

# Storage System User Manual

UD05216B

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#### **FCCInformation**

FCCcompliance: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. The device is advised to note that as a seller or a business user (Class A) Devices and intended for use outside the Home area.

#### **FCC Conditions**

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.

2. This device must accept any interference received, including interference that may cause undesired operation.

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This product and - if applicable - the supplied accessories too are marked with "CE" and comply therefore with the applicable harmonized European standards listed under the EMC Directive 2014/30/EU, the RoHS Directive 2011/65/EU, the LVD Directive 2014/35/EU.



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cadmium (Cd), lead (Pb), or mercury (Hg). For proper recycling, return the battery to your supplier or to a designated collection point. For more information see: www.recyclethis.info

#### Industry Canada ICES-003 Compliance

This device meets the CAN ICES-3 (A)/NMB-3(A) standards requirements.

### Safety Instruction

These instructions are intended to ensure that user can use the product correctly to avoid danger or property loss.

The precaution measure is divided into "Warnings" and "Cautions"

Warnings:Serious injury or death may occur if any of the warnings are neglected.

Cautions: Injury or equipment damage may occur if any of the cautions are neglected.

A	Δ
Warnings Follow these safeguards to	CautionsFollow these precautions to
prevent serious injury or death.	prevent potential injury or material
	damage.



### Warnings

- Proper configuration of all passwords and other security settings is the responsibility of the installer and/or end-user.
- In the use of the product, you must be in strict compliance with the electrical safety regulations of the nation and region. Please refer to technical specifications for detailed information.
- Input voltage should meet both the SELV (Safety Extra Low Voltage) and the Limited Power Source with 100~240 VAC or 12 VDC according to the IEC60950-1 standard. Please refer to technical specifications for detailed information.
- Do not connect several devices to one power adapter as adapter overload may cause over-heating or a fire hazard.
- Please make sure that the plug is firmly connected to the power socket.
- If smoke, odor or noise rise from the device, turn off the power at once and unplug the power cable, and then please contact the service center.

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# Chapter 1 Overview

#### Purpose:

DS-A80&81 series storage system is a high-performance and highly reliable storage system. Designed with four enterprise-class gigabyte network interfaces, it provides a bandwidth with 4 to 8G bps transmission capability and a huge storage space. It is integrated with multiple advanced technologies, including a 64-bit hexa-core processors, stable architecture, and the RAID 6 storage technology, thus to run reliably and protect user data security effectively.

Figure 1. 1 GUI and Table 1. 1 GUI Introduction introduce the elements appear in the GUI (Graphical User Interface) and clarify names for each element.

1	DS-A80624S manag	e system +	+ <sup>+</sup> + + , - <sup>*</sup> W <sup>2</sup> , <sup>N</sup> ormal
Maintenance ** System Monitor	intenance -> System Monito	DI	
* Performance	Reboot Power off	C	
<sup>™</sup> Common	ervice information Wed Nov 2	25 2015 09:30:02	
** Graphical Display	n info		
* Control Message	Users		IP address
Storage	web_admin	5	10.16.1.220
	I connection info		
Hybrid SAN	LUN ID	iSCSI ID	Initiator name
System			
Log			
? Help			
🗭 Logout			

Figure 1. 1 GUI

Table 1. 1 GUI Introduc
-------------------------

\_

No.	Name	Description	
1	Banner and device	Shows the device model.	
	model		
2	Running status	A shortcut for obtaining the real-time running status.	
3	Navigation Bar	Lists the storage system menu.	
4	Help and logout	A shortcut for accessing user manuals, downloading software, and logout.	
5	Operation window	Lists the parameters. You can configure parameters in the area.	

# Chapter 2 Getting Started

#### Purpose:

The chapter introduces HDD installation steps, web browser access steps, and login steps.

#### Table 2. 1 Module Description

Module	Description
HDD Installation	Describes the steps of HDD installation.
Web Browser Access	You can get access to the storage system via a server with the web browser installed.
Login	Introduces login storage system steps.

Key Words:

HDD Installation, Web Browser Access, Login

# 2.1 HDDInstallation



In the event of device appearance shown in following steps conflicts with real device, the later prevails.

Before you start:

Prepare the following equipment and accessories.

- A storage system
- Hard HDDs
- A pair of anti-static gloves
- A screwdriver

Steps:

1. Press the blue button. Then the handle pops up.



Figure 2. 2 Press the Blue Button

2. Hold the hander and pull the HDD dummy out of the slot.



Figure 2. 3 Pull out the HDD Dummy

- 3. Use the screwdriver to uninstall the baffle in the bottom of HDD slot.
- 4. Place an HDD in the HDD dummy. The SATA interface must face the HDD dummy rear.



#### Figure 2. 4 Place HDD

5. Adjust the HDD position. Ensure the HDD rear aligning with HDD dummy rear and the two screw holes aiming at the holes that marked with red frame in Figure 2.5 HDDPosition.



Figure 2.5 HDD Position

6. Use a screwdriver to fasten the four screws into the screw holes in both sides.



Figure 2. 6 Install Screws

7. Push the HDD dummy back into the slot.



Figure 2. 7 Push the HDD Dummy into Slot

# 2.2 Accessingby Web Browser



You shall acknowledge that the use of the product with Internet access might be under network security risks. For avoidance of any network attacks and information leakage, please strengthen your own protection. If the product does not work properly, please contact with your dealer or the nearest service center.

#### Purpose:

You can get access to the storage system via a server with a web browser installed, without needing to install any other software. The recommended web browsers are Internet Explorer 8 and Internet Explorer 11. Before you start:

- 1. Use a network cable to connect the system Ethernet port and the storage system management network interface.
- Configure the server IP address. Ensure it is in the same network segment with the IP address of management network interface is 10.254.254.254.

#### Steps:

- 1. Open web browser.
- 2. Input the storage system IP address (https://10.254.254.254.2004) in Web browser address bar.
- 3. Press Enter.

## 2.3 Login

#### Steps:

- If the device has not been activated, you need to activate the device first before login.
  - 1. Set the password for the admin user account.
  - 2. Click OKto login to the device.

<u>STRONGPASSWORDRECOMMENDE</u>D–Wehighly recommend you create a strong password of your own choosing (Using a minimum of 8 characters, including at least three of the following categories: upper case letters, lower caseletters, numbers, and special characters.) in order to increase the security of your product. And we recommend you reset your password regularly, especially in the high security system, resetting the password monthly or weekly can better protect your product.

- If the device is already activated:
  - 1. Select Login account as Basic Management or HYBRIDSAN Sub-system.
    - BasicManagement:Used to configure basic parameters of the storage system.
    - > HYBRIDSAN Sub-system: Used to Log into the HYBRID SAN sub-system.
  - 2. Select Username.
  - 3. Enter Password.
  - 4. Mode is Advancedby default and is not selectable.
  - 5. Click Login to log in the system.

Login:	Basic Management	-	
User:	web_admin		
Password:	[		
Mode:	Advanced	-	

Figure 2.8 Login

# Chapter 3 Maintenance

#### Purpose:

Maintenance function enables you to view login and iSCSI information, monitor running status, restore default settings, check and download logs, upgrade storage system, and so forth.

Table 3. 1 Module Description		
Module	Description	
System	• A shortcut for reboot and shutdown.	
	• Lists the login user information and iSCSI connection information.	
Performance	Shows you the real-time graph and data of system performance, including	
Performance	bandwidth usage, memory usage, CPU usage, IO status, and Vmstatus.	
General	You can view system version, reset system, view logs, upgrade system, and add	
General	check and repair strategy.	
Graphical Display	Provides a graph to show the front view status and a pie chart to show the storage	
Graphical Display	information.	
Environmental	Shows the fan information, module temperature, fan control panel version, and	
Livitonnenta	chassis power.	

#### Key words:

System, Performance, General, Graphical Display, Environmental



Figure 3. 2 Maintenance

# 3.1 System

#### Purpose:

Once you log into the storage system, system menu appears. System menu is a shortcut for reboot and shutdown and lists the login users and iSCSI connection information.

#### Steps:

1. Click Maintenance in navigation bar and choose System to enter System interface.

Maintenance ** System	Maintenance -> System Information	
** Performance	Reboot Shut Down	
* General	Provided Service Mon Nov 06 2017 01:55:55	
" Graphical Display	Login Information	
Storage	User Name	IP Address
	web_admin	10.192.45.52
SAN Management	web_admin	10.192.45.161
Hybrid SAN		

Figure 3. 3 System Monitor

- 2. Reboot, power off, or view login information or iSCSI connection info.
  - Click Rebootor Poweroff to restart or shut down the storage system.
  - The logged in users and IPaddresses are listed in the Logininfo.
  - The LUN ID, iSCSIID, and Initiator name are listed in iSCSIconnection info, which shows which devices are connecting iSCSI.

# 3.2 Performance

#### Purpose:

Performance menu shows you the real-time graph and data of system performance, including bandwidth usage, memory usage, CPU usage, IO status, and system performance.

Steps:

1. Click Maintenance in navigation bar and choose Performance to enter Performance interface.

Maintenance	Maintenance -> Performance Surveillance
▹ System	
* Performance	Enable Graphical System Performance
P General	Graphic Surveillance
Provide the second seco	C View IO Performance
➡ Environmental	

#### Figure 3. 4 Performance

- 2. Click EnableGraphicalto show the real-time graphs of bandwidth usage, memory usage, and CPU usage.
- 3. Optionally, click DisableGraphicalto fold the graphs.

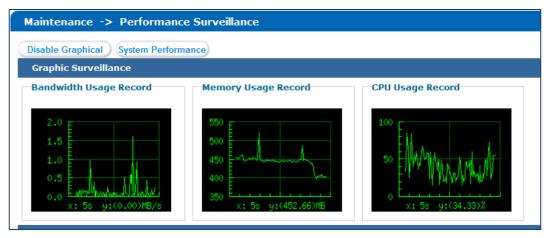


Figure 3. 5 Graph Monitor

4. Click System Performance to pop up system performance window. System performance updates per second.

- 5. Click 主 of View IPPerformanceto unfold input/output status.
- 6. Optionally, click 🖃 of View IPPerformance to fold input/output status.

# 3.3 General

#### Purpose:

You can view system version, reset system, view logs, and upgrade system.

#### Step:

Click Maintenance in navigation bar and choose General.

Maintenance -> G	eneral Maintenance
Version Information	Open the version detailed information to show all modules' version information.
Reset System	Operate the restore factory default function to empty system configuration. Operate with care because the function will result in data loss.
Factory reset	To factory reset, please click factory reset button. But please be careful, it will cause datas loss.
Download	Check the system logs and download the maintenance logs to analyze the system fault.
<u>System Upgrade</u>	Operate the system upgrade function to update system.

Figure 3. 6 General

## 3.3.1 Viewing Version Information

#### Purpose:

Version information interface lists information including SMI, HYBRID SAN , Support, and so on. Steps:

- 1. Click Versioninformation to pop up version information window.
- 2. Click Cancelto close the window.

Version Information		×
SMI:	Storos-V9.1.5_17392-default-170824	
Hybrid SAN:	Hybrid SAN_V2.3.4	
Support:	s0	
StoreSDK:	StoreSDK-V3.0.0-4	
smi_apiserver:	StoreSDKS-V3.1.8b4-2015.2.10	
CoreSDK:	CoreSDK-V2.2.1-6	
НК9000:	hk9000server-V3.26-1 2017-8-18 16:00	
SAS2008:	15_v2.9cm_v2.2d.2	
SAS2008MPTFW:	17.00.01.00-IT	
Expander(X.):	MAR2EX_DB_B250	
FP_FW:	s	
HDA_FwRev:	605ABBF2	-

Figure 3. 7 Version Information

## 3.3.2 Default Settings

Purpose:

You can reset system to factory defaults when system is abnormal. You are recommended to reset system under the direction of professional technical support.



Resetting operation won't restore administrator user name and password, RAID configuration, hot spot

configuration, and network parameters.

Steps:

1. Click Resetsystem to pop up reset system dialog.

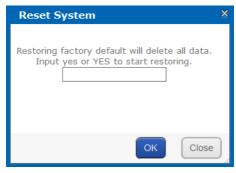


Figure 3. 8 Reset System

2. Enter yesor YESintext field and click OKto reset.

## 3.3.3 Managing Maintenance Log

#### Purpose:

When system is abnormal, you can download the maintenance log to analyze problems. Steps:

For details, refer to 9.1 OperationLog.

### 3.3.4 Modifying Password

#### Purpose:

You can modify password for basic management system and HYBRID SAN sub-system user. Steps:

- 1. Click Modify password.And modify password window appears.
- 2. Select UserName as web\_admin or nvr\_admin.
  - web\_admin:Basic management system user name.
  - > nvr\_admin: HYBRID SAN sub-system user name.
- 3. Enter Old Management Password and the same password in New Management Password and Confirm Management Password.



- The security level of modified password should not be lower than low security.
- Password can only contain numbers, lowercase, uppercase, and underline for your password.

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lines News	web admin			
User Name:	web_admin	~		
Old Management Password:				
New Management Password:				
Risky	Weak	Medium	Strong	
Confirm Management Password:				
Note:		will use new p password is r		

#### Figure 3.9 Modify Password

4. Click OK and click OK in popup message dialog to save the new password.

# NOTE

- Once password is modified, it jumps to login interface. You need to enter the new password to log in.
- Another controller password changes with the current controller password.

### 3.3.5 SNMPConfiguration

#### Purpose:

By configuring SNMP parameters, you can log in PRTG Traffic Grapher tool to monitor the system status, including exception information, CPU usage, and so forth.

#### Steps:

1. Click SNMPConfiguration button.

SNMP Configuration		×
SNMP Version:	⊖V1	
User Name:	public E.g	g.: public
Contact:	snmp_admin Ra String	ndom Character
Physical Address:	web_server Ra String	ndom Character
		OK Exit

Figure 3. 10 SNMP Configuration

- 2. SNMPVersionis V2(v2c) by default and is not editable.
- 3. Enter User Name, Contact, and Physical address.
- 4. Click OKto save the settings. Then you can view system status by logging in PRTG Traffic Grapher Tool.

## 3.3.6 Modifying Host Name

#### Steps:

1. Click Modify and text field appears.

- 2. Enter host name in the text field.
- 3. Click Modify to activate the new host name.

Current Master Identification	M - 416 -
Name:	Modify

Figure 3. 11 Modify Host Name



Only letters (a to z and A to Z), numbers (0 to 9), and underline (\_) can be input.

### 3.3.7 Viewing ServiceStatus

#### Purpose:

Whether the services are running or not. You can enable, disable, or restart the services.

Steps:

- Click Enableto start the service that is not running.
- Click Disableto shut down the running service.
- Click Restart restart services.

Enabling and Disabling of Services (1	otal: 2)	
Service Name	Current Status	Service Operation
Service Name	Current Status	(Enable/Disable/Restart)
SNMP	Running	Enable Disable Restart
iSCSI	Running	Enable Disable Restart

Figure 3. 12 Service Status

## 3.3.8 System Upgrade

#### Purpose:

You are recommended to upgrade system under the help of professional support.

Steps:

1. Click Systemupgrade n Common menu to enter Application Service interface.

Current Upgrade File:	storos-201703231056-B_OS-OS_TEST-915.bin		
Select the system upgrade	Browse	Upload	Restore
file:			

Figure 3. 13 Application Service

- 2. Click Browser and choose the upgrade package.
- 3. Click Uploadto upgrade. After upgrade succeeded, reboot the storage system to activate the new version.
- 4. Optionally, you can click Restore to previous version.



You can only restore to the last upgraded version.

# 3.4 Graphical Display

#### Purpose:

The storage system provides a graph to show the front view status and a pie chart to show the storage information.

