JetStor NAS 724UX
JetStor NAS 724UX 10G
User Manual

Version 8.51
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Firmware Versions

JetStor NAS 724UX: FW 1.4.0
JetStor NAS 724UX 10G: FW 1.4.0

Login Information

LAN1 IP Address: 192.168.1.234
User Name: admin
Password: 00000000

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0 Preface

About This Manual

This manual is the introduction of the **JetStor NAS 724UX (10G)** unified storage system and it aims to help users know the operations of the disk array system easily. Information contained in this manual has been reviewed for accuracy, but not for product warranty because of the various environments / OS / settings. Information and specification will be changed without further notice. For updated information, please visit www.acnc.com.

Before reading this manual, it assumes that you are familiar with computer skills such as hardware, storage concepts, and network technology. It also assumes you have basic knowledge of Redundant Array of Independent Disks (RAID), Storage Area Network (SAN), Network-Attached Storage (NAS), Internet SCSI (iSCSI), Serial-attached SCSI (SAS), Serial ATA (SATA), technology.

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

Technical Support

Thank you for using AC&NC JetStor products; if you have any questions, please e-mail support@acnc.com. We will answer your question as soon as possible.

Tips and Cautions

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

Symbol	Meaning	Description
	TIP	Tips provide helpful information, guidelines, or suggestions for performing tasks more effectively.
	CAUTION	Cautions indicate that failure to take a specified action could result in damage to the software or hardware.

Conventions

The following table describes the typographic conventions used in this manual.

Conventions	Description
Bold	Indicates text on a window, other than the window title, including menus, menu options, buttons, fields, and labels. Example: Click OK button.
<*Italic*>	Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: copy <source-file> <target-file>.
[ ] square brackets	Indicates optional values. Example: [a | b] indicates that you can choose a, b, or nothing.
{ } braces	Indicates required or expected values. Example: { a | b } indicates that you must choose either a or b.
| vertical bar	Indicates that you have a choice between two or more options or arguments.
/ Slash	Indicates all options or arguments.
underline	Indicates the default value. Example: [a | b]

FCC and CE statements

FCC statement

This device has been shown to be in compliance with and was tested in accordance with the measurement procedures specified in the Standards and Specifications listed below and as indicated in the measurement report number: xxxxxxxx-F

Technical Standard: FCC Part 15 Class A (Verification)

IC ICES-003

CE statement

This device has been shown to be in compliance with and was tested in accordance with the measurement procedures specified in the Standards and Specifications listed below and as indicated in the measurement report number: xxxxxxxx-E

Technical Standard:	EMC DIRECTIVE 2004/108/EC
	(EN55022 / EN55024)

UL statement

Rack Mount Instructions - The following or similar rack-mount instructions are included with the installation instructions:

1. Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.
2. Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
3. Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
4. Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
5. Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

CAUTION:
The main purpose of the handles is for rack mount use only. Do not use the handles to carry or transport the systems.

The ITE is not intended to be installed and used in a home, school or public area accessible to the general population, and the thumbscrews should be tightened with a tool after both initial installation and subsequent access to the panel.

Warning: Remove all power supply cords before service

This equipment intended for installation in restricted access location.

- Access can only be gained by SERVICE PERSONS or by USERS who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken.
- Access is through the use of a TOOL or lock and key, or other means of security, and is controlled by the authority responsible for the location.

CAUTION: (English)
Risk of explosion if battery is replaced by incorrect type. Please replace the same or equivalent type battery use and dispose of used batteries according to the instructions.

ATTENTION: (French)
IL Y A RISQUE D'EXPLOSION SI LA BATTERIE EST REMPLACÉE PAR UNE BATTERIE DE TYPE INCORRECT. METTRE AU REBUT LES BATTERIES USAGÉES CONFORMÉMENT AUX INSTRUCTIONS.

VORSICHT: (German)
Explosionsgefahr bei unsachgemaßem Austausch der Batterie. Entsorgung gebrauchter Batterien nach Anleitung.

ADVERTENCIA: (Spanish)
Las baterías pueden explotar si no se manipulan de forma apropiada. No desmonte ni tire las baterías al fuego. Siga las normativas locales al desechar las baterías agotadas.

警告: (Simplified Chinese)
本电池如果更换不正确会有爆炸的危险，请依制造商说明处理用过之电池。

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1 Overview

Product Overview

This user manual describes how to set up and use the JetStor storage systems.

JetStor NAS 724UX / 724UX 10G:

(4U24bays)

The storage array, available in different configurations of GbE iSCSI and 10GbE iSCSI interfaces, provides a flexible, intelligent, network-attached storage (NAS) solution for virtualized server environments and the growing demand for data storage. JetStor storage systems can provide non-stop service with a high degree of fault tolerance by using JetStor technology and advanced array management features.

Model Comparison

- **NAS 724UX:** 7 x GbE ports per controller. 4U 24 bays with 3.5” HDD trays.
- **NAS 724UX 10G:** 2 x 10GbE ports (SFP+) + 7 x GbE ports per controller. 4U 24 bays with 3.5” HDD trays.

Front-end	4U24
7 x GbE ports	724UX
2 x 10GbE (SFP+) + 7 x GbE ports	724UX 10G

Package Contents

The package contains the following items:

- JetStor storage system (x1).
- HDD trays (x24).
- Power cords (x3).
- RS-232 cables (x2), one is for console (black color, phone jack to DB9 female), and the other is for UPS (gray color, phone jack to DB9 male)
- Rail kit (x1 set).
- Keys, screws for drives and rail kit (x1 packet).

Hardware

This section provides basic information about the hardware components.

(4U24bays)

Front View

There is a power switch button at the right front handle.

Number	Description
1	Power button and power LED: • Blue: Power ON. • Off: Power OFF.
2	MUTE button: Press to mute the alarm.

3	IP Reset button: Press within 2 seconds to reset the system to default settings. The default resets include: • LAN 1 IP Address: 192.168.1.234 • **User Name: admin** • **Password: 00000000**
4	Status LED: • Red: System failure. • Off: System OK.
5	Access LED: This indicates the host interface (frontend) connectivity, not the hard drive activity. Please be aware. • Blink: There is host interface activity (data I/O or management). • OFF: There is no host interface activity.

Disk Drive Assembly

Remove a drive tray. Then install a HDD.

The front of each disk tray has four components:

This table provides details about the front components of a disk tray.

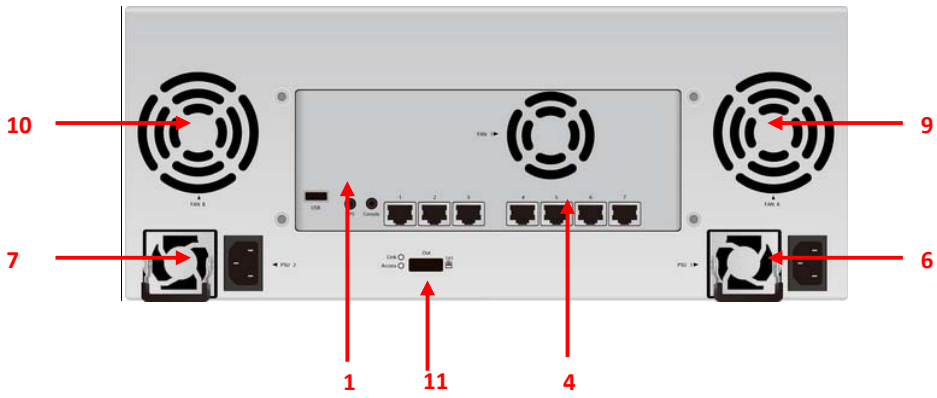
Number	Description
1	Status LED: • Green: The hard drive is inserted and working normally. • Amber: The hard drive has failed. • Blinking amber: The hard drive data is being rebuilt. • Off: There is no hard drive in the tray or the power is off.
2	Access LED: • Blinking green: The hard drive is being accessed. • Off: The hard drive is not being accessed or there is no hard drive in the tray.
3	Tray removal handle.
4	Latch to release the tray.

