RAID array, data availability in the RAID array is not affected.

RDV Initialization	The volumes on the back-end storage device are directly provided to the front-end application server and the original data is reserved.
RDV-LUN	It refers to the LUNs that are created based on volumes initialized in RDV mode and can be directly accessed by front-end application servers.
Reduction LUN	It refers to the LUN with enabled deduplication and/or compression, including deduplication LUN, compression LUN and deduplication and compression LUN.
Replication	Replication is one of the commonly used data protection methods, which refers to the process of replicating data from the primary resource to the replica resource according replication mode initiated by source device after the replication relationship is configured.
Replication--Activate/Suspend Replication Policy	Replication policies can be manually suspended or activated for replication pairs. After suspending the replication policy, replication will not be performed when the policy is met next time. The policy will not take effect until it is activated again. Suspending operation does not affect the current replication in progress.
Replication—Activate/Suspend Replication Mode Switching Policy	Replication pair's replication mode switching policy can be suspended or activated manually. After suspending a replication mode switching policy, replication mode will not be switched automatically until the policy is reactivated in the case of its replication mode switching policy is met.
Replication-in and Replication-out	It means the replication direction. The primary resource is replication-out and the replica resource is replication-in in one replication pair.
Replication--Initial Replication	It refers to the first replication process between primary resource and replica resource.
Replication--Local Replication and Remote Replication	Local replication refers to the replication in one device, which means both the primary resource and the replica resource are in the same device. Remote replication refers to the replication in different devices, which means the primary resource and the replica resource are in different devices. The link of remote replication is usually on wide-area network.
Replication Mode Switching Policy	Replication is switched automatically according to the set replication mode switching policy.
Replication Pair	It refers to the primary resource and replica resource of replication.
Replication Policy	It refers to the time policy configured by the user, and when the time policy is met, replication function will be triggered automatically by the replication source device.
Replication--Primary Resource and Replica Resource	The primary resource refers to the production data volume in the production center, while the replica resource refers to the data replica in the disaster recovery center. When replication is triggered, the data in primary resource is always replicated to the replica resource.
Replication--Scan	For replication pairs, the scanning operation allows you to obtain the differential data of the primary and replica resources, so that only the differential data is replicated in the next replication, thus reducing the amount of replicated data.
Replication--Scan Difference Before Initial Replication	This parameter specifies whether to scan before the initial replication. If yes, the scan is automatically started to obtain the differential data between the primary resource and the replica resource. Only the differential data is

	replicated during the initial replication to reduce the amount of replicated data. If you select No, all data in the primary resource is replicated during the initial replication.
Replication--Source Device and Target Device	The source device refers to the storage device to which the primary resource belongs, and the target device refers to the storage device to which the replica resource belongs. The source and target devices are relative to a certain replication pair. There can be multiple replication pairs between the two devices at the same time, and the replication direction can be the same or different.
Replication—Synchronous Replication and Asynchronous Replication	Synchronous replication refers to synchronizing data in real-time, which means data of the primary LUN is synchronously written to the replica LUN, strictly ensuring real-time consistency. Asynchronous replication refers to synchronizing data periodically, which means the changing data in the primary LUN is replicated to the replica LUN periodically based on the preset replication policy.
Replication--Update	It means that the replication relationship is disabled and the replica resource is promoted to a Thick-LUN.

S

SDAS	Symmetrical Dual Active Storage system, also known as SDAS system. In order to address business interruption caused by natural disasters or software and hardware failures, a read-write replica is created for a specific LUN in the storage device. When one of the LUNs experiences a disaster, the business can be quickly switched to the replica LUN, achieving the dual purpose of "data protection" and ensuring "business continuity".
Snapshot	Snapshot is one of the commonly used methods of data protection. After configuring snapshots, multiple time points can be created to provide "soft disaster" protection for production data volumes.
Snapshot Policy	It refers to the time policy configured by the user. When the time policy is met, the device will automatically create a snapshot time point.
Snapshot Resource	Snapshot resource relies on LUN. It is used to save data at a snapshot time point on a LUN.
Snapshot Resource Auto-expansion	Snapshot resource auto-expansion is triggered automatically when the resource usage reaches the threshold to avoid invalid snapshot resource caused by full capacity.
Snapshot Resource Data Validity	It is a logical state, which indicates whether the data in the snapshot resource is available, including valid and invalid.
Snapshot Rollback	It is usually called rollback. If the data is damaged because of "soft disaster", the data of the front-end business corresponding to the LUN or view can be rolled back to attempt to recover the business. Snapshot rollback supports rollbacks on time point, view and LUN.
Snapshot Time Point	It is usually called time point. Data on the historical time plane of a LUN is saved by using snapshot. One time point is corresponding to a time plane.
Snapshot View	By creating a snapshot view, the data of the time plane corresponding to the time point associated with the view can be read. At the same time, the view also supports enabling snapshot, creating time points and views.