### Step:

Click Maintenance in navigation bar and choose GraphicalDisplay to enter Graphical Display interface.

Maintenance	Maintenance -> Graphical Display
** System Monitor	
** Performance	Front view Pie chart
* Common	Refresh Overview
··· Graphical Display	
* Control Message	
SAN Management	
Hybrid SAN	
System	
-og Help	
Logout	
	Nose

Figure 3. 14 Graphical Display

### 3.4.1 Front View

#### Purpose:

Front view can show you the HDD status.

Steps:

1. Click Front View in Graphical Display menu to show front view.

Table 3. 2 Indicator Status Description

Indicator	Color	Description
Top indicator	Unlit	HDD doesn't exist.
Top indicator	Green	HDD is connected and recognized.
	Green	HDD is normal.
Bottom indicator	Blue	Reading and writing normally.
	Red	HDD is rebuilding.

2. Positioning the pointer in a green indicator slot. Then the message dialog appears.

Location:	0/0-1
Supplier:	Seagate
Model:	ST2000NM0033-9ZM.S1X0A59A
Size(MB):	1,907,729MB
Status:	Normal
Group:	Free

Figure 3. 15 HDD Information

3. Click Overview to view information of all HDD.

HDD Overview						×
Position	Supplier	Model	Capacity (MB)	Status	Group	
0/0-1	Seagate	ST2000NM0001.Z1P105J3	1,907,729	Normal	Array	
0/0-3	Seagate	ST2000NM0001.Z1P10PRH	1,907,729	Normal	Array	
0/0-4	Seagate	ST8000NM0075.ZA103VH60000J607VTV9	7,630,885	Normal	Array	
0/0-5	Seagate	ST2000NM0001.Z1P10KV9	1,907,729	Normal	Array	
0/0-6	Seagate	ST8000NM0075.ZA102T6F0000J607TUCD	7,630,885	Normal	Array	

#### Figure 3. 16 HDD Overview

4. Optionally, click Refreshin top-right corner to update the front view.

### 3.4.2 Pie Chart

#### Purpose:

Pie chart shows the free size of all storage modules, including system, LUN, snapshot, HYBRID SAN, iSCSI, and FC. Steps:

- 1. Click Pie Chartin Graphical Display to enter Pie Chart interface.
- 2. Positioning the pointer in the part you want to view. Freesize and free size Percentage appear in a dialog.
- 3. Optionally, click Refreshin top-right corner to update the information.



Figure 3. 17 Pie Chart

# 3.5 Environmental

#### Purpose:

Environmental shows the fan information, module temperature, fan control panel version, and chassis power. Steps:

1. Click Maintenance in navigation bar and choose Control Message to enter Control Message interface. Fan RPM (Revolutions per Minute), temperature, and other information are shown.



You can install or uninstall fans. Up to 6 fans' formation can be connected.

ontroller					
Mute O Position 🌼	Speed Regulat	ion			
Fan Information		Temperat	ure Information	Other Information	<b>A</b>
Name Value(RPM)		Name	Value(C)	Name Value	
Chassis 3900		A CPU	. +48.0	Fan Con B250	
Chassis 3650		A IC1 T.	+41.0	Chassis Normal	
Chassis 3900		A IC2 T.	+50.0	Chassis Normal	
Chassis 3900		A Mem.	+38.0	Slot Left	
Chassis 3650		A Mem.	+36.0	BBU None	
Chassis 3650		System	. +25		
		System	. +24		
		Environ	+25		

- Figure 3. 18 Host
- 2. Click Mute in top-right corner to turn off system audible warning.
- 3. To find out which controller is working, click Position in top-right corner and click OK in popup dialog. The

FN indicator of working controller would light up and flash for 10 minutes.

- 4. Set fan speed.
  - 1) Click SpeedRegulationin top-right corner to pop up dialog box.

Fan Speed Regulation					
Chassis Fan Speed Level: Medium Speed 🗸					
OK Exit	)				

Figure 3. 19 Fan Speed

- 2) Choose speed as Low speed, Medium speed, or High speed in dropdown list.
- 3) Click OK to save the settings.

# Chapter 4 Storage Management

#### Purpose:

Storage management provides configuration including HDD management, array, storage pool, LUN (logical Volume), and storage settings.

Module	Description
	You can:
HDD Management	• View HDD information and status.
	• Rescan, positioning, initialize, and detect HDDs.
	You can:
	• Create arrays.
Array	• Add hot spare.
	• View array and hot spare information.
	• Delete array and hot spare.
	You can:
Storage pool	• Add, delete, and positioning storage pools.
Storage poor	• Remove and positioning HDDs.
	• View system total and free capacity.
	You can
LUN (Logical volume)	• Add and delete LUNs.
	• Rename, expand, clone, and snapshot LUNs.
	You can:
Configurations	• Set array synchronization speed.
Configurations	• Set array synchronization type.
	• Set flicking frequency for HDD positioning indicator.

Table 4. 1 Module Description

#### Key words:

HDD Management, Array, Storage Pool, LUN (Logical Volume), Configuration

Storage
HDD Management
₩ Array
** Storage Pool
₩ LUN
✤ Configuration

Figure 4. 2 Storage

# 4.1 Managing Local HDD

#### Purpose:

You can view the HDD information here, including HDD location, supplier, model, size, status, and belonging group.

Step:

Click Storagein navigation bar and choose HDDManagement.

Storage-> HDD Management							
HD	HDD Status Rescan Sleep Status						
■ HDD	Informatio	n (Total:	:18) 🕞 🕤 1 2 Expand		🕤 То	page 🔿 T	otal 2 Page
	Position	Supplier	Model	Capacity (MB)	State	Group	HDD Status
	0/0-1	Seagate	ST2000NM0001.Z1P105J3	1,907,729	Normal	Array (RAID5_1)	View
	0/0-3	Seagate	ST2000NM0001.Z1P10PRH	1,907,729	Normal	Array (RAID5_2)	View
	0/0-4	Seagate	ST8000NM0075.ZA103VH6000	7,630,885	Normal	Array (RAID5_1)	View

Figure 4. 3 HDD Management

## 4.1.1 Viewing HDDStatus

Purpose:

You can view status of one HDD or all HDDs.

### 4.1.1.1 One HDD

Steps:

- 1. In the HDD information list, Click Details of an HDD. HDD state dialog appears.
- 2. Click SMART to view the HDD SMART detection information.

HDD Status	×
Position	0/0-1
State	Normal
Group	Array (RAID5_1)
Health Value	Good
Temperature	30
Bad Sector & Repair	0
SMART	SMART

Figure 4. 4 HDD Status

### 4.1.1.2 All HDDs

#### Steps:

- 1. Click HDDStatusin the upper left corner.
- 2. Click SMARTofan HDD to view its SMART detection information.

) Info: (Total:	18)	Home Prev. 1	2 Expa	nd Next Las	st To pa	ge 🕤 Total 2 F
Position	State	Group	Health Value	Temperature	Bad Sector & Repair	SMART
0/0-1	Normal	Array (RAID5_1)	Good	30	0	SMART
0/0-3	Normal	Array (RAID5_2)	Good	31	0	SMART
0/0-4	Normal	Array (RAID5_1)	Good	30	0	SMART
0/0-5	Normal	Array (RAID5_2)	Good	29	0	SMART
0/0-6	Normal	Array (RAID5_1)	Good	32	0	SMART
0/0-7	Normal	Array (RAID5_2)	Good	33	0	SMART
0/0-13	Normal	Array (RAID5_1)	Good	32	0	SMART
0/0-14	Normal	Array (RAID5_2)	Bad	34	0	SMART
0/0-15	Normal	Array (RAID5_1)	Good	34	0	SMART
0/0-16	Normal	Array (RAID5_2)	Good	32	0	SMART

Figure 4. 5 HDD Status



There are totally 6 kinds of status for an HDD.

Table 4. 2 HDD Status Description

Status	Description
Normal	HDD works normally.
Undetected HDD failed the HDD detection.	
Lost HDD is unrecognized.	
Risky	Exception occurs during HDD detection. But it can still work.
Bad	HDD is kicked out by an array.
Warning	HDD read and writing speed is higher than 10 MB/S during pressure test.

## 4.1.2 Rescanning HDD

Step:

- If detecting a newly installed HDD failed, click Rescantofind the HDD.
- If an HDD is uninstalled from the storage system, click Rescantoremove it from the HDD interface.



Rescanning HDDs may result in HDD status appearing as Unknown. Fresh the interface or click Rescanagain to solve the problem.

### 4.1.3 Positioning HDD

#### Purpose:

HDD bottom indicator flickers after enabling the function. It enables you to find a certain HDD more easily.

Before you start:

Set the flickering time first. For details, refer to 4.5.2 FlickeringTime.

#### Steps:

- 1. Check the checkbox of HDD you want to find.
- 2. Click Position and click OK in popup dialog box. Then HDD indicator keeps flickering in red for the set flickering time.

### 4.1.4 HDDInitialization

#### Purpose:

To recover an HDD when its status is uninitialized or when it is kicked out by an array, you can initialize it.

Steps:

- 1. Check the checkbox of HDD you want to initialize.
- 2. Click Initialize and click OKin popup dialog box to start initializing.

### 4.1.5 HDDDetection

#### Purpose:

To recognize an HDD which is added to a storage system for the first time, detect it.

Steps:

- 1. Check the checkboxes of HDDs to detect.
- 2. Click Detect.

HDD Detection				×
Mode:Not Selected	Detection Progress:0%	Elapsed Time: 0	.0Minute	^
HDD Position	Мос	lel	Detection Status	
0/0-1	ST2000NM000	01.Z1P105J3	Uncommitted	
0/0-3	ST2000NM000	1.Z1P10PRH	Uncommitted	
Detection Mode:				
				$\sim$
			Disable	

Figure 4. 6 HDD Detection

- 3. Select the Detection Mode as Rapid or Comprehensive.
  - > Rapid:Detect parts of all HDD blocks. It takes shorter time than Comprehensive.
  - Comprehensive:Detect all HDD blocks. It takes longer time than Rapid.



- It is recommended to operate rapid detection when system is under low pressure.
- You are recommended to operate comprehensive detection for the first use HDD.
- To keep data safe, detect an HDD every 3 months.
- 4. Click Start to start detecting. The selected detection mode, detection progress, and detection time are listed in the top part of the interface.

Optionally, click Refreshto update the detection status, detection process and detection time.
 Or you can click Stop to end all detections.



There are 3 kinds of detection status: Unsubmitted, Detecting, and Completed.

Table 4. 3 Detection Status Description

Check Status	Description
Uncommitted	HDD detection has not been committed.
Detecting	HDD is being detected.
Waiting	Another HDD is being detected. You need to wait till the detection is finished.

# 4.2 Array

Purpose:

You can create and manage array.

Step:

Click Storagein navigation bar and choose Array.

Storag	Storage -> Array Management								
Cr	Create								
Array	Information (Tota	il: 1)							
	Array Name	Туре	Capacity (MB)	State	Group	Maintenance			
	RAID5_1	RAID5	9,538,695	Normal	Idle	Maintenance			
X Delet	<u>e</u>								
Add Hot Spare Disk									
Hot Sp	are Disk Informatio	n							

Figure 4. 7 Array

## 4.2.1 Creating Array

Purpose:

You can use available HDDs to create array.

Steps:

1. Click CreateArray.

Storage System User Manual

Array Name	:			
Array Type	RAID5		<b>v</b>	
Array Block Size (KB	128		<b>v</b>	
I/O Priority	Smart		~	
Select All Cancel (Note:c	reate array c	hoose disk loca	tion should inter	(al)
Head Position		Capacity (MB)		raij
		Capacity (MB)		

Figure 4. 8 Create Array

- 2. Input Array Name in text field.
- 3. Select Array Type in drop-down list. RAID 0, RAID 1, RAID 3, RAID 5, RAID 6, RAID 10, and RAID 50 are selectable.

Array Type	Required HDDQuantity
RAID 0	At least 2 HDDs.
RAID 1	At least 2 HDDs.
RAID 3	At least 3 HDDs.
RAID 5	Valid range: [3, 12].
RAID 6	At least 4 HDDs.
RAID 10	RAID is made of RAID 0 and RAID 1 which requires
	at least 4 even HDDs.
RAID 50	RAID is made of RAID 0 and RAID 5 which requires
	at least 6 even HDDs.

Figure 4. 9 Required HDD Quantity

- 4. Select Array Block Size(KB)in drop-down list.
- 5. Select I/O Priority as Performance Priority, Protection Priority, Balanced, or Smart.
  - > PerformancePriority: To guarantee external IO task performance, internal IO task is totally stopped.
  - Protection Priority: To guarantee internal IO task performance, external IO task would only take the rest channel.
  - Balanced:When both internal and external IO task exist, Balance ensures internal IO task occupy certain channel without influencing external IO task.
  - Smart:Without external IO task, array is initialized in the highest speed. Or array is initialized in the lowest speed.



If RAID level is RAID 0, I/O priority is unavailable.

6. Select the Available HDDsto create RAID.

Or select Available arrays to create RAID.

Or select the combination of Available HDDs and Available arrays.



- Only enterprised HDDs are listed in Auailable HDDs list.
- In order to increase the performance of created RAID, it is recommended to use HDDs of the same model and capacity when creating a RAID.
- 7. Click OK to create array. The successfully created array lists in Array information list. Once created, the array starts initializing.

## 4.2.2 Array Exception

#### Purpose:

If HDD failure occurs, array degrades. When more HDDs fail, array fails. Degraded array can keep working. However, failed array cannot work. Notification area will notify you once array degraded or failed. Refer to following table for array degraded and failed condition.

RAID Level	Degraded Condition	Failed Condition
RAID 0	RAID 0 will not degrade.	One HDD fails.
RAID 1	N-1 HDDs fail.	All HDDs fail.
RAID 3	One HDD fails.	Two HDDs fail.
RAID 5	One HDD Tails.	
RAID 6	N-1 HDDs fail.	More than three HDDs fail.
RAID 10	One HDD fails.	Two HDDs fail in either contained RAID.
RAID 50	טווש ועט ומווג.	

Table 4. 4 Array Degraded Condition



- If array in storage pool degrades, physical volume degrades.
- If array in storage pool fails, physical volume fails.

### 4.2.3 Rebuilding Array

#### Purpose:

Rebuilding refers to the process of using a normal HDD or array to virtually replace a failed HDD in a degraded array. The normal HDD can be hot spare HDD, newly inserted HDD, and so forth.



- During rebuilding process, if the rebuilding HDD fails, the array stays degraded.
- During rebuilding process, if a normal HDD in array fails, the array becomes failed.
- During rebuilding process, if I/O error occurs to the rebuilding HDD, you need to change rebuilding HDD.

### 4.2.3.1 Rebuilding with Hot Spare

Before you start:

Add global, area, or local hot spare HDD or array for array.

Step:

Once the array degraded, hot spare HDD or hot spare array automatically rebuilds the array.



When the degraded array possesses both global and local hot spare, it rebuilds with local hot spare preferentially.

### 4.2.3.2 Rebuilding with Available HDD

#### Before you start:

Ensure there is at least one available HDD which isn't included in any array or storage pool.

Steps:

- 1. Click Maintenanceof a degraded array in Array information list.
- 2. Click Rebuild to pop up Array rebuild interface.
- 3. Select an Available HDDor Available Array.
- 4. Click OK to start rebuilding.

### 4.2.4 Detecting Array

#### Purpose:

You can detect whether the data bit and parity data in an array match or not.



If array in storage pool starts detecting, the physical volume status is detecting.

Steps:

- 1. Click Maintenanceof a degraded array in Array information list.
- 2. Click Detect to start detecting.

### 4.2.5 Repairing Array

#### Purpose:

You can repair the data bit and parity data mismatch issue.