Rear View

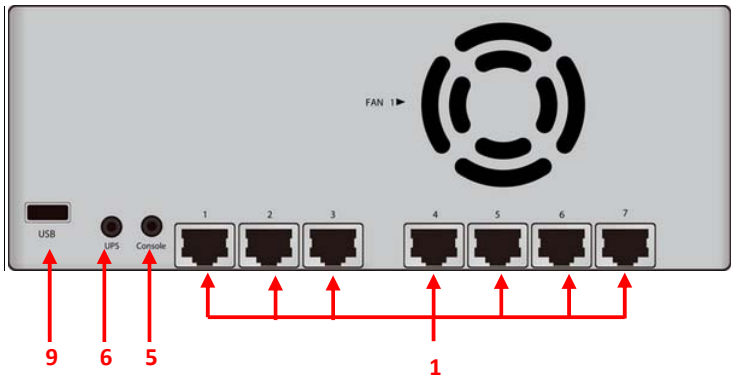
This table describes the rear modules.

Number	Description
1	Controller 1 (CTRL 1).
2	Dummy.
3	Power Switch • |: ON. • O: OFF.
4	Fan Module (FAN1 / FAN2).
5	Fan Module (FAN3 / FAN4).
6	Power Supply Unit (PSU1).
7	Power Supply Unit (PSU2).
8	Power Supply Unit (PSU3).
9	Fan Module (FAN A).
10	Fan Module (FAN B).
11	SAS JBOD expansion port.

JetStor NAS 724UX Chassis:



JetStor NAS 724UX (7 x GbE ports) controller:

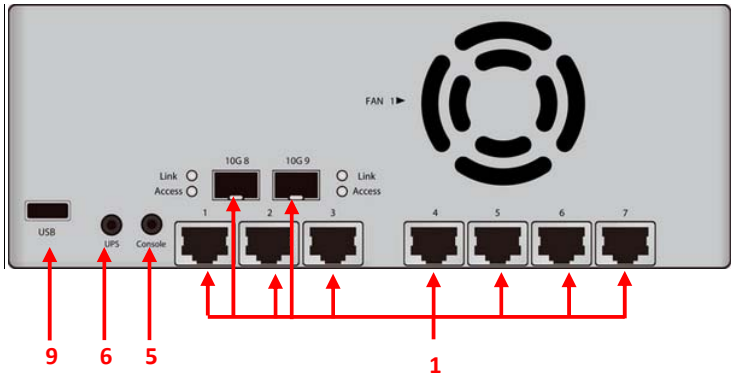


This table describes the rear components.

Number	Description
1	Ports (depending on model): • 724UX: 7 x GbE ports. • 724UX 10G: 2 x 10GbE ports + 7 x GbE ports.
2	LED (from left to right) Controller health LED: • Green: Controller status normal. • Red: System booting or controller failure. Master slave LED (only for dual controllers): • Green: This is the Master controller. • Off: This is the Slave controller. Dirty cache LED: • Orange: Data on the cache waiting for flush to disks. • Off: No data on the cache.
3	No function now. Button is reserved for BBM.
4	Management port.
5	Console port.
6	RS 232 port for UPS.
7	SAS JBOD expansion port.
8	Empty slot.
9	USB port is used to save debugging information.
LED	10GbE Link LED (724UX 10G): • Orange: Asserted when a 1G link is established and maintained. • Blue: Asserted when a 10G link is establish and maintained. 10GbE Access LED (724UX 10G): • Yellow: Asserted when the link is established and packets are being transmitted along with any receive activity.

CAUTION:
Be aware that when Controller Health LED is in RED, please DO NOT unplug the controller from the system or turn off the power suddenly. This may cause unrecoverable damage, which will not be covered by warranty.

JetStor NAS 724UX 10G (2 x 10GbE (SFP+) + 7 x GbE ports) controller:



RAID Concepts

RAID is the abbreviation of Redundant Array of Independent Disks. The basic idea of RAID is to combine multiple drives together to form one large logical drive. This RAID drive obtains performance, capacity and reliability than a single drive. The operating system detects the RAID drive as a single storage device.

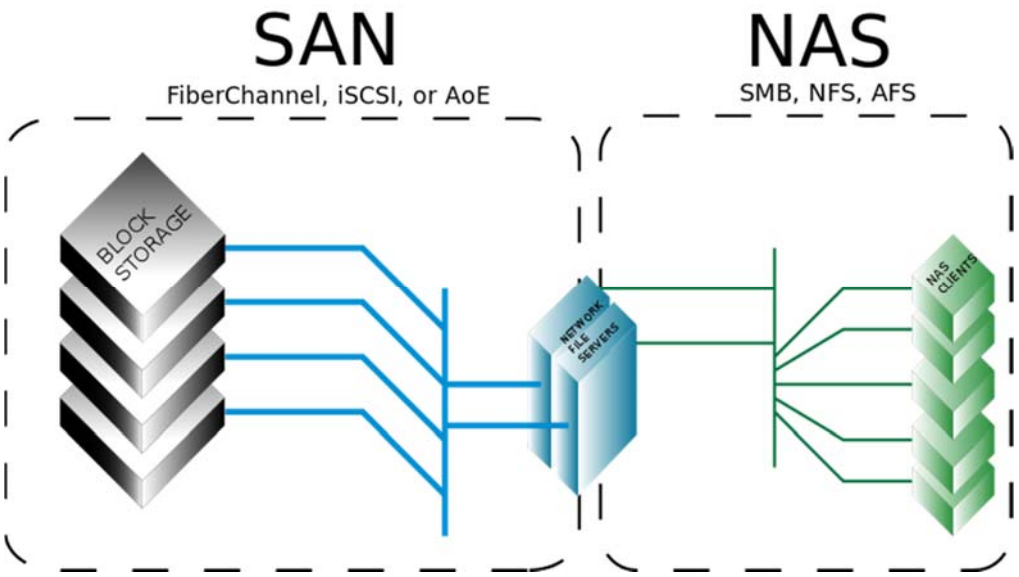
RAID Levels

There are various RAID levels with different degrees of data protection, data availability, and performance. A description of supported RAID levels follow:

Type	Description	Min. No. of Drives
RAID 0	Disk striping.	1
RAID 1	Disk mirroring over two disks.	2
RAID 5	Striping with interspersed parity over the member disks.	3
RAID 6	2-dimensional parity protection over the member disks.	4
RAID 10	Striping over the member RAID 1 volumes.	4
RAID 50	Striping over the member RAID 5 volumes.	6
RAID 60	Striping over the member RAID 6 volumes.	8

NAS Concepts

NAS (Network-Attached Storage) is file-level computer data storage connected to a computer network providing data access to heterogeneous clients. NAS uses file-based protocols such as NFS (popular on UNIX systems), SMB/CIFS (Server Message Block/Common Internet File System) (used with MS Windows systems), or AFP (used with Apple Macintosh computers). NAS units rarely limit clients to a single protocol.

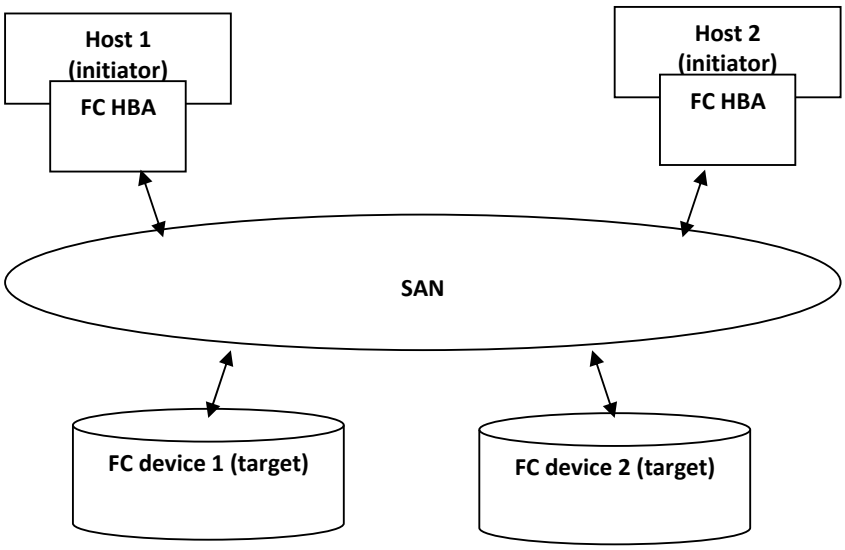


NAS provides both storage and a file system. This is often contrasted with SAN (Storage Area Network), which provides only block-based storage and leaves file system concerns on the "client" side. SAN protocols are SCSI, Fibre Channel, iSCSI, ATA over Ethernet (AoE), or HyperSCSI.