SNSD	Combining SNSD with the iNoF of the switch can achieve plug-and-play and fast fault detection in NVMF environments, achieving second level switching in case of path failures, improving the reliability of the storage system.
SP	Storage Processor (SP) commonly refers to storage controller, which can be installed in a Storage Processor Unit (SPU) to achieve data sending and receiving, processing and protection of storage devices.
SPU	Storage Processor Unit (SPU) commonly refers to main control cabinet which consists of Storage Processors (SP), fan modules, battery modules, power supply modules, etc. It can be connected to the application server through the front-end network and also to the Storage Switch Unit (SSU), Fabric Switch Unit (FSU) and Disk Shelf Unit (DSU) through the back-end network, which enables the functions of data reading, writing and protection.
SSU	Storage Switch Unit (SSU) is a special disk enclosure and commonly refers to switch enclosure, which consists of Exchange Processors (XP), fan modules, battery modules, power supply modules, disk modules and other modules to achieve disk swapping, storage device capacity expansion and other functions.

T

Target	Target usually refers to the storage device, which is the receiver of commands and requests in the SCSI protocol.
Thick-LUN	It refers to the LUN without thin provisioning.
Thin-LUN	It refers to the LUN with thin provisioning.
Thin-LUN Data Area	It is used to store Thin-LUN user data.
Thin-LUN Extent	It is the smallest unit of Thin-LUN space management. The smaller the extent, the higher the space utilization.
Thin-LUN Logical Capacity	It refers to the size of Thin LUN shown on the client server.
Thin-LUN Physical Capacity	It refers to the physical space allocated to Thin-LUN.
Thin-LUN Private Area	It is used to store Thin-LUN management data.
Thin Provisioning	Thin Provisioning is a new storage management feature, with the core principle of "deceiving" the operating system into recognizing that there is a large amount of storage space when the actual physical storage space is small; As applications write more and more data, the storage system will automatically expand physical storage space in the background, achieving on-demand allocation and resulting in higher utilization of physical storage space and saving users' investment.

V

Virtualization Device	It refers to a storage device that provides virtualization function and centrally manages the storage space provided by the virtualized devices.
Virtualized Device	It is external device, also called back-end storage device, whose resources

	are allocated to virtualization devices for unified management of storage devices.
Volume	It refers to the LUN created on a back-end storage device is recognized as a volume after it is assigned to the virtualization device.
Volume Attach Status	The attach status of the volume is determined by user operations.
Volume Online Status	It means whether the virtualization device can access the volume and is determined by the path state.
Volume--Owing SP	It refers to the controller of the virtualization device that can access the volume and is determined by the path state.

X

XP	Exchange Processor (XP) is a special disk enclosure controller, commonly refers to switch enclosure controller, which can be installed in Storage Switch Units (SSU) to achieve back-end data processing and distribution of the storage device.

Appendix D. **Acronyms**

A	
ATA	Advanced Technology Attachment
C	
CHAP	Challenge Handshake Authentication Protocol
CLI	Command-Line Port
COW	Copy on Write
CRAID	RAID based Cell
D	
DDSR	Data Duplicate Shared Resource
DSU	Disk Shelf Unit
E	
EP	Expander Processor
F	
FC	Fiber Channel
G	
GE	Gigabit Ethernet
GUI	Graphical User Port
H	
HA	High Availability
I	
IE	Internet Explorer
iNoF	Intelligent Lossless NVMe over Fabrics
IP	Internet Protocol
iSCSI	Internet Small Computer Systems Port

J

JRE	Java Runtime Environment

L

LUN	Logical Unit Number

N

NDM	Non-interrupt Data Migration
NGUID	Namespace Globally Unique Identifier
NVMe	Non-Volatile Memory Express
NVMf	NVMe over Fabrics

Q

QoS	Quality of Service

R

RAID	Redundant Array of Independent Disks
RDV	Reserved Data Virtualize
ROW	Redirect on Write

S

SAN	Storage Area Network
SAS	Serial Attached SCSI
SATA	Serial ATA
SCSI	Small Computer System Port
SDAS	Symmetrical Dual Active Storage
SMI-S	Storage Management Initiative Specification
SMTP	Simple Mail Transfer Protocol
SNMP	Simple Network Management Protocol
SNSD	Storage Network Smart Discovery
SP	Storage Processor
SPU	Storage Processor Unit
SSD	Solid State Drive
SSU	Storage Switch Unit

W

WWN	World Wide Name/World Wide Name

X

XAN	eXchange Area Network
XP	Exchange Processor