If array in storage pool starts repairing, physical volume status is repairing. Steps:

- 1. Click Maintenanceof a degraded array in Array information list.
- 2. Click Repairto start repairing.

### 4.2.6 Renaming Array

#### Steps:

- 1. Click Maintenanceof an array in Array information list.
- 2. Click Rename.
- 3. Enter a new name.

#### 4. Click OK to save the new name.

### 4.2.6.1 Modify I/O Priority

#### Steps:

- 1. Click Maintenance of an array in Array information list.
- 2. Click Modify.
- 3. Select I/O Priority in dropdown list.
- 4. Click OK.

### 4.2.6.2 Pause Initialization/Rebuilding/Detection/Repair

#### Purpose:

When the array is initializing, rebuilding, detecting, or repairing, you can pause.

#### Steps:

- 1. Click Maintenance of an array in Array information list.
- 2. Click Pauseto pause current process.
- 3. You can click Keep to resume.

## 4.2.7 Deleting Array

#### Steps:

- 1. Check the checkbox of array you want to delete.
- 2. Click **X** <u>Delete</u> button to delete.



If the array has been added to a storage pool, you need to remove it from storage pool first, or it can't be deleted.

## 4.2.8 Adding Hot Spare

#### Purpose:

The hot spare HDD can replace failed HDD in the degraded array. In order to protect data from damage in case of HDDs in array fail, it is recommended to add hot spare HDDs for a created array.



RAID 0 will not degrade. So you need not add local hot spare HDD for it.

Steps:

- 1. Click Add Hot SpareDiskto enter Add hot spare interface.
- 2. Select Group as Global, Area, or Local.
  - Global: Global hot spare HDDs can replace failed HDDs in any degraded arrays of storage devices in the same system.
  - > Area: Area hot spare HDDs replace failed HDDs in any degraded arrays of one storage system.
  - Local:Local hot spare HDDs replace failed HDDs in designated array.



Priority of hot spare: Local hot spare > area hot spare > global hot spare

- If Group is Area, select available array in Area dropdown list.
   If Group is Local, select array in Array dropdown list.
- 4. Select at least one Available HDD.Or select at least one Available array.Or select the combination of Available HDDor Available array.
- 5. Click OKto create hot spare.

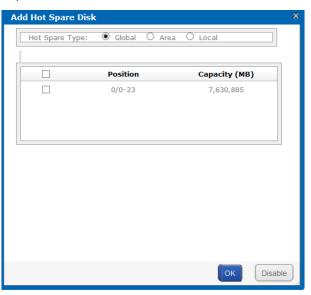


Figure 4. 10 Add Hot Spare

### 4.2.9 Deleting Hot Spare

#### Steps:

- 1. Select arrays you want to delete.
- 2. Click **Science** button to delete.

## 4.3 Storage Pool

Purpose:

Storage pool, which is made of physical volumes and contains arrays and HDDs, is designed for central management of storage capacity.

Step:

Click Storagein navigation bar and choose StoragePool.

	System Total Capacity	: 72,457,568 MB System Free 4	Capacity: 0 MB		
	Logical Total Capacity	: 72,457,568 MB			1
Hvł	oird SAN Volume Capacity	: 72,457,568 MB iSCSI Volume (	Capacity: 0 MR		
,.					
	Add Delete	Position			
		Position			
	Add Delete	Position	Total Capacity (MB)	Idle Capacity (MB)	State
= Phy	Add Delete sical Volume Information PV Name	Position (Total: 2) Device Name		Ir	State
= Phy	Add Delete sical Volume Information	Position (Total: 2)	<b>Total Capacity (MB)</b> 45,764,800		17.000 F

#### Figure 4. 11 Storage Pool

#### Table 4. 5 Interface Description

Area	Name	Description
1	Information Area	Lists the storage pool total size, free size, LUN size, snapshot size,
		HYBRID SAN size, iSCSI size, and FC size.
2	Configuration Area	You can add, delete, and positioning created physical volume here.

## 4.3.1 Adding Storage Pool

Purpose:

You need to create physical volumes to build storage pool.

Before you start:

Ensure available array or HDD exists in the storage system. Steps:

1. Click Add.



Figure 4. 12 Add Storage Pool

- Select at least one array or HDD as storage pool. Or select the combination of array or HDD.
- 3. Input PVName in text field.

4.	Click OK to add the storage pool.
----	-----------------------------------

	Add	Delete Position			
■ Phy	ysical Volume Inf	ormation (Total: 3)			
	PV Name	Device Name	Total Capacity (MB)	Idle Capacity (MB)	State
	G0_POOL_RAID_1	RAID5_1	13,291,616	0	Repaired
	G0_POOL_RAID_2	RAID5_2	15,209,600	0	Initialize Progress:5.3% Remaining Time: 50 Hour 28 Minute
	PV01	0/0-23	7,578,656	7,578,656	Normal
× R	emove 🚓 Po	osition			

Figure 4. 13 Storage Pool

## 4.3.2 Deleting Storage Pool

#### Purpose:

You can delete storage pool by deleting the added physical volumes.

#### Steps:

1. Check the checkboxes of physical volumes you want to delete.



Idle physical volumes can be deleted except the first created physical volume.

## 4.3.3 Positioning Storage Pool

#### Before you start:

Set the flickering time first. For details, refer to 4.5.2 FlickeringTime.

Steps:

- 1. Check the checkbox of physical volume you want to positioning.
- 2. Click Position button. Then the HDD bottom indicator keeps flickering in green for the set flickering time.

## 4.4 Logical Volume

#### Purpose:

Logical volume is the virtual HDD which is made of physical HDD.

Step:

Click Storagein navigation bar and choose LUN.

_	e -> Lo eate	gical Volume	e Management							
LUN In	formatio	n (Total: 8)								
	ID	Name	Block Size (Byte)	Capacity (MB)	Physical Volume	Usage	Snapshot Number	Clone	Extend	Rename
	0	LUN_BACK1	512	51,200	G0_POOL_RAID_1	CVR Reserved Volume	0	<u> </u>	വ്	REN
	1	LUN_BACK2	512	51,200	G0_POOL_RAID_1	CVR Reserved Volume	0	\$	്	REN

Figure 4. 14 Logical Volume

## 4.4.1 Creating Logical Volume

#### Purpose:

You can create logical volumes by using available physical volumes.

#### Steps:

1. Click Create.

Name:         E.g., database_lun           Capacity (MB):         E.g., 300000           Block Size (Byte):         512         V					
vailable	Physical Volume				
Select	PV Name	Device	Idle Capacity (MB)		
۲	G0_POOL_RAID_1	RAID5_1	0		
0	G0_POOL_RAID_2	RAID5_2	0		
0	PV01	0/0-23	7,578,656		
0	PV01	0/0-23	7,578,656		

Figure 4. 15 Create Logical Volume

- 2. Enter Name.
- 3. Enter Capacity(MB).
- 4. Select Block Size(Byte) from dropdown list.
- 5. Choose Available PhysicalVolume.
- 6. Click OKto create logical volume. Created logical volume is listed in logical volume information list.

### 4.4.2 Deleting Logical Volume

#### Steps:

- 1. Select the logical volume you want to delete.
- 2. Click **X** Delete button to delete them.

```
NOTE
```

The working logical volume can be deleted. Only free logical volume can be deleted.

### 4.4.3 Renaming Logical Volume



You can only rename the free logical volumes. Steps:

- 1. Click button of the logical volume you want to rename.
- 2. Enter a new name.
- 3. Click OK to save the new name.

## 4.4.4 Enlarging Logical Volume

#### Purpose:

You can enlarge the size of created logical volume.



You can only enlarge the idle logical volumes.

Steps:

1. Click 🗹 button of the logical volume you want to extend.

Available Physical Volume							
	PV Name	Device	Total Capacity (MB)	Idle Capacity (MB)			
	G0_POOL_RAID_1	RAID5_1	13,291,616	0			
	G0_POOL_RAID_2	RAID5_2	15,209,600	0			
	PV01	0/0-23	7,578,656	7,577,664			

Figure 4. 16 Extend LUN

- 2. Enter New Capacity(MB).
- 3. Select Available PhysicalVolume used to extend.
- 4. Click OKto extend.

# 4.5 Configuration

#### Purpose:

You can set the array synchronization speed type and flickering time of positioning indicator.

Step:

Click Storagein navigation bar and choose Configuration.

Storage -> Configuration Managemer	nt	
Array Synchronization Speed:	Low	Modify
Array Synchronization Type:	Serial	Modify
HDD Positioning Flickering Time (s):	25	Modify
Array Disk Cache:	On	Modify
HDD Sleeping:	Disabled	Enablec

Figure 4. 17 Configurations

## 4.5.1 Synchronization Speed and Type

#### Purpose:

Array synchronization speed and synchronization type is editable.

#### Steps:

- 1. Click Modify of Array Synchronization Speed.
- 2. Select Array Synchronization Speedas High, Medium, Low, or None.



The faster the speed is, the highest the internel IO percentage is.

- 3. Click OK.
- 4. Click Modify of Array SynchronizationType.
- 5. Select Array Synchronization Type as Serial or Parallel.
- 6. Click OK.



Figure 4. 18 Synchronization Speed and Type

## 4.5.2 Flickering Time

#### Purpose:

When positioning an HDD, the HDD bottom indicator keeps flickering for the set time.

#### Steps:

1. Enter a number as flickering time in HDDPositioning Flickering Time (s).



Valid flickering time ranges from 5 to 300 and the unit is second.

2. Click Modify.

# Chapter 5 SAN

#### Purpose:

You can add iSCSI disks and FC (Fiber Channel) disks in your computer.

Table 5. 1 Module Description

Module	Description
iSCSI	You can add iSCSI disks in your computer.
FC	You can add FC disks in your computer.

Keywords:

iSCSI, FC

SAN Management	
* iSCSI	
* FC	
* Setting	

Figure 5. 2 SAN

# 5.1 iSCSI

#### Purpose:

You can add iSCSI HDDs in your computer.

#### Step:

Click SANin navigation bar and choose iSCSItoenter iSCSI interface.

SAN Management	> iSCSI M	lanagement				
Enable iSCSI						
■ iSCSI Configuration 1	Information					
Search:		Search				
Local Tar	get ID	Remote Target ID	Logical Volume	Client IP	Access Mode	CHAP User
X Delete						
Add/Modify CHAP						
CHAP User Informati	on					
				CHAP User		
X Delete						

Figure 5. 3 iSCSI

## 5.1.1 Adding CHAPUser

#### Purpose:

When enabling iSCSI, you can select an added CHAP user as a way to verify your computer permission. Steps:

1. Click Add/Modify CHAP button to enter Add CHAP User interface.

dd/Modify CH	AP User						×
U	lser Name:		E.g	g., database_a	admin		^
New	Password:		(12	2 to 16 chara	cters)		
Confirm	Password:						
	Risky	Weak	Medium	Strong			
							~
					ОК	Clos	se

Figure 5. 4 Add CHAP User

- 2. Enter CHAP User Name, New Password, and Confirm password.
  - UserName:Only letters, numbers, and underline are allowed.
  - > New Password:Only12 to 16 characters, including letters, numbers, and underline, are allowed.
  - Confirm Password: It must be the same as New Password.
- 3. Click OKand click OKin confirmation dialog box to add the CHAP user.

## 5.1.2 Modifying CHAPUser

Purpose:

You can modify the password of added users.

Before you start:

If the CHAP going to be modified is linked to one or more iSCSIs and these iSCSIs are connecting with computers, you need to disconnect them from computer first.

Steps:

- 1. Click Add/Modify CHAP button to enter Modify CHAP User Interface.
- 2. Enter the CHAP username you want to modify in the text field.
- 3. Enter a new Passwordand Confirm password.
- 4. Click OKand click OKin confirmation dialog box to modify the CHAP user.

### 5.1.3 Enabling iSCSI

#### Purpose:

1.

Click

Enabling iSCSI in the storage system makes it possible for you to add iSCSI HDDs in computer. Steps:

Client IP: E.g., 192.168.40.60 Local Target ID: E.g., 100 (Range [1,1024]) Remote Target ID: E.g., 200 (Range [1,1024]) CHAP User: Disable Access Mode: Read/Write Logical Volume Select Name Block Size(B) Capacity (MB) Physical Volume Statu		Service
Remote Target ID:     E.g., 200 (Range [1,1024])       CHAP User:     Disable       Access Mode:     Read/Write		Client IP: E.g., 192.168.40.60
CHAP User: Disable V Access Mode: Read/Write V	Lo	cal Target ID: E.g., 100 (Range [1,1024] )
Access Mode: Read/Write	Rem	ote Target ID: E.g., 200 (Range [1,1024] )
Logical Volume		CHAP User: Disable
-		Access Mode: Read/Write
	Select Na	me Block Size(B) Capacity (MB) Physical Volume State

Figure 5. 5 Enable iSCSI

- 2. Enter Client IP and iSCSIID.
  - ClientIP: To turn on iSCSI for a specified client (computer), enter the client IP address. To turn on iSCSI for multiple clients, enter 0.0.0.0 in the text field.
- 3. Select the identity authentication method in the dropdown list of CHAPUser.
  - Disable:There is no limit for client access.
  - > Other CHAP user: Correct CHAP user name and password are needed for client to get access to LUN.
- 4. Select the logical volume AccessMode as Read/Write, Write-Through, ReadOnly, or Intelligent Read-Only.
  - Read/Write: Read and writing permission.
  - Intelligent Read-Only:Eventhough writing operation succeeded, data wouldn't be written into LUN. It is mainly used to test the storage system performance.

- Write-Through: It writes the data into HDDs directly without writing into HDD buffer. A low writing speed makes the data complete.
- 5. Choose an available LogicalVolume.
- 6. Click OKto enable the iSCSI.



When multiple iSCSIs share the same LUN, only one iSCSI server access mode can be R/W and other servers should be RO or IRO, or file system may be damaged or data may lose.

### 5.1.4 Disabling iSCSI

#### Purpose:

For the unnecessary iSCSIs, you can disable them, thus to keep the storage system safe and stable.

#### Before you start:

Disconnect the storage system from the clients for which you want to disable iSCSI.

Steps:

- 1. Check the checkbox of iSCSI you want to disable.
- 2. Click **Click** and click OKin confirmation dialog box.

## 5.1.5 Modifying iSCSIPort

#### Purpose:

iSCSI port is needed when accessing via computer. It can be edited.

#### Before you start:

Disconnect all iSCSIs first, or iSCSI enabled under pervious iSCSI port couldn't be deleted.

Steps:

1. Click SANin navigation bar and choose Setting to enter Setting interface.

Maintenance	SAN -> Setting				
Storage	SAN > Setting				
SAN Management	FC Topology mode:	Public Loop	•	Modify	
* iSCSI	i o ropology model	T done Loop		mouny	
" FC	Current target		_	1	
* Setting	port:	3260		Modify	
Hybrid SAN	Please input the numb	ers between 300	) and 6	5534.(Do not use the reserved port of 740	2.)
System	Please disconnect all t	he iSCSI services	, or the	e iSCSI service with old port cannot be del	eted.

#### Figure 5. 6 Setting

- 2. Enter a number between 3000 and 65534 except 7402 in Currenttarget port text field.
- 3. Click Modify, click OKin confirmation dialog box, and click OKin second popup dialog box.

# 5.2 FC(Optional)

#### Purpose:

You can add FC HDDs in your computer.

Before you start:

- 1. Install fiber Ethernet adapter and fiber Ethernet adapter drive in both the storage system and the client server.
- 2. Connect the storage system and client server to fiber channel switch with fiber.

Step:

Click SANin navigation bar and choose FCto enter FC interface.