One way to loosely conceptualize the difference between a NAS and a SAN is that a NAS appears to the client OS (operating system) as a file server (the client can map network drives to shares on that server) whereas a disk available through a SAN still appears to the client OS as a disk, visible in disk and volume management utilities (along with client's local disks), and available to be formatted with a file system and mounted.

Fibre Channel Concepts

Fibre channel started use primarily in the supercomputer field, but has become the standard connection type for storage area networks (SAN) in enterprise storage.

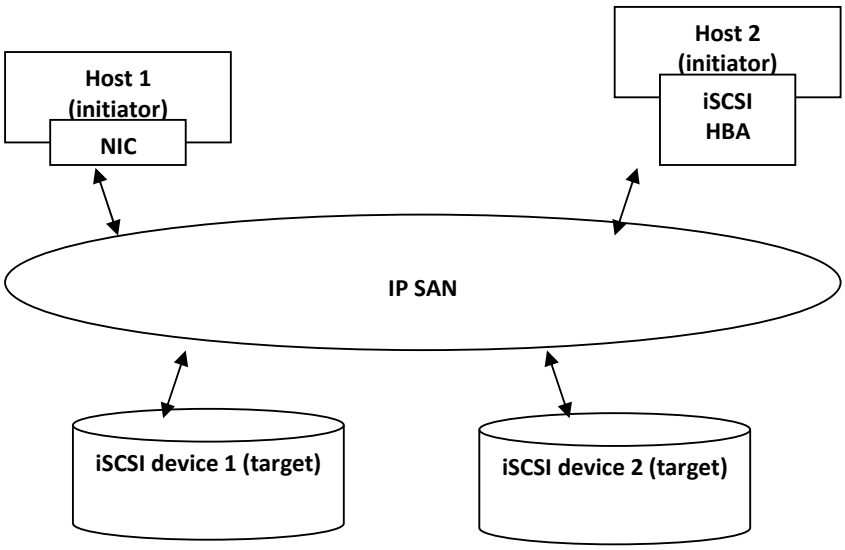


The target is the storage device itself or an appliance which controls and serves volumes or virtual volumes. The target is the device which performs SCSI commands or bridges to an attached storage device.

iSCSI Concepts

iSCSI (Internet SCSI) is a protocol which encapsulates SCSI (Small Computer System Interface) commands and data in TCP/IP packets for linking storage devices with servers over common IP infrastructures. iSCSI provides high performance SANs over standard IP networks like LAN, WAN or the Internet.

IP SANs are true SANs (Storage Area Networks) which allow several servers to attach to an infinite number of storage volumes by using iSCSI over TCP/IP networks. IP SANs can scale the storage capacity with any type and brand of storage system. In addition, it can be used by any type of network (Ethernet, Fast Ethernet, Gigabit Ethernet, and 10 Gigabit Ethernet) and combination of operating systems (Microsoft Windows, Linux, Solaris, Mac, etc.) within the SAN network. IP-SANs also include mechanisms for security, data replication, multi-path and high availability.



Storage protocol, such as iSCSI, has “two ends” in the connection. These ends are initiator and target. In iSCSI, we call them iSCSI initiator and iSCSI target. The iSCSI initiator requests or initiates any iSCSI communication. It requests all SCSI operations like read or write. An initiator is usually located on the host side (either an iSCSI HBA or iSCSI SW initiator).

The target is the storage device itself or an appliance which controls and serves volumes or virtual volumes. The target is the device which performs SCSI command or bridge to an attached storage device.

2 Installation

Installation Overview

Before starting, prepare the following items:

- A management computer with a Gigabit Ethernet NIC (recommend) on the same network as the JetStor storage system.
- Connection cables:
  - **724UX:** CAT 5e, or CAT 6 (recommend) network cables.
  - **724UX 10G:** Fibre Channel cables or AOCs (Active Optic Cable).
- Prepare a storage system configuration plan by the network administrator. The plan should include network information for all network ports. If using static IP addresses, please prepare a list of the static IP addresses, the subnet mask, and the default gateway.
- Switches
  - **724UX:** Gigabit switches (recommended). Or Gigabit switches with VLAN / LCAP / Trunking (optional).
  - **724UX 10G:** 10 Gigabit switches with VLAN / LCAP / Trunking (optional).
- CHAP security information, including CHAP username and secret (optional).

Drive Slot Numbering

The drives can be installed into any slot in the enclosure. Slot numbering is reflected in Web UI.

Slot 1	Slot 7	Slot 13	Slot 19
Slot 2	Slot 8	Slot 14	Slot 20
Slot 3	Slot 9	Slot 15	Slot 21
Slot 4	Slot 10	Slot 16	Slot 22
Slot 5	Slot 11	Slot 17	Slot 23
Slot 6	Slot 12	Slot 18	Slot 24

System Installation and Deployment

Using the following instructions to install and deploy the storage system.

- Install the Rail Kit onto the unit and insert it into the rack.

CAUTION:
The system is very heavy. It's recommend that a mechanical lifter or at least two persons be used to raise and align the system to prevent injury during installation. Use care when inserting or removing a system into or out of a rack to prevent the accidental tipping or the rack causing damage or personal injury.

- Install the disk drives.
- Connect the management port cable and data port cables on the network plan, the topology examples are on the following.

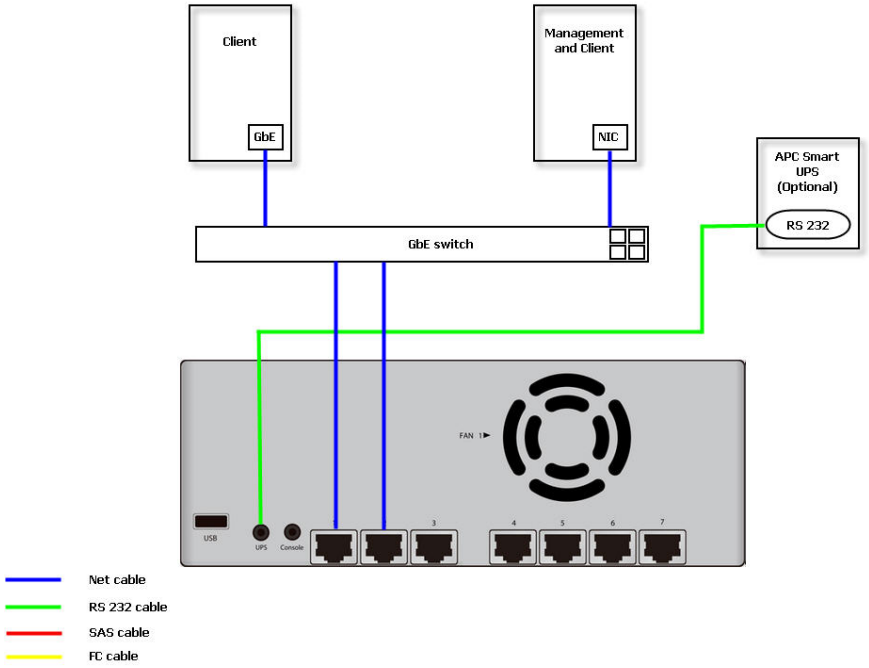
Using the following instructions to install and deploy the storage system.

- At the rear, check that the Master Controller is in its slot (CTRL 1).
- Install the Rail Kit onto the unit and insert it into the rack.