Maintenance	SAN -> FC				
Storage	SAN -> FC				
SAN Management	Enable FC				
" iSCSI	E FC info				
" FC	LUN name	Client WWPN	Fiber channel	Logical LUN ID	LUN access mode
" Setting	X Delete				

Figure 5. 7 iSCSI

## 5.2.1 Enabling FC

#### Purpose:

Enabling FC in the storage system makes it possible for you to add FC HDDs in computer. To visit FC HDD via computer, the storage system and the computer should locate in an optical fiber network. You can enable FC service for:

- A specified fiber channel.
- All available fiber channels.
- A specified FC port.
- All available FC ports.

Before you start:

- Install optical fiber card first.
- Create at least one LUN first. For detailed steps, refer to 4.4 Logical Volume.

#### Steps:

1. Click EnableFCto enter Enable FC interface.

Enable FC			×
Fiber channel:	Available channels -		
Client WWPN:		(Please input 16 hexadecimal values.)	
LUN name:	LUN_02 -		
Logical LUN ID:	Auto		
LUN access mode:	R/W -		
		ок	Cancel

Figure 5. 8 Enable FC

 According to actual connection, select Fiber Channelas Fiber Channel0, Fiber Channel1, Fiber Channel2, or Fiber Channel3. If you are not sure about selecting which one, select Available channels. The storage system can automatically connect the client with an available channel.



Fiber Channel 0 refers to fiber port 1 in real panel. Fiber Channel 1 refers to fiber port 2 in rear panel. And so on.

3. To specify a client, enter Client WWPNof 16 numbers.

Client WWPN: The client fiber Ethernet adapter WWPN. You can use a fiber client to obtain WWPN. If no client is available, enter 0000000000000000. The storage system connects all available clients WWPN and share FC with all connected clients.

- 4. Select available LUN in the dropdown list of LUNname.
- 5. Choose LogicalLUNID as Auto or Manual.
  - > Auto: The storage system automatically specifies a free LUN ID.
  - Manual: It is recommended to choose Manual. The logical LUN ID which is the first manual one must be 0.
- 6. Select LUN access mode as R/W, SR/W, RO, or IRO.
  - ▶ R/W: Read and writing permission.
  - IRO(Intelligent Read Only): Even though writing operation succeeded, data wouldn't be written into LUN. It is mainly used to test the storage system performance.
  - ➢ RO:Read only
  - SR/W(Synchronous Read/Write): It writes the data into HDDs directly without writing into HDD buffer.
     A low writing speed makes the data complete.
- 7. Click OK and click OK in confirmation dialog box to enable FC.

### 5.2.2 Disabling FC

#### Purpose:

You can disable FC service for:

- A specified fiber channel.
- All available fiber channels.
- A specified FC port
- All available FC ports.

#### Steps:

- 1. Check the checkbox of FC you want to disable.
- 2. Click **Click** and click OKin confirmation dialog box.

# Chapter 6 HYBRIDSAN

#### Purpose:

You can configure HYBRID SAN  $\;$  and N+1 parameters.

Table 6. 1 Module Description					
Module	Description				
HYBRID SAN	<ul> <li>You can:</li> <li>Configure private volume, HYBRID SAN configuration, create record volume, and extend record volume.</li> <li>HYBRID SAN one-key configuration.</li> <li>Manage N+1.</li> <li>Log in HYBRID SAN sub-system to add encoders, add strategy, search video, and so forth.</li> </ul>				
N+1	A storage system whose HYBRID SAN service has started can serve as a backup HYBRID SAN for other HYBRID SAN s.				

Keywords:

HYBRID SAN , N+1



Figure 6. 2 HYBRID SAN

# 6.1 One-KeyConfiguration

#### Purpose:

Quick-setting creating helps you to create HYBRID SAN quickly.

#### Before you start:

Ensure there is neither storage pool nor array in the storage system.

#### Steps:

- 1. Click the One-KeyConfigurationbutton in upper right corner to start quick settings.
- 2. Click OK to confirm. Quick-setting takes 3 to 15 minutes. During the quick-settings, following operations are performed automatically.
  - 1) Add HDDs to storage pool. Or create RAIDs and add them to storage pool.



The whole HDDs are added to storage pool with no more free capacity. You can view the storage pool usage in Storage > Storage Pool.

 Create private volume, reserved volume, and record volume. If more than 3 LUNs are created, one archive volume is created.

Hybrid SAN Service St configured or configured Hybrid SAN System Logi	ation is incomp		ybrid SAN service			<u>o</u>	ne-Key Configuration Configu	re Hybrid SAN	Backup a	ind Restor
Record Volume	-1	lume Name	Used I UN Number	Total(MB)	Used(MB)	Free(MB)	Total 0 page( Video Retention Time	s), 0 row(s). 2	20 per pag Usage	14
LUN Information		LUNTO		fotal(MB)			Block Size(Byte)		Usa	Ige

Figure 6. 3 HYBRID SAN Settings Interface



- Bad HDD, risky HDD, and warning HDD would not be added to storage pool.
- Non-enterprise HDD is added to storage pool by single-HDD mode.
- Quick-setting takes longer if any undetected HDD exists.
- > If HDDs in the storage system are less than 6, they are added to storage pool by single-HDD mode.
- If HDDs in the storage system are not less than 6 and HDDs in storage enclosure is less than 6, the storage system HDDs are added by array mode and the storage enclosure HDDs won't be added.
- If HDDs in the storage system and HDDs in storage enclosure are both not less than 6, they are both added to storage pool by array mode.
- If only one HDD exists, no reserved volume is created. In single-HDD mode, no reserved volume is created in the last HDD of the storage system. In array mode, two reserved volumes are created in each RAID.
- > By default, a 50 GB size private volume and a 50 GB size reserved volume should be created.

# 6.2 HYBRIDSAN Configuration

Purpose:

You can start and reset HYBRID SAN and create record volume.

Step:

Click the Configure HYBRIDSAN button in upper right corner.

Configure Private Volume	Whrid SAN Configuration		on Create Record Volume Expand Re		Expand Record Volume
					e volume by less than 5 GB. To e
Allocate private volume's Allocate	reserved	Enable p reserved sp			Enable Hybird SAN service er finishing
Select LUN to configure priv	ate volume	ieseiveu sp	ace	ditt	st mustary
					Private Volume 1
Available LUN				(large	r than or equal to 50000MB)
LUN3(pv_ne47) LUN4(pv_ne47)		Private Vol	ume 1 >>		
LUN1(pv_ne47) LUN2(pv_ne47)					
Lonz(pr_norr)					Private Volume 2
				(large	r than or equal to 50000MB)
		Private Vol	ume 2 >>		
1					4

Figure 6. 4 HYBRID SAN

## 6.2.1 Starting HYBRIDSAN

Purpose:

You can start HYBRID SAN after private volumes are created. Before you start:

- 1. To create storage pool, do one of the following:
  - Single-HDD mode: Add HDDs to storage pool.
  - Array mode: Create arrays and add them to storage pool.
- 2. Create at least 5 LUNs. Ensure at least 4 of them are larger than 20 GB. The four LUNs are used to create private volume, reserved volume. Other LUNs are used to create record volume.



- If record volume size is fewer than 120T, then private volume 1 and private volume 2 size should both larger 50G.
- If record volume size ranges from 120T to 180T, then private volume 1 and private volume 2 size should both larger 60G.
- > If record volume enlarges by 60T, record volume 1 and record volume 2 should both enlarge by 10G.

Steps:

1. Click the Configure Private Volume tab.

Configure Private Volume	Hybrid SAN C	onfiguration	Create Record V	/olume	Expand Record Volume
Reserved volume should be	equal to the p	rivate volume	or larger than th	e private	volume by less than 5 GB. To e
Allocate private volume's space Select LUN to configure priva		Enable p reserved sp			nable Hybird SAN service r finishing
					Private Volume 1
Available LUN				(larger	than or equal to 50000MB)
LUN3(pv_ne47) LUN4(pv_ne47) LUN1(pv_ne47) LUN2(pv_ne47)		Private Vol	ume 1 >>		
					Private Volume 2
				(larger	than or equal to 50000MB)
		Private Vol	ume 2 >>		
					1

Figure 6. 5 HYBRID SAN Configuration

- 2. Check the checkbox of EnableHYBRIDSAN after finishing.
- 3. Optionally, check the checkbox of Allocate private volume's reserved space and Enable private volume's reserved space.

Enable private volume's reserved space: Create a spare volume for private volume. The spare volume works as a backup volume. When error occurs to the two private volumes, the two spare LUNs would replace them.



It is not recommended to use a spare volume in the same physical volume with the private volume.

- 4. To add private volume 1, choose a FreeLUNand click Private volume 1 >> button.
- 5. To add private volume 2, choose a FreeLUNand click Private volume 2 >> button.



- > HYBRID SAN configuration information is saved in private volume 1 and private volume 2.
- It is not recommended to use the LUN created by the HDD first added to storage pool to create private volume 1.
- The chosen LUNs' capacity should meet the demand shown in red frames in Figure 6. 5 HYBRIDSAN Configuration.
- If Allocate private volume's reserved spaceand Enableprivate volume's reserved spaceare selected, the storage system automatically select two free LUN as the spare volumes.
- 6. Click OKto start creating the two private volumes. After private volumes are created, HYBRID SAN starts running.



Figure 6. 6 Created Prviate Volume

Table 6. 2 HYBRID SAN	Status Description	
	Description	

Status	Description		
Not configured or incomplete	HYBRID SAN is not configured.		
Running	HYBRID SAN is correctly started.		
	Click Stop HYBRIDSAN to stop HYBRID SAN service. Once HYBRID SAN		
Stopped	is stopped, you are not able to view encoder information and videos. You		
	can click Start HYBRIDSAN to recover to Running status.		
Running and Recovering	Indicators HYBRID SAN is working normally and in automatic recovery		
Kulling and Recovering	process.		
Stopped and Recovering	Indicators HYBRID SAN is stopped and in automatic recovery process.		

## 6.2.2 Resetting HYBRIDSAN

#### Purpose:

You can delete HYBRID SAN videos, encoders, and other configurations by resetting HYBRID SAN . After reset, HYBRID SAN status restores to not configured or incomplete.

#### Steps:

1. Enter HYBRID SAN configuration menu.

onfigure Hybrid SAN				
onfigure Private Volume	Hybrid SAN Configuration	Create Record Volume	Expand Record Volume	
eset	1			
Hybrid SAN Service Reset	-			
	Warning:	n will delete all configurat	ions and records of Hybrid	
	SAN !			
			ОК	Close
			OK	Close

Figure 6. 7 Reset HYBRID SAN

- 2. Click HYBRIDSAN Service Reset.
- 3. Enter yes or YES intext field to start reset.

### 6.2.3 Record Volume

#### Purpose:

Record volume is the logical volume stores videos.

### 6.2.3.1 Creating Record Volume

#### Steps:

1. Click CreateRecordVolume menu.

Configure Hybrid SAN				×
Configure Private Volume	Hybrid SAN Configuration	Create Record Volume	Expand Record Volume	Ê
The largest storage of LUN a displayed.	allowed by record volume is a	8388608 MB. LUN with a	larger storage will not be	
You are recommended to all	ocate the logical volumes of	the same storage pool t	o the same record volume.	
Record Volume Name:				
Overwrite Strategy:	Overwrite 💌	1		
Usage:	Video Storage			
Logical Volume Source:	LOCAL	[		
Usable LUN:	Select All			
			ОК	Close

Figure 6. 8 Create Record Volume

- 2. Enter the RecordVolume Name in text field.
- 3. Select Overwrite Strategyas Overwrite or Do Not Overwrite.
  - Overwrite: Once the record volume is full, videos can still write into it by covering the earliest videos.
  - Do Not Overwrite: Once the record volume is full, videos cannot be written in it
- 4. Select Record Volume Usageas Video Storage or Picture Storage.
- 5. If you want to create record volume based on local HDD or array, select LogicalVolumeSourceas Local.If you want to create it based on IP SAN, select LUNsourceas IP SAN.
- 6. Select one or more UsableLUN.



If the capacity of private volume 1 and private volume 2 are both larger than 50 GB, maximum capacity of each LUN of record volume is 8 TB.

7. Click OKto create the record volume. The created record volumes are listed in Record Volume list.

### 6.2.3.2 Clearing, Modifying, and Deleting Record Volume

#### Purpose:

The created record volumes are listed in Record Volume list. You can clear videos saved in it, modify its configuration, and delete it.

Table 6. 3 Icon Description

lcon	Name	Description	
Û	Clear data	You can clear videos saved in the record volume.	
$\bigotimes$	Modify	You can modify record volume name, usage, and data overlay strategy.	
(I)	Delete	You can delete the record volume. Data saved in it is removed.	

If a record volume consists of two or more LUNs, you can delete one of them according to following steps: Steps

1. Click the record volume name.

RV_1		ک
Usable LUN:	Repair Record Volu	ume Expand Record Volume
LUN being used	Status	Remove LUN
LUN_RV_1	Good	9
LUN_RV_3	Good	9
LUN_RV_2	Good	Ø
LUN_RV_4	Good	9
		Close

Figure 6. 9 LUNs

- 2. Click of the LUN you want to delete.
- 3. Enter yes or YESintext field to delete it. After it is deleted, data saved in the LUN is deleted and the LUN status is Free.

### 6.2.3.3 Extending

#### Purpose:

When the record volume capacity is insufficient, you can use the free LUNs to extend it.

Steps:

1. Click Extend Record Volume menu.

Configure Private Volume	Hybrid SAN Configuration	Create Record Volume	Expand Record Volume
The largest storage of LUN a displayed.	llowed by record volume is	8388608 MB. LUN with a	larger storage will not be
ou are recommended to all	ocate the logical volumes of	the same storage pool t	o the same record volume.
Record Volume Name:	*		
Usable LUN:			
USable LUN,	Select All		

Figure 6. 10 Extend Record Volume

- 2. Select the record volume you want to extend in RecordVolumeName dropdown list.
- 3. Select the UsableLUNused to extend.
- 4. Click OKto start extending.

# 6.3 Backup and Restoring

#### Purpose:

The chapter introduces the video backup and HYBRID SAN restoring steps.

#### Step:

Click Backupand Restorebutton in upper right corner.



Figure 6. 11 Back and Restore

### 6.3.1 Viewing Private Volume Information

Step:

Click Private volume information menu to enter Private Volume information interface. LUNs making up private volume 1 and private volume 2 are listed.

### 6.3.2 Restoring

#### Purpose:

When error occurs to HYBRID SAN , restoring HYBRID SAN can recover it. Restoring may cause data loss, so you need to contact us for professional help. We are not responsible for error caused by unprofessional operation. Step:

Click ExecuteRestorationTaskmenu to enter Restore interface.

Backup and Restore	×
Private Volume Information Execute Restoration Task Execute Backup Task	
Execute Record Data Restoration	
Select the item to restore.	
Encoding device configuration and backup video record	
Record Volume Configuration and Video File Index(Do not select this item when recording, or you may lose your	
data.)	
Restore video record from HDD.(Used to restore all video records. It may take a long time. The needed time	
depends on record volume capacity.)	
OK Clos	e

Figure 6. 12 Restore

### 6.3.3 Backup

#### Purpose:

The storage system backs up the index of all videos every hour. You can manually back up all videos' index according to following steps. The backed up index is saved in database.



The function backs up video index instead of videos.

Steps:

- 1. Click Execute Backup Tasktab.
- 2. Click OKto start backing up.