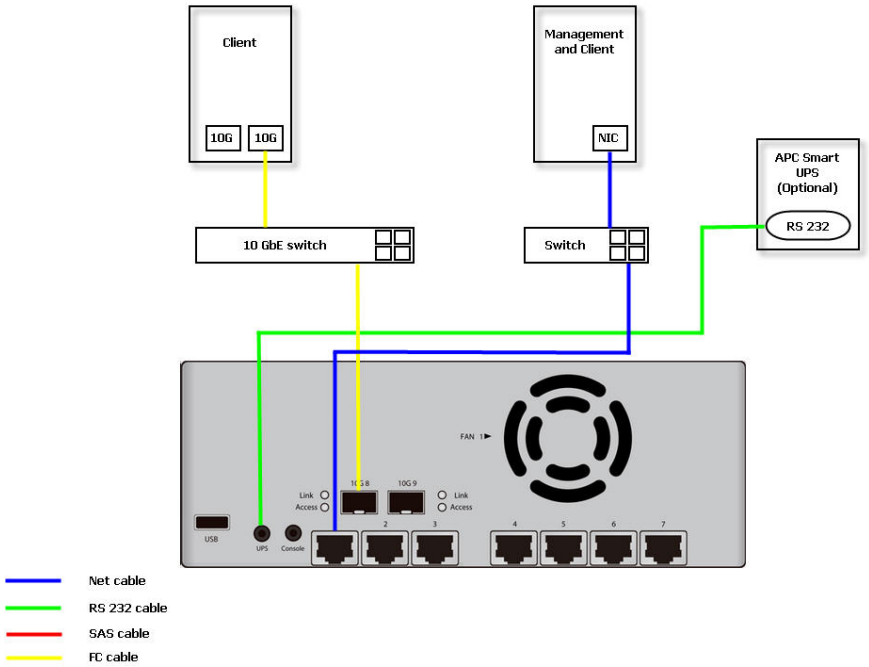
CAUTION:
The system is very heavy. It's recommend that a mechanical lifter or at least two persons be used to raise and align the system to prevent injury during installation. Use care when inserting or removing a system into or out of a rack to prevent the accidental tipping or the rack causing damage or personal injury.

- Install the disk drives.
- Connect the management port cable and data port cables on the network plan, the topology examples are on the following.

724UX:



724UX 10G:



Power ON / OFF

Power on the System

The power button is located at the front of the panel. To turn the system ON, press power button. After you turn the power ON, the system performs a booting process which takes a few minutes.

The power switch is located at the rear of the panel. To turn on the system, you may press power switch to "|". After you turn the power ON, the system performs a booting process which takes a few minutes.

CAUTION:
Be aware that in the first few seconds after power on the system the Controller Health LED is in RED. This is normal because the system is still booting. The Controller Health LED will turn Green in a few seconds.

Power off the System

If it becomes necessary to power down the system, it is recommended using a normal, controlled shutdown form through either the LCM or JetCentral Client to ensure all data is flushed from the cache first.

Has no LCM, so it can shutdown via Web UI or management software.

1. Shutdown using Web UI:

   Using the Web UI:

   - Select **Maintenance -> Shutdown**.
   - Click the **Shutdown** button.
   - The power LED will display blue blinking, and then power off.

2. Shutdown using JetCentral Client:

   Login JetCentral Client:

   - Select **Maintenance -> Reboot and Shutdown**.
   - Click the **Shutdown** icon.
   - The power LED will display blue blinking, and then power off

3 Quick Setup

Management Interfaces

There are several management methods to manage the storage system, described on the following.

LCM

After booting up the system, the following screen shows management port IP and model name.

```
192.168.1.234
JetStor NAS 724UX
```

To access the LCM options, use the **ENT** (Enter) button, **ESC** (Escape) button, ▲ (up) and ▼ (down) to scroll through the functions.

This table describes the function of each item.

Function	Description
System Info.	Display system information including firmware version and amount of RAM.
Alarm Mute	Mutes an alarm after an error occurs.
View IP Setting	Display current IP address, subnet mask, and gateway.
Change IP config	Set IP address, subnet mask, and gateway. There are 2 options: DHCP (Get IP address from DHCP server) or static IP.
Reset IP & Admin Password	Reset management port IP or reset admin password to 1234
Reset/Shutdown	Reset or shutdown the system.

Dump log to USB	Plug in USB drive to either USB port first. Select Yes to download debug information file to USB drive. This is not used for restoring system configuration.

WARNING or ERROR events displayed on the LCM are automatically filtered by the LCM default filter. The filter setting can be changed in the Web UI under **System configuration -> Notification setting**.

This table displays the LCM menu hierarchy.

Main	L1	L2	L3	L4	L5
<IP Addr> JetStor <*Model*> ▲▼	System Info.	Firmware Version <n.n.n>			
		RAM Size <*nnnn*> MB			
	Alarm Mute	▲Yes No▼			
	View IP Setting	IP Config <Static IP / DHCP / BOOTP>			
		IP Address <192.168.001.234 >			
		IP Subnet Mask <255.255.255.0>			
		IP Gateway <xxx.xxx.xxx.xxx>			
	Change IP Config	DHCP	▲Yes No▼		
		BOOTP	▲Yes No▼		
		Static IP	IP Address	Adjust IP address	
			Subnet Mask	Adjust Subnet mask	
			IP Gateway	Adjust Gateway IP	
			Apply IP Setting	▲Yes No▼	
	Reset IP & admin password	Reset IP	▲Yes No▼		
		Reset admin password	▲Yes No▼		
	Reset/ Shutdown	Reset	▲Yes No▼		
		Shutdown	▲Yes No▼		
	Dump log to USB	▲Yes No▼			

CAUTION:
To prevent data loss, when powering down the storage system, it is recommended to execute **Reset/Shutdown -> Shutdown -> Yes** to flush the data from the cache to the physical disks.

Web UI

JetStor storage system uses a web graphic user interface operation. It supports most common web browsers. Be sure to connect the LAN cable to LAN1 of the system.

The web UI can be accessed via every network interface, but we still define LAN1 as default management port. The default LAN1 IP is 192.168.1.234/255.255.255.0; please configure your computer IP address at the same subnet of the system (e.g.: 192.168.1.1/255.255.255.0). And then enter the IP address into your browser to display the authentication screen.

http://<*IP Address*> (e.g.: http://192.168.1.234)

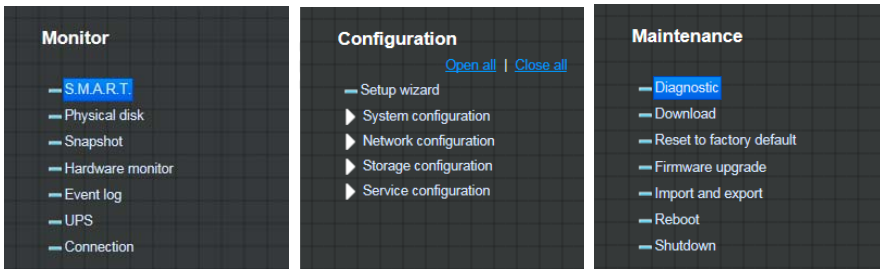
To access the Web UI, you have to enter a user name and password. The initial defaults for administrator login are:

- User Name: admin
- Password: 00000000

Click **Login** button to continue. When the password has been verified, it will go into a page to notice administrator to change the admin password. If it has been updated, this page will be skipped.

Enter the new password of admin and retype, click **Apply** button to continue. When the new password has been verified, the home page is displayed.

Choose the functions from the Menu Bar on the top side of the window to make any configuration changes.



How to Use the Guided Configurations

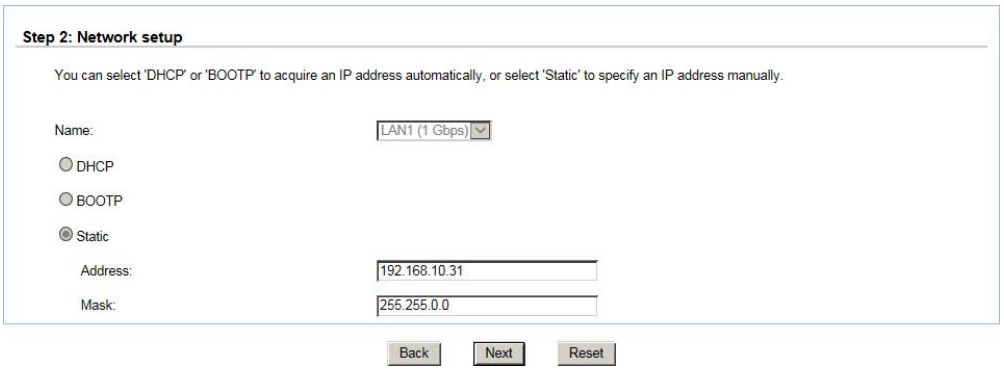
To help users get started quickly, a guided configuration tool is available in the Web UI. **Setup wizard** guides you an easy way to create a volume. If you are an advanced user, you can skip this step.