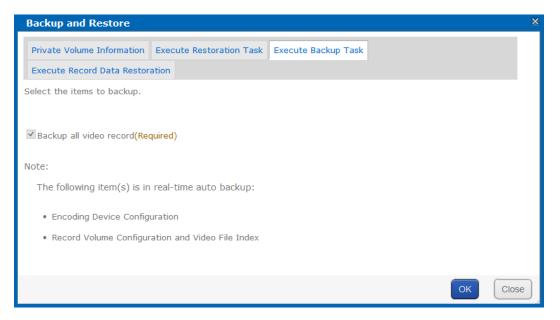


Figure 6. 13 Backup

## 6.3.4 Recovering Video Data

#### Purpose:

If you reset HYBRID SAN, deleted record volume, or cleared record volume by mistake, you can contact us for professional help, we would help you to recover these data. We are not responsible for error caused by unprofessional operation.

#### Step:

Click Execute Record Data Restoration tab.

Backup and Restore				×
Private Volume Information	Execute Restoration Task	Execute Backup Task		
Execute Record Data Resto	ration			
Restoring logical volume reco	rd data when restoring record	l data with error takes l	onger time. Please use with	
caution, and wait with patien	ice.			
Note: This page has only con	pleted restoring data in reco	rd volume. To restore "F	Record Volume Configuration a	and
Video Index", and "Restore Vi	deo from HDD", please operat	e in "Execute Restoratio	on Task".	
Select record volume for rest	oring data( logical volume):			
Record Volume	<include< th=""><th>e Logical Volume &gt;</th><th></th><td></td></include<>	e Logical Volume >		
□ RV_1	< 🗆 LUN	_RV_1 🗆 LUN_RV_3 🗆 L	UN_RV_2 UUN_RV_4>	
L				
			ОК	Close

Figure 6. 14 Record Data Recovery

# 6.4 N+1 Management

#### Purpose:

A storage system whose HYBRID SAN service has started can serve as a backup HYBRID SAN for other HYBRID SAN s. When one or more master HYBRID SAN s fail, the backup HYBRID SAN would record the videos from encoders. Master HYBRID SAN error includes network error, private volumes damaged, database error, and HYBRID SAN service error. After the master HYBRID SAN s recovers to normal, backup HYBRID SAN would upload videos back to master HYBRID SAN s.

#### Before you start:

Start HYBRID SAN service in both master HYBRID SAN and backup HYBRID SAN .

#### Step:

Click N+1in navigation bar and choose N+1to enter HYBRID SAN interface.

ybrid SAN -> N+1				
Add Backup Hybrid SAN Add Master Hy	arid SAN Add t	he backup Hybrid SAN in the master Hybrid SAN first. And then add master Hybrid in the backup Hybrid SAN.		
Master Hybrid SAN				
Maximum Taking Over Number:	Modify			
Select All	IP Address	Status		
Delete				
Backup Hybrid SAN				
Set data synchronization: Synchroniza	tion□Delete the videos saved in backup Hybrid SAN after synchron	ization succeeded. Modify		
Select All	Backup Hybrid SAN			

Figure 6. 15 N+1 Management



- Log into master HYBRID SAN and add backup HYBRID SAN for master HYBRID SAN first. And then Log into backup HYBRID SAN and add master HYBRID SAN for backup HYBRID SAN.
- A storage system can be either backup HYBRID SAN or master HYBRID SAN.
- Ensure the system time of backup HYBRID SAN and master HYBRID SAN are the same. For detailed steps of modifying system time, refer to Chapter8.3Time.
- Once master HYBRID SAN can only link to one backup HYBRID SAN
- It is not recommended that encoding devices added in backup HYBRID SAN have duplicate name.

## 6.4.1 Adding Backup HYBRIDSAN

#### Purpose:

Add backup HYBRID SAN in master HYBRID SAN first.

Before you start:

Log into master HYBRID SAN and enter N+1 Management interface.

Steps:

1. Click the Add BackupHYBRIDSAN button.

Add Backup Hybrid SAN	8
Backup Hybrid SAN IP Address:	For Example: 192.168.0.1
	OK Close

Figure 6. 16 Add Backup HYBRID SAN

- 2. Enter the backup HYBRID SAN IP address.
- 3. Click OKto add.
- Optionally, you can check the checkboxes of Synchronization and Delete the videos saved in backup HYBRIDSAN after synchronization succeeded, and click Modify to enable them.
  - Synchronization:Once master HYBRID SAN recovers to normal, backup HYBRID SAN uploads the videos back to master HYBRID SAN.
  - Delete the videos saved in backup HYBRIDSAN after synchronization succeeded: Delete the videos in backup HYBRID SAN once they are uploaded to master HYBRID SAN.

Backup Hybrid SAN									
Set data synchronization: Synchronization Delete the videos saved in backup Hybrid SAN after synchronization succeeded. Modify									
Select All	Backup Hybrid SAN								
Delete									

Figure 6. 17 Backup HYBRID SAN

## 6.4.2 Deleting Backup HYBRIDSAN

#### Steps:

- 1. Check the checkbox of backup HYBRID SAN you want to delete.
- 2. Click the Delete button and click OKin confirmation dialog box.

### 6.4.3 Adding Master HYBRIDSAN

Before you start:

- 1. Log into backup HYBRID SAN and enter N+1 Management interface.
- Add the same encoding devices in backup HYBRID SAN, which have been added in master HYBRID SAN. For details, refer to chapter 7.3.2 Adding Encoding Device. Ensure the name of encoding devices from different backup HYBRID SAN s varies from each other.
- 3. Delete the added encoding devices in step 2.
- 4. Add schedules for encoding devices in backup HYBRID SAN the same as schedule in master HYBRID SAN . Steps:
- 1. Click the Add Master HYBRIDSAN button.

Add Master Hybrid SAN	X
Master Hybrid SAN IP Address:	For Example: 192.168.0.1
	OK Close

Figure 6. 18 Add Master HYBRID SAN

- 2. Enter master HYBRID SAN IP address.
- 3. Click OKto add. The added master HYBRID SAN is listed in HYBRID SAN master list
- 4. Enter Maximum TakingOver Number and click Modify. If maximum taken-over master HYBRID SAN is 4 and 7 master HYBRID SAN s are added, when 5 master HYBRID SAN s are abnormal, the backup HYBRID SAN would take over the first added 4 master HYBRID SAN s. After one or more of the 4 HYBRID SAN s recovers, other master HYBRID SAN s would be taken over.



The max. taken-over number cannot be more than 10. If input 0 or input nothing, system regards it as 10.

Backup HYBRID	Description										
SAN Status	Description										
Standby	When master HYBRID SAN is normal, backup HYBRID SAN is standby.										
	When master HYBRID SAN is abnormal, backup HYBRID SAN takes over the tasks.										
Working	Now backup HYBRID SAN status is working and master HYBRID SAN status is										
WORKINg	taken-over. When master HYBRID SAN recovers, backup HYBRID SAN recovers to										
	standby.										

#### Table 6. 4 Backup HYBRID SAN Status

# Chapter 7 HYBRIDSAN Sub-System

#### Purpose:

You can configure the parameters for HYBRID SAN sub-system.

Module	Description							
Information	Encoding device, record schedule, and record volume information are listed.							
Encoding Device	You can add and manage encoding devices, adjust HYBRID SAN sub-system time, count							
	remaining recoding capacity, and analyze video loss.							
Draviow and Decord	You can view encoding device status and live view image, and start and stop manual							
Preview and Record	record of one or more encoding devices.							
Strategy and Alarm	You can configure recording schedule, create uploading task and schedule, and configure							
Strategy and Alarm	alarm parameter.							
Download and play	You can search, archive, backup, lock, play, and download recorded videos.							
User Management	You can switch system language and edit display rows in each page.							
System Config	You can configure system alarms and view HYBRID SAN version.							
	Log helps you figure out HYBRID SAN history actions. You can search, export, and clear							
Log Management	logs.							

Table 7. 1 Module Description

#### Key Words:

Information, Encoding Device, Preview and Record, Strategy and Alarm, Download and play, User Management, System Config, Log Management



Figure 7. 2 HYBRID SAN Sub-System

# 7.1 Accessby Web Browser

#### Steps:

- 1. Open web browser.
- 2. Input the storage system IP address (https://10.254.254.2004) in Web browser address bar.
- 3. Press Enter. Then login interface appears.
- 4. Enter Passwordof HYBRID SAN sub-system and click Loginto log in.

STRONGPASSWORDRECOMMENDED-Wehighlyrecommend you create a strong password of your own choosing (Using a minimum of 8 characters, including at least three of the following categories: upper caseletters, lower caseletters, numbers, and special characters.) in order to increase the security of your product. And we recommendyou reset your password regularly, especially in the high security system, resetting the password monthly or weekly can better protect your product.

Information	Informatio	n													
** Information															
Encoding Device	Encoding	Device Inform	nation								Total (	page(s),	0 row(s).	20 per	page, page 1
	Display A	II Filter											Show En	abled Er	ncoding Device 🗸
Preview and Record	Encoding De	vice Enco	ding			URL			Devi	ce Login		Record			
Strategy and Alarm	Name	Device	Туре	Device I	(P addre	ss Por	t No. Chann	el No.	Use	ername	Property	Volume	Stream	туре	Device Status
Download and play															I
User Management			_	_	_	_		_	_					_	
System Config	Record St	ategy List									Total (	page(s),	0 row(s).	20 per	page, page 1
Log Management	Refresh														
Log Management	Strategy	Encoding		Start	End	Duratio	Video	Vid	leo	Alarm Pre	e- Alarm	Loc			main stream to
	No.	device	Strategy	time	Time	Duratio	n Dispatch	Upl	oad	Record	Arming	Durat	Stat ion	us	record
	Record Vo	lume Inform	ation								Total 1	page(s),	1 row(s).	20 per	page, page 1

Figure 7. 3 HYBRID SAN Sub-System

# 7.2 Information

Purpose:

Encoding device, record schedule, and record volume information are listed.

Step:

Click Information in navigation bar.

Informatio	Information															
Encoding Device Information Total 0 page(s), 0 row(s). 20 per page, page 1																
Display All Filter Show Enabled Encoding Device														ed Encoding Device 🗸		
Encoding Dev Name		Channe			ice Login ername	Property	Reco	S	tream Ty	pe Device Status						
Name	Device	туре	Device II	r audre	ss Port	NO.	Channe	1 NO.	USI	ernante		Volui	ile			
Record Str	ategy List										Tota	0 page	(s), 0 ro	w(s). 20	per page, page 1	
Refresh																
Strategy No.	Encoding device	Strategy		End Time	Duration		Video ispatch	Vid Upl	leo oad	Alarm Pr Record			Lock uration	Status	Use main stream to record	
Record Vo	lume Inform	ation									Tota	1 page	(s), 1 ro	ow(s). 20	per page, page 1	

Figure 7. 4 Information

Status	Description
Free	Connection is normal and it is recording.
No video input	It appears when encoding device amount reaches the limit or HYBRID SAN is rebooting.
Recording	Encoding device is recording.
Password or user name error	Incorrect user name or password for encoding device.
Not load	When HYBRID SAN starts, loading encoding device failed.
Unknown	HYBRID SAN is error.
Not connected	Failed to get stream for encoding device.
Recording Archiving	Encoding device is recording and archiving.
Recording Uploading	Encoding device is recording and receiving videos from front-end devices.
Archiving	Encoding device isn't recording, but is archiving.
Uploading	Encoding device isn't recording, but is receiving videos from cameras.

#### Table 7. 2 Status Description

# 7.3 Encoding Device

#### Purpose:

You can add and manage encoding devices, adjust HYBRID SAN sub-system time, count remaining recoding capacity, and analyze video loss.

#### Step:

Click EncodingDevicein navigation bar.

Information	Encoding Device ->	Encoding Devic	e										
Encoding Device	Add Encoding Derice												
** Encoding Device													
Preview and Record													
Strategy and Alarm	Select	Encoding Device	Encoding Device		URL	Device Login	Property	Record	Edit				
Download and play	Select _	Name	Туре	Device IP address	Port No.	Channel No.	Username	Froperty	Volume	Eun			
User Management		<u>55.8_1</u>	Hikvision	10.192.55.8	8000	1	admin	E-P-A	<u>RV 1</u>	0			
System Config		<u>55.8_2</u>	Hikvision	10.192.55.8	8000	2	admin	E-P-A	<u>RV 1</u>	0			
Log Management		<u>55.8_3</u>	Hikvision	10.192.55.8	8000	3	admin	E-P-A	<u>RV_1</u>	0			

Figure 7. 5 Device Management

## 7.3.2 Adding Encoding Device

#### Steps:

- 1. Click Add Encoding Device.
- 2. Enter Encoding Device Name.
- According to encoding device acutal parameters, select EncodingDeviceType, enter IP/Host, Port, Channel, Login user, and Password.
- Optionally, you can enable stream media server by checking the checkbox of EnableSMS(Stream Media System), inputting IP address:port(e.g., 192.168.0.2:554) in SMS, and select URLMark and Transmission Method.
- 5. Optionally, you can enable other function according to your needs.
  - > Enable streaming according to needs: The storage system releases occupied bandwidth, when no

stream requirement for the encoding device. If selected, the encoding device Attribute marks as P.

- ANR(Automatic Network Replenishment): When the storage system disconnects with the encoding device, the encoding device records video and stores in its own storage device, like SD card. Once connection recovers, encoding device sends the video to the storage system. If selected, the encoding device Attribute marks as T.
- Enablesub-streamto preview and record: If selected, when you preview and record via sub-stream, it takes lower bandwidth. But sub-stream video quality and bitrate is lower than main stream. And the encoding device Attribute would mark as S. If record strategy exists, HYBRID SAN gets stream according to strategy.
- EnableArming: If selected, when alarm occurs to encoding device, HYBRID SAN can trigger alarm record. And the encoding device Attribute would mark as A.
- 6. Select related record volume in Link to RecordVolume.
- 7. Click OKand click OKin confirmation dialog box to add the encoding device.

Add Encoding Device		×
Encoding Device Name:	Encoder01	For example pv_0001
Encoding Device Type:	Hikvision 🗸	
Device IP/Domain Name:	192.168.0.64	
Connection Port No.:	80	
Connection Camera No.:	1	Between 0 ~ 255
Device Username:	admin	
Password:	•••••	
	Enable SMS	
SMS:	e.g.1.1.1.1:554 🗸	
URL Mark:	hikvision 🖌	
Transmission Method:	rtprtsp 🗸	
Function Selection: Link to Record Volume:	✓Enable Streaming according to ☐ANR ☐User sub-stream to preview and ☐Enable Arming RV_1	
		OK Close

Figure 7. 6 Add Encoding Device



- Repeat above steps to add more encoding devices. Up to 1024 encoding devices can be added.
- If the encoding device you add isn't in the List of Compatible of Encoding Device, the Attribute would mark as B. You can ask technical support for the List of Compatible of Encoding Device.

### 7.3.3 Modifying and Deleting

#### Steps:

- To delete encoding devices, do following steps:
- 1. Check the checkbox of encoding device you want to delete.
- 2. Click Delete encoding device.

- To modify encoding device parameters, do following steps:
- 1. Click 🧐 of encoding device you want to modify.
- 2. Edit the parameters you want to modify.
- 3. Click OK and click OK in confirmation dialog box to save the settings.
- To modify linked record volume, do following steps:
- 1. Check the checkbox encoding device you want to modify.
- 2. Select the target record volume in the dropdown list.

### 7.3.4 Exporting and Importing Encoding Device

#### Purpose:

For the purpose of modifying a large number of encoding device in batch, you can export them, modify their parameters, and import them back to HYBRID SAN sub-system.

#### Steps:

- To export encoding devices, do following steps:
- 1. Click Export and click OKin confirmation dialog box.