Setup Wizard Tool

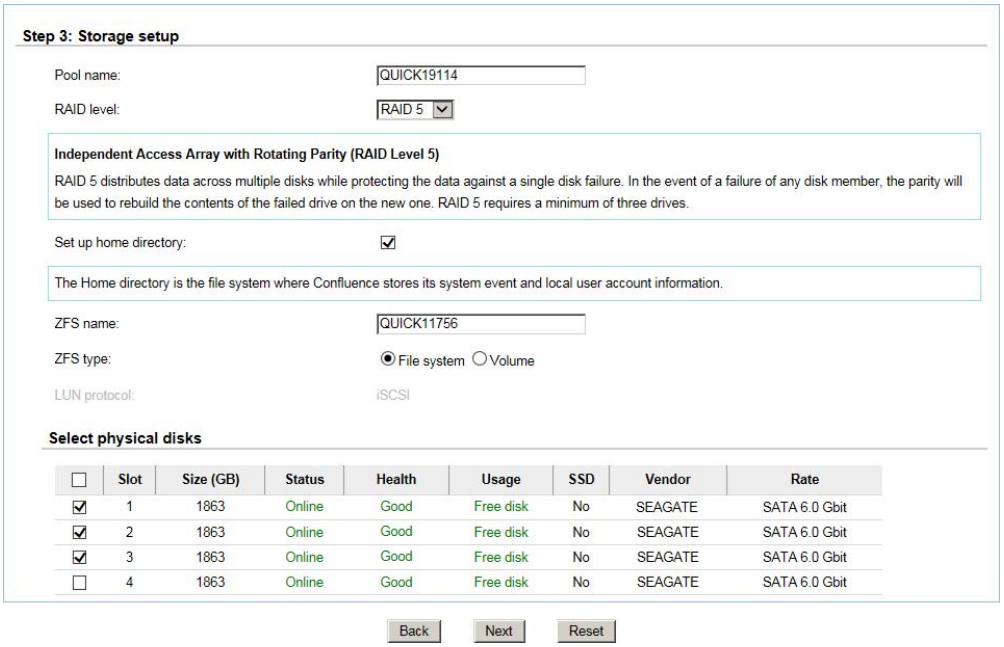
This tool guides you through the process of setting up basic array information, configuring network settings, and the creation of a pool on the storage system. Please make sure that it has some free hard drives installed in the system. The following is the procedure.

1. Click **Configuration** / **Setup wizard**.
2. Enter a **System name** and set up the **Time and date** if necessary. Select a **Time zone**, and then click **Next** button to proceed.

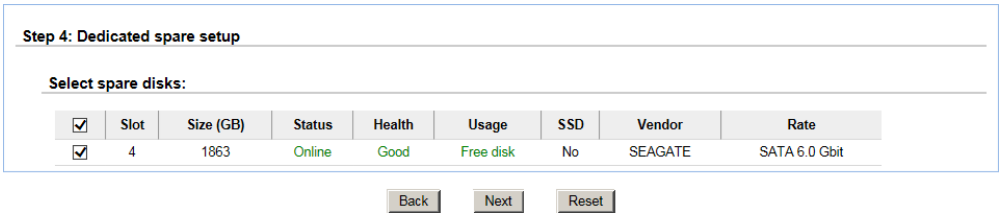
3. Confirm or change the LAN port IP address, and then click **Next** button.



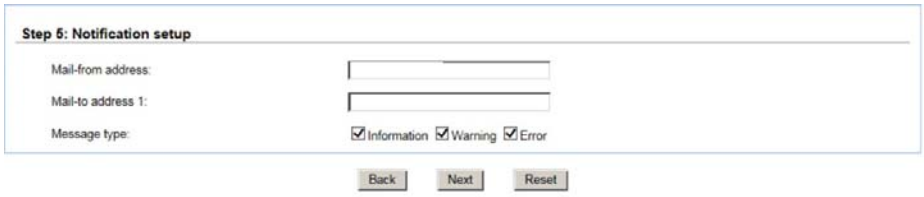
4. Enter a **Pool name** and choose a **RAID level**. Check **Set up home directory** if the pool sets up the home directory at the same the time. Enter a **ZFS name** and choose a **ZFS type**. At last, select physical disks and then click **Next** button.



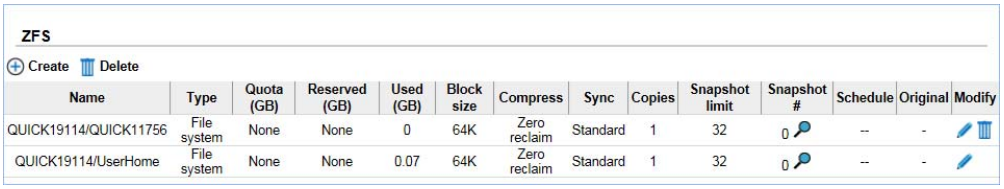
5. Select spare disks if necessary, and then click **Next** button.



6. Enter **Mail-from address** and **Mail-to address 1**, check **Message type** if necessary, and then click **Next** button.



7. Finally, check the configurations in confirm page. If everything is fine, then click **Apply** button. ZFS file systems are created and it is available to use now.



Name	Type	Quota (GB)	Reserved (GB)	Used (GB)	Block size	Compress	Sync	Copies	Snapshot limit	Snapshot #	Schedule	Original	Modify
QUICK19114/QUICK11756	File system	None	None	0	64K	Zero reclaim	Standard	1	32	0	--	-	
QUICK19114/UserHome	File system	None	None	0.07	64K	Zero reclaim	Standard	1	32	0	--	-	

4 Basic Configuration

Interface Hierarchy

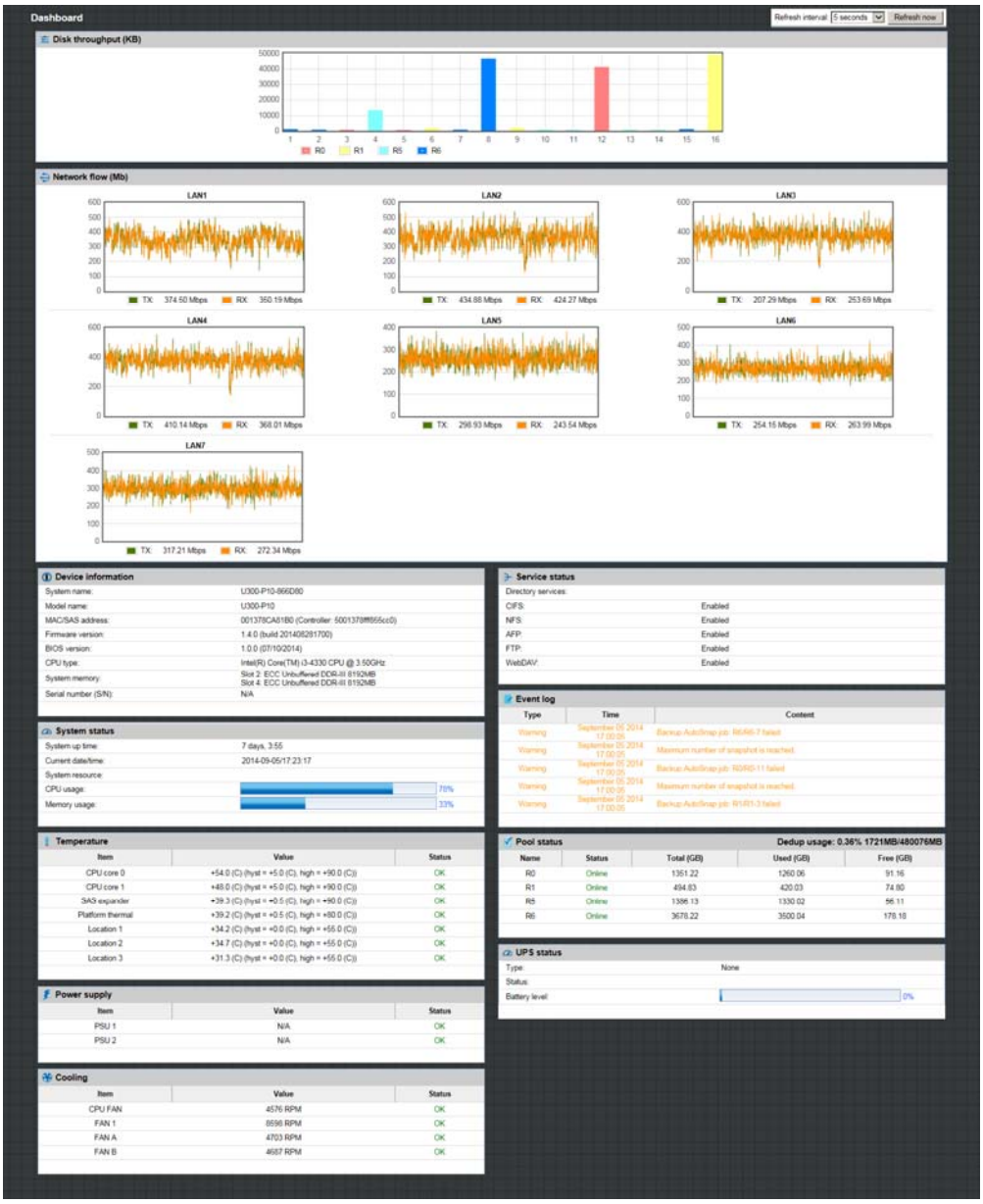
This table describes the hierarchy of the Web GUI.

Menu Bar	L1	L2, Button or Menu
Dashboard	Disk throughput	
	Network flow (Mb)	
	Device information	
	System status	
	Temperature	
	Power supply	
	Cooling	
	Service status	Directory services / CIFS / NFS / ARP / FTP / WebDAV
	Event log	
	Pool status	
	UPS status	
Monitor	S.M.A.R.T	
	Physical disk	
	Snapshot	Filter
	Hardware monitor	Voltage / Temperature / Power supply / Cooling
	Event log	Event log / Service log
	UPS	
	Connection	File service / iSCSI service
Configuration	Setup wizard	Step 1 / Step 2 / Step 3 / Step 4 / Step 5 / Step 6
	System configuration	System / Time / Account / Mail setting / Messenger / SNMP / System log server / UPS
	Network configuration	Network settings / DNS settings / IP filter setting
	Storage configuration	Physical Disk / Pool / ZFS / Share / LUN / Snapshot
	Service configuration	Directory service / CIFS / NFS / AFP / FTP / WebDAV / ISCSI / Rsync / Backup / AntiVirus
Application	Generic	
	Video Editing	
	TV Broadcasting	
	Surveillance	

Maintenance	Diagnostic	Tools / ARP
	Download	Download MIB file / Download system
	Reset to factory default	Reset to factory default
	Firmware upgrade	Firmware upgrade
	Import and export	Import / Export
	Reboot	Reboot
	Shutdown	Shutdown

Dashboard

The **Dashboard** menu option displays a whole picture of the system. The tables include **Disk throughput, Network flow, Device information, System status, Temperature, Power supply, Cooling, Service status, Event log**, and **Pool status**.



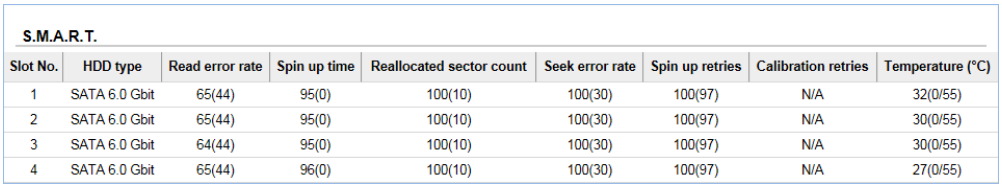
The refresh interval can be changed in the right-top corner. Choose an interval by seconds and then click **Refresh Now** button. It will be active right now.

Monitor

The **Monitor** menu option is for accessing the **S.M.A.R.T., Physical disk, Snapshot, Hardware monitor, Event log, UPS** and **Connection** options.

S.M.A.R.T.

S.M.A.R.T. (Self-Monitoring Analysis and Reporting Technology) is a diagnostic tool for hard drives to deliver warning of drive failures in advance. The **S.M.A.R.T.** option provides users a chance to take actions before a possible drive failure.



S.M.A.R.T.

Slot No.	HDD type	Read error rate	Spin up time	Reallocated sector count	Seek error rate	Spin up retries	Calibration retries	Temperature (°C)
1	SATA 6.0 Gbit	65(44)	95(0)	100(10)	100(30)	100(97)	N/A	32(0/55)
2	SATA 6.0 Gbit	65(44)	95(0)	100(10)	100(30)	100(97)	N/A	30(0/55)
3	SATA 6.0 Gbit	64(44)	95(0)	100(10)	100(30)	100(97)	N/A	30(0/55)
4	SATA 6.0 Gbit	65(44)	96(0)	100(10)	100(30)	100(97)	N/A	27(0/55)

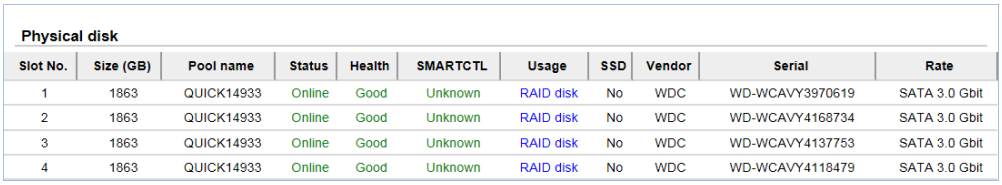
S.M.A.R.T. measures many attributes of the hard drive all the time and inspects the properties of hard drives which are close to be out of tolerance. The advanced notice of possible hard drive failure gives users precautions to back up hard drive or replace the hard drive. This is much better than hard drive crash when it is writing data or rebuilding a failed hard drive.

The numbers displayed are real-time value. The number in parenthesis is the threshold value. The threshold values from different hard drive vendors are different; please refer to hard drive vendors' specification for details.

S.M.A.R.T. only supports SATA drives. SAS drives do not have this function and will show N/A in the web page.

Physical disk

The **Physical disk** option gives you the hard drive status.



Physical disk

Slot No.	Size (GB)	Pool name	Status	Health	SMARTCTL	Usage	SSD	Vendor	Serial	Rate
1	1863	QUICK14933	Online	Good	Unknown	RAID disk	No	WDC	WD-WCAVY3970619	SATA 3.0 Gbit
2	1863	QUICK14933	Online	Good	Unknown	RAID disk	No	WDC	WD-WCAVY4168734	SATA 3.0 Gbit
3	1863	QUICK14933	Online	Good	Unknown	RAID disk	No	WDC	WD-WCAVY4137753	SATA 3.0 Gbit
4	1863	QUICK14933	Online	Good	Unknown	RAID disk	No	WDC	WD-WCAVY4118479	SATA 3.0 Gbit

This table shows the column descriptions.