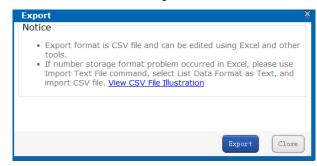


Figure 7. 7 Export

2. Select file saving path and click OKto save it.

# NOTE

The exported file is a .csv file. You can view and edit it via Microsoft Excel. The content of exported file is shown in Figure 7.8 Exported File.

	A	В	C	D	E	F	G	H	I	J	K	L	n	N	0	P	Q	R	S	T	U
1 1	M_ID	NAME	TYPE	DEVICE	CHANNEL	HOST	FORT	USER	PASSWORD	USELUN	PATH	ENABLED	COMMENT	CAMINDEX	GRPINDEX	DEVICESN	HKSLOTID	HKSTREAM	GBDEVSN	GEDEVCHANS	SN
2		1 EncoderC	1 HK	Encoder0	1 1	10.16.1.250		80 admin	Hik12345	(	)	62									
3																					

Figure 7. 8 Exported File

To import encoding devices, do following steps:

1. Click Import

- 2. Click Browseand select the target file.
- 3. Optionally, you can select the Operation Options.
  - Update Duplicate Device: When the contents of HOST and CHANNEL column of several encoding devices are the same, HYBRID SAN judges them as duplicate encoding device. If it is selected, HYBRID SAN would add all of the duplicate encoding devices and update the previous encoding devices' parameters. Or duplicated wouldn't be added.
  - Update encoding device with the same name: If selected, when encoding devices in HYBRID SAN sub-system and importing file share the same name, once imported, the encoding devices in importing file would replace the one in HYBRID SAN sub-system.

- Auto link record volume: If selected, when encoding devices in importing file have no linked record volume, once imported they would link to the first record volume in HYBRID SAN sub-system.
- Auto Rename:If selected, when duplicated name exists during add and modifying, the name of added encoding devices would be renamed as "previousname\_1".
- 4. Click OK and click OK in confirmation dialog box to import. The encoding device list would be updated according to imported file.

Import	×
Note:	^
Only support CSV file. Browse	
Operation Options	
☑Update Duplicate Device	- 11
$\blacksquare$ Update encoding device with the same name	- 11
Auto link record volume (if encoding device does not have linked re	cord
volume)	
☑Auto Rename	$\sim$
OK	Close

Figure 7. 9 Import

# 7.4 Previewing and Recording

Purpose:

Do following steps to start or stop recording manually.

#### Steps:

Click Preview and Recordin navigation bar.

Preview and Record -> Encoding Device										
Turn on All Turn off all										
Encoding Dev	Encoding Device Total 0 page(s), 0 row(s). 20 per page, page 1									
Display All	Filter					S	how Enable	d Encoding Device	e 🗸 🛛 Turn on v	rideos
Encoding	Encoding	ι	JRL		Device Login		Record	a		Select
Device Name	Device Type	Device IP address	Port No.	Channel No.	Username	Property	Volume	Stream Type	Device Status	🗌 (0)

Figure 7. 10 Preview and Record

- To start or stop manual recording for specified encoding devices, do following steps:
- 1. Check the checkboxes of encoding devices you want to start manual record.
- 2. Click Turnon videos to start recording. And you can click turn off videos to stop recording.
- To start or stop manual recording for all encoding devices, do following step:

Click Turnon All to start recording for all. And you can click Turnoff All to stop recording for all.



If the encoding device is recording according to record schedule, click Stop recording or All stop wouldn't stop recording, for record schedule would start recording again. For schedule details, refer to 7.5 StrategyandAlarm.

# 7.5 Strategy and Alarm

#### Purpose:

You can configure recording schedule, create uploading task and schedule, and configure alarm parameter.

#### Step:

Click Strategyand Alarm in navigation bar.

Strategy and Alarm -> Record Strategy								
Simple Record Plan								
Create record plan								
ОК	Name Monday	Tuesday We	dnesday Thur	sday Friday	y Saturday	Sunday		
Use Encoding Device Type Use group View All Advanced Record Plan		_	_	Total 0 page(s)	), 0 row(s). 20 per	bage, page 1		
Advanced Strategy	Import	t Export	Delete Selected		Delete All the			
Strategy Encoding Strategy St No. device	art time End Time	Video Duration Dispate	Alarm Video Pre- ch Upload Record	<b>Arming Duration</b>	Use main Status stream S to record	elect 🗌 (0)		

Figure 7. 11 Strategy and Alarm

## 7.5.1 Record Plan

Purpose:

Set the record plan, and then the encoding devices automatically starts and stops recording according to the configured plan.

Step:

Click RecordStrategyin navigation bar.

Simple Record Plan									
Create record pla	n								
	ОК	Name	Monday	Tuesday	Wednesday	Thursday	Friday	y Saturday	Sunday
Use Encoding     Device Type     All	se group Vie	w							
a duran and proceed pl									
Advanced Record Pl			Import	Export	Delete S	Tota elected Strategy		), 0 row(s). 20 per j Delete All the :	

Figure 7. 12 Record Strategy



It is recommended to configure either simple record plan or advanced record plan.

### 7.5.1.2 Simple Record Plan

#### Purpose:

Set the simple record plan, and then the specified encoding devices automatically start/stop recording according to the configured plan.

Steps:

- 1. Click Createrecord plan.
- Enter in the encoding device name and click OKto select the encoding device. Repeat the step to add more.
   Or select encoding devices or groups in the list.

Please select an encoding device
OK
Use Encoding Device Type
⊖Use group
All

Figure 7. 13 Select Encoding Devices

3. Select the Date on which you want to set schedule.

Date Selection:	Monday	Tuesday	Wednesday	Thursday
	Friday	Saturday	Sunday	The Whole Week

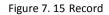
Figure 7. 14 Date

4. In Recordmode, to schedule an all-day recording, check the checkbox of Whole-day Video. Or you can select the one or more time segments to set start time and end time.



Up to 8 periods can be configured for each day. And the time periods can't be overlapped with each other.

Record Mode: Whole-day	y Video		
☑ Time 1:	02 ♥ 00 ♥ : 00 ♥ 06 ♥ :	✓ Time 2:	$\begin{array}{c} 06 \checkmark \\ 00 \checkmark \end{array} : \begin{array}{c} 02 \checkmark \\ \end{array} 11 \checkmark : \end{array}$
Time 3:	00 <b>v</b> : 00 <b>v</b> 00 <b>v</b> :	Time 4:	00 <b>∨</b> : 00 <b>∨</b> 00 <b>∨</b> : 00 <b>∨</b>
Time 5:	00 <b>v</b> : 00 <b>v</b> 00 <b>v</b> : 00 <b>v</b> :	Time 6:	$\begin{array}{c} 00 \checkmark \\ 00 \checkmark \end{array} : \begin{array}{c} 00 \checkmark \\ \end{array} 00 \checkmark : \end{array}$
☐ Time 7:	00 <b>v</b> : 00 <b>v</b> 00 <b>v</b> : 00 <b>v</b>	Time 8:	00 <b>v</b> : 00 <b>v</b> 00 <b>v</b> : 00 <b>v</b> :



- 5. Optionally, you can select one or more Dispatchoptions.
- Disabledby Default: If selected, schedule status is Stopped. And encoding device would not start recording. Other Schedule options wouldn't take effective.
- Not executerecord dispatch: If selected, encoding device wouldn't start recording. Other Schedule options

wouldn't take effective.

- Copyback: If selected and uploading schedule exists, the camera video would upload to HYBRID SAN. For details of configuring uploading schedule, refer to chapter 7.5.2.3AddingUpload.
- Disable alarm pre-record: Pre-record refers to the time you set to record before the scheduled time or event. If selected, pre-record is turned off.
- > Disablealarm arming: If selected, when encoding device is error, HYBRID SAN wouldn't alarm.
- Lock: If selected, you need to set locking time as a specified duration or keep locking. During locking time, videos wouldn't be overlapped. Locking time must be longer than duration time.
- Usesubstream to record: If selected, encoding device records via sub-stream instead of main stream.

### 7.5.1.3 Advanced Record Plan

#### Purpose:

By setting advanced record plan, you can specify the start recording time and recording duration for designated. Steps:

- 1. Click Advanced Strategy.
- Enter in the encoding device name and click OKto select the encoding device. Repeat the step to add more.
   Or select encoding devices or groups in the list.

Please select an encoding device     OK	26
Use Encoding Device Type	

Figure 7. 16 Select Encoding Devices

- 3. Select Start time by Instant Recordingor Preset Time.
  - > Instant Recording:Starts recording once schedule is added.
  - PresetTime: Starts recording at the set time.
- 4. Select Duration unit as Week, Day, Hour, Minute, or Secondand enter number.
  - Duration: Keeps recording during the time.

Start Time:	○Instant Recording	
Duration:	Unlimited V	

#### Figure 7. 17 Start Time and Duration Time

- 5. Optionally, you can select one or more Dispatchoptions. For details, refer to step 5 of 7.5.1.2 SimpleRecord Plan.
- 6. Select UseStrategyand set the end time.



If Schedule is set as hour, minute, or customized, locking in schedule options is not selectable.

7. Click OK to save the schedule. Then before the end time, the selected encoding devices would repeatedly start recording at set start time and stop recording till the duration time.

### 7.5.1.4 Exporting and Importing Advanced Record Plan

#### Purpose:

For the purpose of managing advanced schedules in batch, you can export them, modify their parameters, and import them back to HYBRID SAN sub-system.

Step:

For detailed steps, you can refer to chapter 7.3.4 Exporting and Importing EncodingDevice.

# 7.5.2 Upload Strategy

#### Purpose:

When videos in HYBRID SAN lost, and the lost videos exist in encoding devices. You can upload the videos back to HYBRID SAN .

Step:

Click Strategyand Alarm in navigation bar and choose Upload Strategy.

Strategy and Alarm -> Upload Strategy									
Dipload Process Conliguration	Upload Process Configuration								
Basic Configuration Ad	Basic Configuration Advanced Configuration								
🗏 Upload Task						Total 0 page(s), 0 rov	w(s). 20 per	page, page 1	
Add Upload Task					De	elete Selected Tasks	Del	ete All Tasks	
Encoding Device Name Tas	k No. Recording	Start Time	Recording End tim	e Task Start	Time	Task Finish Time	e Status	Select 🗌 (0)	
🗖 Upload Plan						Total 1 page(s), 1 rov	w(s). 20 per	page, page 1	
Add Upload Plan					D	elete Selected Plans	De	lete All Plans	
Encoding device	Plan No.		Plan	Start time		End Time	Sele	ect 🗌 (0)	
_AII_	1	The	Whole Week	00:00:00		23:59:59			

Figure 7. 18 Upload Strategy

### 7.5.2.1 Basic Settings

Steps:

- 1. Click BasicConfiguration.
- Enter Detection Start Time, Detection End Time, Max. CameraNumber, and Max. Uploading Camerafor One DVR.
  - > Detection Window Start Time: Start time of detecting uploading.
  - Detection Window EndTime: End time of detecting uploading. Videos ranges from detection start time to end time would be uploaded.
  - > UploadChannelmaxlimit: The maximum cameras that could upload simultaneously.
  - SingleDVRUploadingMax Limit: The maximum cameras in a DVR that could upload simultaneously.

<b>Basic Configuration</b>			×
Detection Window Start Time	30 Day	0 Hour	0 Minute
Detection Window End Time	0 Day	1 Hour	0 Minute
Upload channel max limit	1024		
Single DVR Uploading Max Limi	t 8		
			OK Cancel

Figure 7. 19 Basic Configuration

### 7.5.2.2 Adding Uploading Tasks

#### Purpose:

When videos in HYBRID SAN lost, and the lost videos exist in encoding devices. You can upload the videos back to HYBRID SAN by adding uploading tasks.

#### Steps:

- 1. Click Add Upload Task.
- Enter the encoding device name and click OKto select the encoding device. Repeat the step to add more.
   Or select encoding devices or groups in the list.

Please select an encoding device
Use Encoding Device Type

Figure 7. 20 Select Encoding Devices

3. Set the Video Start time and Video Endtime of video you want to upload.

2017-03-22	00:00:00
2017-03-22	22:49:54

Figure 7. 21 Add Uploading Tasks

4. Click OKto add the task. Then if encoding device contains the video, it starts uploading the video to HYBRID SAN .

### 7.5.2.3 Adding Upload Plan

Purpose:

Uploading schedule can judge whether video loss happens during record schedule. Configure the uploading schedule to upload the videos saved in encoding devices back to HYBRID SAN .

Before you start:

Ensure pulling back data from encoding device in schedule options is selected when configuring basic or advanced schedule. For detailed steps, refer to chapter 7.5.1.2 SimpleRecordPlan and chapter 7.5.1.3 Advanced. Steps:

- 1. Click Add Upload Plan.
- 2. Enter the encoding device name and click OKto select the encoding device. Repeat the step to add more. Or select encoding devices or groups in the list.

FI			encoding dev
_	Use End	coding [	)evice Type

Figure 7. 22 Select Encoding Devices

- 6. Select the date on which you want to set schedule.
- In Upload mode, to schedule an all-day uploading, check the checkbox of All-day Upload.
   Or you can select the one or more time segments to set start time and end time.



Up to 8 periods can be configured for each day. And the time periods can't be overlapped with each other.

8. Click OK to add the schedule. Then selected encoding devices only upload videos during the set data and time segments.

## 7.5.3 Alarm

Purpose:

You can set the recording time for alarm events.

Before you start:

Enable alarm events you want to pay attention in encoding devices first. For details, refer to user manual of encoding device.

Steps:

1. Click Strategyand Alarm in navigation bar and choose Alarm.

Alarm Configuration Total 1 page(s), 0 row(s). 20 per page, page 1								e 1									
Set Alarm Configuration Delete Alarm Configuration Delete All																	
		Detect	ViewTampering BorderCross		GoWrongDirection SomethingRemains			ObjectLost Linkage Alarm			Sele						
	Duration		Duration		Duration		Duration						Duration		Duration		C
device	(5)	Archive	(5)	Archive	(5)	Archive	(5)	Archive	Duration (s)	Archive	Duration (5)	Archive	(5)	Archive	(5)	Archive	(0

Figure 6. 23 Alarm

- 2. Click Set Alarm Configuration.
- Enter the encoding device name and click OK to select the encoding device. Repeat the step to add more.
   Or select encoding devices or groups in the list.

Please select an encoding device
ОК
Use Encoding Device Type
OUse group

Figure 6. 24 Select Encoding Devices

- Enter Trigger Recording (Archive) Duration for alarm types you want to pay attention. Valid Duration ranges from 5 to 9999. Then when an alarm occurs, HYBRID SAN starts recording for the set Duration. The supported alarm types include Signal Source, Motion Detection, Video Tampering, Perimeter Cross, Wrong Direction, Unattended Baggage, and Object Loss.
- 5. Optionally, you can check the checkbox of Archive of alarm types. Then the alarm videos can be viewed in Archive Search interface.

Other Configuration Conditions							
Alarm Type	Trigger Recording (Archive) Duration (Second)						
SignalsIn							
MotionDetect							
ViewTampering							
BorderCross							
GoWrongDirection							
SomethingRemains							
ObjectLost	,						

Figure 6. 25 Other Configurations

6. Click OK to save the settings.

# 7.6 Playing and Downloading

#### Purpose:

You can search, archive, backup, lock, play, and download recorded videos.

#### Step:

Click Download and Playin navigation bar.

Download an	d play -> Searcl	h Video						
Search Video				[	Lock Configuration	Video Play	/back Dowr	nload Video
Encoding Device Name	Start Time	End Time	Duration	Video Type	Video Size (MB)	Lock Duration	Quick Connection	Select 🗌 (0)

Figure 7. 26 Download and Play

# 7.6.1 SearchingVideo

#### Steps:

- 1. Click SearchVideo.
- Enter the encoding device name and click OKto select the encoding device. Repeat the step to add more.
   Or select encoding devices or groups in the list.