Column Name	Description
Slot No.	The position of a hard drive.
Size (GB)	Capacity of hard drive.
Pool Name	Pool name.
Status	The status of the hard drive:

	• Online: The hard drive is online. • Rebuilding: The hard drive is being rebuilt. • Degraded: One of the RAID set is at degraded mode. • Failed: One of the RAID set is at failed mode. • Importing: The system is loading data from the disks, which means the pool is not ready for use yet.
Health	The health of the hard drive: • Good: The hard drive is good. • Failed: The hard drive is failed. • Error alert: S.M.A.R.T. error alerts. • Read errors: The hard drive has unrecoverable read errors. • Reserved: The disk is one of the member disks of a RAID group. It contains RAID group and pool information, but the original RAID group and pool can't be found. Either you put this disk at its original slot or set this disk as a free disk.
SMARTCTL	The S.M.A.R.T. status of the hard drive: • Unknown: The S.M.A.R.T. of the hard drive is unknown. • No error: The S.M.A.R.T. of the hard drive has no error. • Has error: The S.M.A.R.T. of the hard drive has error.
Usage	The usage of the hard drive: • RAID disk: This hard drive has been set to a RAID group. • Free disk: This hard drive is free for use. • Dedicated spare: This hard drive has been set as dedicated spare of a pool.
SSD	HDD or SSD.
Vendor	Hard drive vendor.
Serial	Hard drive serial number.
Rate	Hard drive rate: • SAS 6Gb/s. • SAS 3Gb/s. • SATA 6Gb/s. • SATA 3Gb/s. • SATA 1.5Gb/s.

Snapshot

The **Snapshot** option gives you the status of the snapshot file systems or volumes.

Snapshot

Filter: All Total: 59

Name	Used (MB)	Refer (MB)	Created time
R5-NAS/Others@AUTO-20140212-0000	0.22	803.15	Wed Feb 12 0:00 2014
R5-NAS/Others@AUTO-20140215-0000	0.22	813.35	Sat Feb 15 0:00 2014
R5-NAS/Others@AUTO-20140219-0000	0.22	838.09	Wed Feb 19 0:00 2014
R5-NAS/Others@AUTO-20140222-0000	0.34	841.28	Sat Feb 22 0:00 2014
R5-NAS/Others@AUTO-20140226-0000	0.22	841.32	Wed Feb 26 0:00 2014
R5-NAS/Others@AUTO-20140301-0000	0.24	846.63	Sat Mar 1 0:00 2014
R5-NAS/Others@AUTO-20140305-0000	0.22	850.14	Wed Mar 5 0:00 2014
R5-NAS/Others@AUTO-20140308-0000	0.24	853.23	Sat Mar 8 0:00 2014
R5-NAS/Others@AUTO-20140312-0000	0.21	853.6	Wed Mar 12 0:00 2014
R5-NAS/Others@AUTO-20140315-0000	0.19	857.32	Sat Mar 15 0:00 2014
R5-NAS/Others@AUTO-20140319-0000	0.05	857.47	Wed Mar 19 0:00 2014
R5-NAS/Others@AUTO-20140322-0000	1.25	863.39	Sat Mar 22 0:00 2014
R5-NAS/Others@AUTO-20140326-0000	0.19	865.48	Wed Mar 26 0:00 2014
R5-NAS/Others@AUTO-20140329-0000	0.19	865.95	Sat Mar 29 0:00 2014
R5-NAS/Others@AUTO-20140402-0000	0.03	866.04	Wed Apr 2 0:00 2014
R5-NAS/Others@AUTO-20140405-0000	0.04	871.16	Sat Apr 5 0:00 2014
R5-NAS/Others@AUTO-20140409-0000	0.04	870.21	Wed Apr 9 0:00 2014
R5-NAS/Others@AUTO-20140412-0000	0.04	870.41	Sat Apr 12 0:00 2014
R5-NAS/Others@AUTO-20140416-0000	0.03	871.13	Wed Apr 16 0:00 2014
R5-NAS/Others@AUTO-20140419-0000	0.35	888.46	Sat Apr 19 0:00 2014
R5-NAS/Others@AUTO-20140423-0000	0.35	889.06	Wed Apr 23 0:00 2014
R5-NAS/Others@AUTO-20140426-0000	0.02	896.73	Sat Apr 26 0:00 2014
R5-NAS/Others@AUTO-20140430-0000	0.09	905.96	Wed Apr 30 0:00 2014
R5-NAS/Others@AUTO-20140503-0000	0.59	910.72	Sat May 3 0:00 2014
R5-NAS/Others@AUTO-20140507-0000	0.03	908.64	Wed May 7 0:00 2014
R5-NAS/Others@AUTO-20140510-0000	0.04	908.64	Sat May 10 0:00 2014
R5-NAS/Others@AUTO-20140514-0000	0.02	912.7	Wed May 14 0:00 2014
R5-NAS/Others@AUTO-20140517-0000	0.02	912.82	Sat May 17 0:00 2014
R5-NAS/Others@AUTO-20140521-0000	0.07	914.18	Wed May 21 0:00 2014
R5-NAS/Others@AUTO-20140524-0000	0.16	915	Sat May 24 0:00 2014
R5-NAS/Others@AUTO-20140528-0000	0.18	916.96	Wed May 28 0:00 2014
R5-NAS/Others@AUTO-20140531-0000	0.02	917.6	Sat May 31 0:00 2014
R5-NAS/Others@AUTO-20140604-0000	0.05	917.82	Wed Jun 4 0:00 2014
R5-NAS/Others@AUTO-20140607-0000	0.11	918.6	Sat Jun 7 0:00 2014
R5-NAS/Others@AUTO-20140611-0000	0.1	927.05	Wed Jun 11 0:00 2014
R5-NAS/Others@AUTO-20140614-0000	0.09	927.35	Sat Jun 14 0:00 2014
R5-NAS/Others@AUTO-20140618-0000	1.05	929.89	Wed Jun 18 0:00 2014
R5-NAS/Others@AUTO-20140621-0000	0.12	931.1	Sat Jun 21 0:00 2014
R5-NAS/Others@AUTO-20140625-0000	0.12	931.4	Wed Jun 25 0:00 2014
R5-NAS/Others@AUTO-20140628-0000	0.03	938.45	Sat Jun 28 0:00 2014
R5-NAS/Others@AUTO-20140702-0000	0.04	938.72	Wed Jul 2 0:00 2014
R5-NAS/Others@AUTO-20140705-0000	0.11	941.68	Sat Jul 5 0:00 2014
R5-NAS/Others@AUTO-20140709-0000	109.43	1059.65	Wed Jul 9 0:00 2014
R5-NAS/Others@AUTO-20140712-0000	0.03	952.28	Sat Jul 12 0:00 2014
R5-NAS/Others@AUTO-20140716-0000	35.49	1014.53	Wed Jul 16 0:00 2014
R5-NAS/Others@AUTO-20140719-0000	29.55	1045.03	Sat Jul 19 0:00 2014
R5-NAS/Others@AUTO-20140723-0000	0.13	996.21	Wed Jul 23 0:00 2014
R5-NAS/Others@AUTO-20140726-0000	0.04	1006.23	Sat Jul 26 0:00 2014
R5-NAS/Others@AUTO-20140730-0000	0.1	1009.78	Wed Jul 30 0:00 2014
R5-NAS/Others@AUTO-20140802-0000	0.09	1010.68	Sat Aug 2 0:00 2014
R5-NAS/Others@AUTO-20140806-0000	0.02	1013.77	Wed Aug 6 0:00 2014
R5-NAS/Others@AUTO-20140809-0000	1	1022.6	Sat Aug 9 0:00 2014
R5-NAS/Others@AUTO-20140813-0000	0.17	1033.48	Wed Aug 13 0:00 2014
R5-NAS/Others@AUTO-20140816-0000	0.03	1034.49	Sat Aug 16 0:00 2014
R5-NAS/Others@AUTO-20140820-0000	0.04	1040.05	Wed Aug 20 0:00 2014
R5-NAS/Others@AUTO-20140823-0000	0.55	1043.13	Sat Aug 23 0:00 2014
R5-NAS/Others@AUTO-20140827-0000	0.11	1042.43	Wed Aug 27 0:00 2014
R5-NAS/Others@AUTO-20140830-0000	0.08	1055.35	Sat Aug 30 0:00 2014
R5-NAS/Others@AUTO-20140903-0000	0.1	1056.75	Wed Sep 3 0:00 2014

This table shows the column descriptions.

Column Name	Description
Name	The snapshot name.
Used (MB)	The amount of snapshot space that has been used.
Refer (GB)	The refer capacity of the file system or volume.
Created time	The time the snapshot is created.