P	lease select an encoding device
	Use Encoding Device Type

Figure 7. 27 Select Encoding Devices

- 3. Specify the search conditions including Start Time, End Time, Record Type, Search Type, and Display locktime (whether it is a locked video).
- 4. Click OKto start search. And the videos meet the search conditions would be listed.

## 7.6.2 Locking Videos

#### Purpose:

The locked videos will not be overlapped by other videos.

Before you start:

Search videos first.

Steps:

- 1. Check the checkboxes of videos you want to lock. Not more than 100 videos can be selected.
- 2. Click LockConfiguration.

- 3. Select lock mode as Unlock, Locklast, or Locktime.
  - > Unlock: If selected, the locked video would be unlocked.
  - > AlwaysLocked: If selected, the video is locked permanently.
  - LockDuration: If selected, you need to set the locking time. Then the video would be locked from the video start time for the set time.

Lock Configuration	×
Please select	
⊖ Unlock	
Always Locked	
○ Lock Duration	
ОК	Close

Figure 7. 28 Lock Mode

# 7.6.3 Playing Videos

Purpose:

Play back videos to view the history image.

Before you start:

- Search videos first.
- Add IP address of HYBRID SAN to web browser trusted sites and enable all of ActiveX controls and plug-ins.
- 1. Enter Trusted Sites menu.

Tools > Internet Options > Security > Trusted Sites

Storage System User Manual

Internet Options
General Security Privacy Content Connections Programs Advance
Select a zone to view or change security settings.
🎱 🎕 🏑 🚫
Internet Local intranet Trusted sites Restricted sites
Trusted sites This zone contains websites that you trust not to damage your computer or your files. You have websites in this zone.
Security level for this zone
<b>Custom</b> Custom settings. - To change the settings, dick Custom level. - To use the recommended settings, dick Default level.
Enable Protected Mode (requires restarting Internet Explorer)           Qustom level         Default level
Reset all zones to default level
OK Cancel Apply

Figure 7. 29 Trusted Sites

- 2. Click Sites button, enter https://IP address of HYBRIDSAN, click Add, and click Closeto go back to upper menu.
- 3. Click <u>Custom level...</u> button, enable all of ActiveX controls and plug-ins, click OKto save and go back to

upper menu.

4. Click OK to save the settings.

## 7.6.3.2 Whole Video Playback

Purpose:

Play the original video.

- 1. Check the checkboxes of videos you want to play. Not more than 16 videos can be selected.
- 2. Click Video Playback. And another window pops up. You can view the playback image.



Figure 7. 30 Playback Window

3. You can play all selected videos by clicking PlayAll in upper-right corner.

# 7.6.4 Downloading Videos

Purpose:

Save the videos to computer by downloading them. Before you start: Search videos first.

## 7.6.4.1 One-Key Downloading

Step:

Click  $\P$  button and select the saving path to save a single video.

## 7.6.4.2 Block Downloading

Steps:

Click 戅 button and click CompleteDownload to download.

Archive/Down	load by Block	2
	: 2017-03-23 20:22:30 : 2017-03-23 20:28:11	
Video Downlo		
Complete Downloa Download Divisior		
	Close	в

Figure 7. 31 Segment Downloading

## 7.6.4.3 Batch Dowloading

- 1. Check the checkboxes of videos you want to download.
- 2. Click Download button to pop up batch downloading interface.
- 3. Click Select button to select saving path.
- 4. Select downloading mode as By signle-taskor By multi-task.
  - By single-task:Download one video at a time.
    - By multi-task: Download several videos simultaneously. The maximum downloading video amount is Max. number of tasks whose valid range is from 1 to 5.
- 5. Click Start to start downloading. You can click Stop to stop downloading.

Address C:\Downloads\									
<ul> <li>By single-tas</li> </ul>	sk 🔿 By mul	ti-task Max.	number of tasks	1 -					
Start Stop Note: File size is subject to the downloaded size. Close									
Task name	File size	Downloaded	Completed	Time used	Storage f				
Encoder02_1	0	0	0%	0	Encoder02				
Encoder04_1	0	0	0%	0	Encoder04				
Encoder01_1	0	0	0%	0	Encoder01				
Encoder01_1	0	0	0%	0	Encoder01				
Encoder01_1	0	0	0%	0	Encoder01				
Encoder01_1	0	0	0%	0	Encoder01				
Encoder04_1	0	0	0%	0	Encoder04				
Encoder01_1	0	0	0%	0	Encoder01				
Encoder01_1	0	0	0%	0	Encoder01				
Encoder01_1	0	0	0%	0	Encoder01				
Encoder01_1	0	0	0%	0	Encoder01				
Encoder01_1	Ο	Ο	0%	0	Encoder01				

Figure 7. 32 Batch Downloading

# 7.7 User

Purpose:

You can switch system language and edit display rows in each page.

Steps:

- 1. Click UserManagementin navigation bar.
- 2. To modify Interface language, select language in the dropdown list.
- 3. To modify the display rows in each page, select number in the dropdown list of Number of table rows shown in each page.
- 4. Click UploadConfiguration to save the changes.

User Management -> Persona	al Set
Personal Set	
Interface Language: Number of table rows shown in eac	English V Ch page: 20 V
Update Configuration	Restore Default Configuration

Figure 7. 33 User

# 7.8 SystemConfiguration

Purpose:

You can configure system alarms and view HYBRID SAN version. Step:

Siep.

Click SystemConfigin navigation bar.

# 7.8.1 SystemAlarm

#### Purpose:

You can set linkage actions for alarm type, specify alarm type for alarm events, and turn on or turn off status alarm.

- 1. Click Systemin navigation bar and choose SystemAlarm to enter System Alarm interface.
- 2. Alarm type includes Info (Information), Warning, Error, and Fatal.Specify 3 linkage actions for the 4 alarm types.

System Config -> System Alarm								
Alarm Settings: Set the linkage action for all kinds of alarm.								
Information: Webpage Log SMS/EMAIL/SNMP Handling Error								
Warning:	☑ Webpage Log ☑ SMS/EMAIL/SNMP □ Handling Error							
Error:	☑ Webpage Log ☑ SMS/EMAIL/SNMP □ Handling Error							
Fatal:	✓ Webpage Log ✓ SMS/EMAIL/SNMP ✓ Handling Error							

Figure 7. 34 Alarm Setting

3. Specify alarm type for alarm events.

Private volume 2 is damaged:	C Information: C Warning: C Error:      Fatal:
Private volume 1 is damaged:	C Information: C Warning: C Error: @ Fatal:
Hybrid SAN service is abnormally exited:	C Information: C Warning: C Error: • Fatal:
System time changed:	C Information: C Warning: © Error: C Fatal:
Remaining record volume capacity is too low:	C Information:      Warning: C Error: C Fatal:
HKServer:	C Information:      Warning: C Error: C Fatal:
CoreServer:	C Information:      Warning: C Error: C Fatal:
StoreServer:	• Information: C Warning: C Error: C Fatal:
Built-in Stream Media Server:	C Information:      Warning: C Error: C Fatal:
Video Record Detection Alarm:	C Information: • Warning: C Error: C Fatal:
Video Real-Time Surveillance Alarm:	C Information: • Warning: C Error: C Fatal:
System resource alarm occurs:	C Information: C Warning: C Error:   • Fatal:
Recording is abnormal:	C Information: C Warning: C Error: @ Fatal:

Figure 7. 35 Alarm Events

4. Turn on or turn off status alarm.

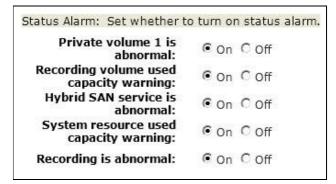


Figure 7. 36 Status Alarm

5. Click Submit to save the settings.

## 7.8.2 HYBRIDSAN Version

Purpose:

You can view HYBRID SAN version, HYBRID SAN library version, and HYBRID SAN other version. Step:

Click SystemConfigin navigation bar and choose Version.



Figure 7. 37 HYBRID SAN Version

# 7.9 Log Management

### Purpose:

Log helps you figure out HYBRID SAN history actions. You can search, export, and clear logs. Step:

Click LogManagementin navigation bar to enter Log Management interface.

Complete Log Total 6 page(s), 108 row(s). 20 per page, page 1 😕 😌 😌 😁							
Search log	View Printed Log	Export All Logs	Clear All System Logs				
1	Log Time		Lo	og Content			
2017 Year 10 Moi	nth 17 Day 16:17:25	User(nvr_admin) IP:(10.1	92.45.161)Login Hybird SAN system com	npleted.			
2017 Year 10 Moi	nth 17 Day 15:46:30	Start Hybrid SAN Service.					
2017 Year 10 Moi	nth 17 Day 15:46:23	Auto HDD checking and re	pairing result: No error found.				
2017 Year 10 Moi	nth 17 Day 15:45:56	Install Hybrid SAN service					
2017 Year 10 Moi	nth 17 Day 15:41:51	Unmount Hybrid SAN Serv	ice				

Figure 7. 38 Log Management

# 7.9.1 Searching Log

- 1. Click Searchlog.
- 2. Specify the search condition including Logtype, Starttime, Endtime, and Including Characters.
- 3. Click OKto start search. The matched logs would be listed.

Search log	×
Log Type: Complete Log V Start Time: End Time: Including Characters:	
(	OK Close

Figure 7. 39 Log Search

# 7.9.2 Exporting Log

Purpose:

You can export the listed logs to local HDD.

Before you start:

Search the logs you want to export.

Step:

Click ExportAll Logsand choose the saving path to save it.



The exported logs are integrated in a .csv file.

# 7.9.3 Clearing Log

Step:

Click ClearAll SystemLogsand click OK in popup confirmation dialog box to clear all logs saved in HYBRID SAN sub-system.

# Chapter 8 System

### Purpose:

You can configure network parameters, alarm triggered action, system time, modify system password, and so forth.

Module	Description					
	You can:					
	• Modify the configuration of management network interface and data network					
Network	interfaces.					
Network	• Bond data network interfaces.					
	• Remotely access the storage system via a specified gateway.					
	• Edit DNS server IP address, bond mode, and network work speed.					
Alarm	You can:					
Alarm	• Send the storage system alarms to client via e-mail or SNMP manager.					
Time	You can:					
Time	• Manually or automatically adjust system time.					
	You can:					
Power Supply	• View UPS mode.					
Fower Suppry	• Modify UPS power-off time.					
	Modify supported UPS manufacturer.					
	You can:					
	• Modify user password.					
Management	• Configure SMTP parameters.					
Tool	• Test network communication between the storage system and a specified IP					
1001	address.					
	• Update the storage system.					
	• View service status.					

Table 8. 1 Module Description

Keywords:

Network, Alarm, Time, Power Supply, Tool

System
Network
Alarm
₩ Time
Power Supply
Management Tool

Figure 8. 2 System

# 8.1 Network

#### Purpose:

The storage system provides one management network interface and two data network interfaces. The management network interface is designed for configuring the data network interface and device maintenance. The data network interfaces are used to transmit data.

Step:

Click Systemin navigation bar and choose Network.

Syst	System -> Network										
🗏 Bas	Basic Network Interface (Total: 1)										
	Network Interface	IP Address	Subnet Mask	м	MAC Address			Jumbo Frame S		Connection Status	Speed
	Management NIC	10.254.254.254	255.255.255.0	8C:E	7:48:7C:8	2:A2	1500	Byte I	Enabled	Disconnect	Unknown
Inter	Bind Network Interface Bound Network Interface (Total: 1)										
	Bound Network IP Address Subnet Mask Subnet Mask Frame Frame Status Stat								ddress		
	Bound NIC1	10.192.54.13	255.255.254.0	1500 Byte	Enabled	Data N Data N		Connect Connect	1000Mb/s 1000Mb/s		:7c:82:a1
× D	elete	Modify									

Figure 8. 3 Network

## 8.1.1 Modifying Data Network Interface

#### Steps:

- 1. Check the checkbox of data network interface.
- 2. Click Modify in Basic Network Interface list.
- Enter the new IP Addressand Subnet Mask and select MTU in dropdown list.
   MTU (Maximum Transmission Unit): Select MTU as larger than 1500 byte for the purpose of improving transmission performance.
- 4. Click OK to save the settings.

## 8.1.2 Binding Network Interfaces

### Purpose:

When transmitting data via a single data network interface, once the data network interface fails, data transmission stops. By bonding multiple data network interfaces into one, they can share one IP address, thus to balance network load and create redundant links. When transmitting data via a bound network interface, once a data network interface fails, other data network interfaces take over the transmission task.



- The management network interface does not support bond.
- The IP addresss of bound network interface is the same as the first data network interface. Before you start:

Connect all data network interfaces to network via network cables.

## 8.1.2.1 Creating Bond

Steps:

- 1. Check the checkboxes of data network interfaces in Basic Network Interface list.
- 2. Click Bind Network Interface and click OKin confirmation dialog box.

E Bo	Bound Network Interface (Total: 1)									
	Bound Network Interface:	IP Address	Subnet Mask	Jumbo Frame	Status	Network Interface	Connection Status	Speed	MAC Address	
	Bound NIC1	10 100 51 10	255,255,254,0	1500 0 10	-4.0 1500 Bute	Enabled	Data NIC1	Connect	1000Mb/s	8c:e7:48:7c:82:a1
	Bound NIC1	10.192.54.13	255.255.254.0	1500 Byte	Enabled	Data NIC2	Connect	1000Mb/s	8c:e7:48:7c:82:a0	
× D	elete	Modify								

Figure 8. 4 Bound Network Interface Information

## 8.1.2.2 Deleting Bond

Steps:

- 1. Check the bound network interface checkbox.
- 2. Click **Delete** and click OKin confirmation dialog box. Then the bound network interface is recovered to several data network interfaces.



Figure 8. 5 Confirmation Dialog Box

## 8.1.2.3 Modifying Bonding Mode

For detailed information and steps, refer to section8.1.5.2BindingMode.

# 8.1.3 Adding Route

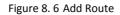
Purpose:

By default, the route is empty, clients in different network segment access the storage system via the default gateway. If you want to access the storage system via a specified gateway, add route here.

Steps:

1. Click Add RouteInfo in Custom Route Information list.

Add Route		E State Stat
Route Address:		E.g. 10.23.2.0
Subnet Mask:	255.255.255.0	E.g. 255.255.255.0
Gateway:		E.g. 192.168.0.1
Network Interface:	Bound NIC1 V	]
		OK Close



- Input Route IP Address, Subnet Mask, and Default Gateway.
   The client server within Route IP address can access the storage system via the Default Gateway.
- 3. Select Bound data Network Interface in the dropdown list.
- 4. Click OKto add the route. Thus the client server within 10.128.50.1 to 10.128.50.55 can access the storage system via the bound network interface 1 whose the gateway is 192.168.0.2.

# 8.1.4 MAC and IP Bonding

### Purpose:

Only client with the specified MAC address and IP address is allowed to get access to iSCSI HDD. Steps:

1. Click MAC&IPBonding.

AC&IP Bonding		×
Tips: The devices for IP and MAC bonding m segment (e.g., if the device IP is 10.192.45. be from 10.192.45.0 to 10.192.45.255)		
Client IP Address:	E.g. 192.168.8.128	
MAC Address:	E.g. bc:ae:c5:84:e3:a0	
	OK Close	

Figure 8. 7 MAC&IP Bonding

2. Input target Client IPAddressand MACAddress.



Ensure the client IP is in the same network segment with the storage system.

3. Click OK and click OK in pop up confirmation box to create bond.

## 8.1.5 Advanced Parameters

Purpose:

You can configure DNS server, bond mode, and network work speed parameters.

## 8.1.5.1 DNSServer

Purpose:

You are required to add DNS server IP address if you need to access external network.

Steps:

- 1. Click Modify of Preferred DNSServer.
- 2. Enter IP address in text field.
- 3. Click OK and click OK in confirmation dialog box to save the settings.

Preferred DNS Server:	None	Modify
Alternate DNS Server:	None	Delete

Figure 8. 8 DNS Server

## 8.1.5.2 Binding Mode

Purpose:

The selection of bond mode is related to actual application and network situation. Up to seven types of bond modes are provided. For details, refer to Table8. 2 BondingMode Description.

Steps:

- 1. Click Modify of NICBinding Mode.
- 2. Select bond mode in dropdown list. Up to 7 bond modes are selectable.
- 3. Click OK and click OK in confirmation dialog box to save the settings.

Default Gateway:	10.192.54.254		
NIC Binding Mode:	Active-backup 🗸	ОК	Cancel

Figure 8. 9 NIC Binding Mode

Table 8. 2 Bonding Mode Description

Bond Mode	Description	
	Definition:	
	All data network interfaces sends and receives data in turn.	
	> When using the mode, it is recommended to apply protocols except	
	TCP/IP.	
	Advantage:	
Round-robin	Load balance.	
	All data network interfaces are fully used.	
	There is no requirement about hardware like network switch.	
	Disadvantage:	
	The order of received data is uncertain.	
	Low network throughput.	
	• Definition: The default bond mode. Transmits data via a specified data network	
Active-Backup	interface, other data network interfaces are standby. Only when the specified	
	data network interface fails, another standby data network interface takes over	

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Bond Mode	Description		
	transmission task.		
	Advantage:		
	> There is no requirement about hardware like network switch.		
	Redundant network links.		
	Disadvantage:		
	Load balance isn't supported.		
	> Uses only one data network interface at a time. Other data network		
	interfaces aren't fully used.		
	Definition:		
	> The storage system can figure out the relationship between each data		
	network interface and client MAC addresses. According to the relationship,		
	the storage system transmits data to clients with corresponding data		
	network interface. If the working data network interface fails, another		
XOR	data network interface takes over the task.		
<b>XUK</b>	$\succ$ It is recommended to use this mode in a local area network. However, if		
	data is transmitted via network gateway, don't use the mode.		
	Advantage:		
	There is no requirement to hardware like network switch.		
	Balance the load in the local area network within a network switch.		
	• Disadvantage:Loadbalance isn't supported in different local area network.		
	• Definition: All the data network interfaces transmit the same data.		
	Advantage:		
	There is no requirement about hardware like network switch.		
Broadcast	Redundant network links.		
2.000000	Data network interfaces are fully used.		
	Disadvantage:		
	Load balance isn't supported.		
	Low data network interface usage.		
	• Definition: The storage system figures out the relationship between each data		
	network interface and clients' MAC addresses according to Hash Algorithm. The		
	storage system transmits data to client via corresponding data network		
802.3ad	interface.		
	Advantage:		
	Based on IEEE standard, devices in system can work efficiently if they are		
	all 802.3ad mode.		
	Load balance.		
	Data network interfaces are fully used.		
	• Disadvantage: The storage system, network switch, and client server are all		
	required to support 802.3ad mode.		
	• Definition: The storage system allocates output traffic to each data network		
Tlb	interfaces, according to current load. And transmits data to clients via different		
	data network interfaces. If the working data network interface fails, another		
	data network interface takes over the task.		

Bond Mode	Description	
	Advantage:	
	Data network interfaces are fully used.	
	Load balance when sending data.	
	• Disadvantage:Loadbalance isn't supported when receiving data.	
	Definition:	
	> The storage system allocates input and output traffic to each data network	
	interfaces, according to current load.	
Mintuclination	> It is recommended to use the mode when sending and receiving data to	
Virtualization	multiple clients.	
	Advantage:	
	Data network interfaces are fully used.	
	Load balance in both sending and receiving data.	

## 8.1.5.3 Network Work Speed

#### Purpose:

It is the speed of all data network interfaces. The default network work speed is 100 Mb/s. It is recommended to set network work speed according to actual network situation.

Steps:

- 1. Click Modify of Network Word Speed.
- 2. Select Network Work Speedas 1000 Mb/s or 100 Mb/s.
- 3. Click OK and click OK in confirmation dialog box to save the settings.

dify	
	dify

# 8.2 Alarm

#### Purpose:

The storage system supports notifying you about the occurring alarms via e-mail and SMTP manager.

### Steps:

Click Systemin navigation bar and choose Alarm to enter Network interface.

System -> Alarm			
Add Email User Configure SMPT			
■ Email Alarm User List (Total: 0)			
Email	User Name	Event Level	
X Delete OTest			
Add SNMP Manager			
SNMP Manager Alarm User List			

Figure 8. 10 Alarm

# 8.2.1 Alarm Type

Purpose:

The Table8. 3 Alarm TypeDescriptiondescribes the supported alarm types and corresponding event level. E-mail

and SNMP manager support notifying you about the alarm types in Table8.3.

Module	Alarm Type	Event Level
Doworcupply	Controller power supply error	Serious
Power supply	Storage enclosure power supply error	Serious
	Temperature is too high	Warning
Temperature	Temperature is high	Serious
	Temperature is too low	Serious
	Fan speed is too low	Warning
Fan	Fan speed error	Serious
	Fan damaged or poor connection	Serious
Memory	Memory is used too much.	Warning
DOM card	Insufficient capacity	Serious
	HDD loss	Serious
	HDD warning	Warning
	Bad HDD	Serious
HDD	Risky HDD	Serious
	Drive kicked an HDD	Serious
	Array kicked an HDD	Serious
	Not available	Serious
Array	Degraded	Warning
	Rebuilding	Warning
	Physical HDD loss	Serious
_	Unknown physical HDD loss	Serious
Storage system	Storage pool unmounted	Serious
	All storage pool lost	Serious
	SAMBA error	Serious
	NFS error	Serious
	FTP error	Serious
NAS	AFP error	Serious
	HTTP error	Serious
	RSYNC error	Serious
	iSCSI configurations mismatch	Serious
iSCSI	I/O error	Serious
	Data network interface %d unconnected	Serious
	Network speed of data network interface %d is	Serious
Network	100M Ethernet.	
	Single data network interface %d unconnected	Serious
	Cluster heartbeat communication error: network	Serious
Cluster	transmission failed	
	Cluster resource network error: resource network	Serious

Table 8. 3 Alarm Type Description

Module	Alarm Type	Event Level
	interface % disconnected	

# 8.2.2 Adding Email

Purpose:

Alarm messages are sent to receiving e-mails via sending e-mails.

Before you start:

Set DNS server first. Refer to section 8.1.5.1 DNSServerfor detailed steps.

## 8.2.2.1 Sending Email

Steps:

- 1. Click Configure SMTP button.
- 2. Enter User Name, Password, SMTP, and SMTPPort.
  - ➢ UserName: sending e-mail account.
  - Password:sending e-mail password.
  - SMTP:sending e-mail server website.
  - SMTPPortNo.: sending e-mail server port.
- 3. Click OKto add the sending e-mail.

Configure Sending Email Address	×
User Name: test01@gmail.com	E.g. wang@gmail.com
Password: •••••	
SMTP: smtp.gmail.com	E.g. smtp.gmail.com
SMTP Port No.: 25	E.g. 25
L	
	OK Exit

Figure 8. 11 Configure Sending Email

## 8.2.2.2 Receiving Email

- 1. Click Add Email User.
- 2. Enter Email and UserName.
- 3. Choose Event Level as Alarm Event or Serious Event.
- 4. Click OK and click OK in confirmation dialog box to add the user. The added e-mail account is listed in List of email alarm users.

Email:	Test@gmail.com	E.g. wang@gmail.com
User Name:	Test	E.g. nameli,name_wang
Event Level:	OSystem Log	OAlarm Event
	Error Event	<ul> <li>Serious Event</li> </ul>

Figure 8. 12 Add Email Alarm User

# 8.2.3 Testing Email

Purpose:

After sending and receiving e-mail are configured, you can test the communication between them.

Steps:

- 1. Check the checkbox of sending e-mail you want to test.
- 2. Click **Click** button and click OK in confirmation dialog box to start test. The test result is listed in a message dialog box.

## 8.2.4 Adding SNMPManager

Purpose:

SNMP manager can notify the SNMP-Trap software installed in your computer about the storage system alarm. When alarm occurs, alarm message pops up in SNMP-Trap software.

Before you start:

- 1. Install the SNMP-Trap software in your computer.
- 2. To receive alarm message in client, turn on Administration & Monitoring Tools in client.

Steps:

1. Click Add SNMP manager

dd SNMP Manager Al	arm User		×
SNMP Manager:	192.168.0.64	E.g. 192.168.0.2	^
SNMP Port No.:	162	Default: 162	
SNMP Version:	●V1 ●V2(v2c)	OV3(usm)	
Event Level:	⊖System Log	OAlarm Event	
	OError Event	Serious Event	
			~
		OK Exit	)

Figure 8. 13 Add SNMP Manager

- 2. Enter SNMPManager and SNMPPort No. in the text field.
- 3. SNMPVersion is V2(V2C) by default and is not editable.
- 4. Choose Event Level as SystemLog, Alarm Event, Error Event, or Serious Event.
- 5. Click OKand click OKin conformation dialog box. The added SNMP manager is listed in SNMP manager list.

## 8.2.5 Testing SMTPManager

### Purpose:

You can test the network communication of SMTP manager.

Steps:

- 1. Check the checkbox of SMTP manger to test.
- 2. Click **Click** button and click OKto start test. Then test result pops up.

# 8.3 Time

#### Purpose:

System time is adjustable.

#### Steps:

Click Systemin navigation bar and choose Time.

System -> Time Management		
Current System Time Zone:	(UTC-12:00)'International Date Line West'	Modify
Enable DST:		
Current System Time:	Wed Mar 22 2017 23:44:05	Modify
Time Server IP Address:		Time Sync
NTP Server Status:	Disable	Enable
Cluster Time SYNC Status:	Enable	Disable
Time Sync Strategy Status:	Enable	Disable
Time Sync Strategy		
Time Server IP Address:	10.192.45.121	Configure
Sync Cycle:	1 Minute	Delete

Figure 8. 14 Time Management

# 8.3.1 Adjusting SystemTime

### 8.3.1.1 Manual Adjust

#### Steps:

Do one or more of the following:

Adjust Time Zone

- 1. Click Modify of Current SystemTime Zone.
- 2. Select time zone in the dropdown list.
- 3. Click OK and click OK in confirmation dialog box.
- Adjust Date and Time
- 4. Click Modify of Current SystemTime.
- 5. Select date and time in text field.
- 6. Click OK and click OK in confirmation dialog box.

### 8.3.1.2 Auto Adjust

#### Purpose:

The storage system automatically adjusts system time according to time server.

Before you start:

Turn off the NTP server in client software.

Steps:

- 1. Enter a correct Time ServerIPAddressin text field.
- 2. Click Enable of NTPServer Status to start auto time adjust.

Time Server IP Address:		Time Sync
NTP Server Status:	Disable	Enable

Figure 8. 15 Adjust Time Automatically

# 8.3.2 Synchronizing Time

Purpose:

You can configure time synchronization strategy.

Before you start:

- Turn off the NTP server in client software.
- Log in the storage system via resource IP address.

- 1. Click Enableof Time SyncStrategyStatus(Synchronization Strategy Status).
- 2. Enter Time ServerIPAddressin text field
- 3. Enter SyncCycle(Synchronization Cycle) in text field.
- 4. Click Configureto start time synchronization.

Time Sync Strategy Status:	Enable	
Time Sync Strategy		
Time Server IP Address:	10.192.45.121	Configure
Sync Cycle:	1 Minute	Delete

Figure 8. 16 Synchronize Time

# Chapter 9 Log

Purpose:

### Table 9. 1 Module Description

Module	Description
Log Download	You can download logs by downloading mode.
Operation log	It records the content and time of each operation. Search, download, and clear logs are supported.
Performance log	The storage system records the performance logs at every ten minutes. Performance log includes messages of CPU usage, memory footprint, network traffic, and array read and writing speed.
Update log	It records the details information of every system update.

### Keywords:

Log Download, Operation log, Performance log, Update log

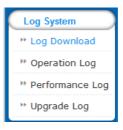


Figure 9. 2 System

# 9.1 Operation Log

Purpose:

Operation log records the content and time of each operation. Search, download, and clear logs are supported.

Steps:

Click Login navigation bar and choose Operation Log to enter Operation Log interface. Do one or more of the following:

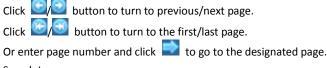
Log System -> Operation Log	
Operation Log Information (Total: 56)	🛞 🕒 1 2 3 😌 🕄 To Page 🗾 🔿 Total 3 Page(S
Search: Complete	Log V Search
Date	Log Content
March 22 2017 23:47:43	rsync time server 10.192.45.121 success count:86 first time:March 22 2
March 22 2017 22:03:29	Open raid monitor mode success
March 22 2017 22:03:05	rsync time server 10.192.45.121 success count:24 first time:March 22 2

Figure 9. 3 Operation Log

View Logs



Figure 9. 4 Paging



Search Logs

		_
Search:	Complete Log 🗸 Sear	ch

Figure 9. 5 Search Log

To search by time, enter date and time you want to search in Searchtext field.
 To search by log type, select log type in dropdown list.



Input correct data format, like March 23 2016 16:47:07.

- 2) Choose log type as All, Information, Warning, Error, or Seriousin dropdown list.
- 3) Click Search.Logsmeet the search conditions would be listed in operation window.
- Clear All Logs

Click ClearOperation Logand click OK in popup dialog to confirm.

# 9.2 Performance Log

#### Purpose:

The storage system records the performance logs at every ten minutes. Performance log includes messages of CPU usage, memory footprint, network traffic, and array read and writing speed. Steps:

- 1. Click Login navigation bar and choose Operation Logto enter Operation Log interface.
- 2. For detailed steps of viewing and search performance logs, refer to section9.1 OperationLog.

Log System -> Performance Log				
Performance Log Information (Total: 455)		<b>€€</b> 1 2	3 4 5	
Search Search				
Date	CPU(%)	Memory(KB)	Network Flow(Kbps/s)	IO(IOPS)
20120809:Wed Mar 22 23:42:10 2017	24.62	416716	693.97	1266
20120809:Wed Mar 22 23:32:10 2017	25.29	425576	700.22	1301
20120809:Wed Mar 22 23:22:10 2017	28.98	413968	801.35	1289
20120809:Wed Mar 22 23:12:10 2017	28.88	410776	779.87	1292
20120809:Wed Mar 22 23:02:10 2017	29.05	409436	764.28	1346

Figure 9. 6 Performance Log

# 9.3 Upgrade Log

Purpose:

Update log records the details information of every system update.

Steps:

- 1. Click Login navigation bar and choose UpgradeLog.
- 2. To view logs and search logs, refer to section9.1 OperationLogfor detailed steps.

Log System -> Upgrade Log	
Upgrade Log Information (Total: 805)	֎֎ 1 2 3 4 5 ⊛⊛
Search: Search	
Date	Log Content
March 23 2017 07:10:34	Upload bios success (storos-201703231056-B_OS-OS_TEST-915.bin)
March 23 2017 14:43:43	Upload bios success (storos-201703220844-C-TO-N+1-FOR_232-6-suse_x64-9
March 23 2017 14:43:43	Upload bios success (storos-201703060846-B_OS_915-storOS_switch_overse
March 23 2017 14:43:42	Upload bios success (storos-201701042023-C_OS-StorOSManager_EN-915.bin

Figure 9. 7 Update Log

0100001070327