The options is available in this tab:

- **Filter:** Drop down menu to select the file systems or volumes.

Hardware monitor

The **Hardware monitor** option provides the status of system voltage, temperature, power supply, and cooling.

Voltage

Item	Value	Status
On Board Vcore	+0.86 V (min = +0.56 V, max = +1.42 V)	OK
Onboard +1.5V	+1.51 V (min = +1.34 V, max = +1.64 V)	OK
Onboard +1.05V	+1.07 V (min = +0.95 V, max = +1.15 V)	OK
Onboard +5V	+5.18 V (min = +4.49 V, max = +5.50 V)	OK
Onboard +3.3V	+3.39 V (min = +2.97 V, max = +3.62 V)	OK
Onboard +12V	+12.10 V (min = +10.84 V, max = +13.26 V)	OK
Onboard Battery +3.0V	+3.17 V (min = +2.69 V, max = +3.29 V)	OK

Temperature

Item	Value	Status
SYS Temp1	+33.0 (C) (hyst = +0.0 (C), high = +57.0 (C))	OK
SYS Temp2	+31.0 (C) (hyst = +0.0 (C), high = +60.0 (C))	OK
Core Processor	+39.0 (C) (hyst = +0.0 (C), high = +93.0 (C))	OK

Power supply

Item	Value	Status
PSUPower1	N/A	OK
PSUPower2	N/A	OK

Cooling

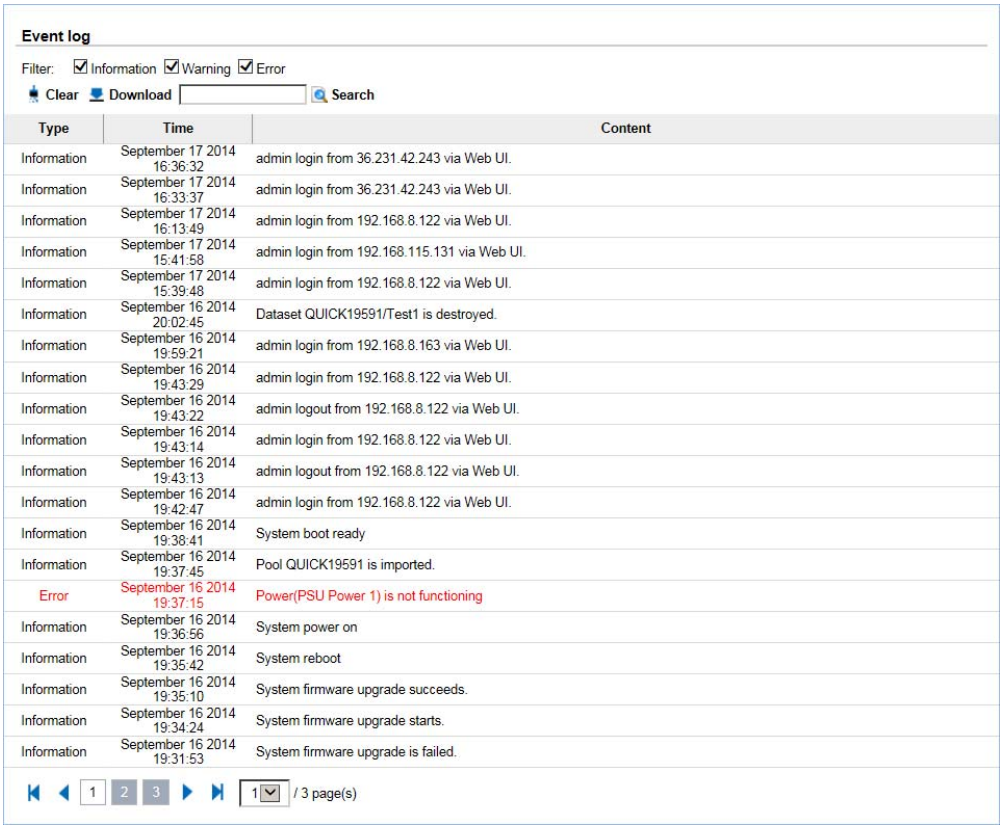
Item	Value	Status
CPUFAN	4350 RPM	OK
SYSFAN1	4850 RPM	OK
SYSFAN2	4850 RPM	OK
SYSFAN3	4850 RPM	OK
PSUFAN	4864 RPM	OK

This table shows the column descriptions.

Column Name	Description
Item	The item name.
Value	The value of the item and its criteria.
Status	OK or Failed.

Event log

The **Event log** option provides event messages and service logs. In **Event log** tab, check INFO, WARNING, or ERROR to display those particular events.



The options are available on this tab:

- **Clear:** Click **Clear** button to clear all event logs.
- **Download:** Click **Download** button to save the whole event log as a text file with file name "LOG-SystemName-Date-Time.log".
- **Search:** Enter a keyword and then click **Search** button to search the event logs which contents the keyword.

The event log is displayed in reverse order which means the latest event log is on the first / top page. When UserHome directory exists, the system will store event log content in the storage pool where UserHome directory belongs. Deleting UserHome pool will result in deleting event log content. Re-assigning UserHome directory to a different storage pool will make event log content wipe out as well.

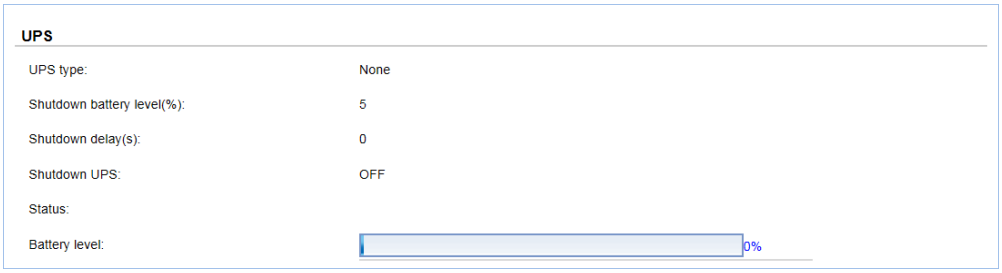
In **Service log** tab, check CIFS, AFP, FTP, WebDAV or iSCSI to display those particular events.

The options are available on this tab:

- **Download:** Click **Download** button to save the whole event log as a text file with file name "LOG-SystemName-Date-Time.log".
- **Search:** Enter a keyword and then click **Search** button to search the event logs which contents the keyword.

UPS

The **UPS** option provides the status of the UPS (Uninterruptible Power Supply).



This table shows the available options and their descriptions.

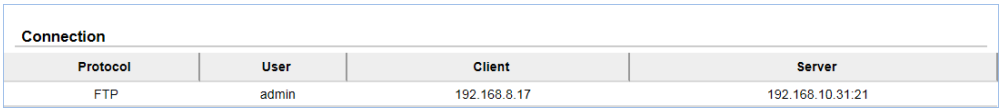
Column Name	Description
UPS Type	UPS Type: • None: No UPS or other vendors. • Smart-UPS (SNMP): APC Smart-UPS with network function.
Shutdown battery level (%)	When the battery level goes down and lower than the configured threshold, the system will auto shutdown. This function will be disabled if the configured threshold is set to "0".

Shutdown delay (s)	When there is the power outage happening, if the power cannot be recovered within the configured time, such as 30 seconds, the system will auto shutdown at the moment. This function will be disabled if the configured seconds is set to “0”.
Shutdown UPS	The status of shutdown UPS: • ON: The system will send the command to shut down the connected UPS if one of the above functions is triggered when the power outage is happening. • OFF: Disable this function.
Status	The status of UPS: • Detecting… • Running • Unable to detect UPS • Communication lost • UPS reboot in progress • UPS shutdown in progress • Batteries failed. Please change them NOW!
Battery level (%)	Current power percentage of battery level.

The system will shut down either **Shutdown battery level (%)** or **Shutdown delay (s)** reaches the condition. User should set these values carefully.

Connection

The **Connection** option provides the all connections of file service and iSCSI service. In **File service** tab, it displays the connection of the file service.



This table shows the available options and their descriptions.

Column Name	Description
Protocol	The protocol type of the connection.
User	The connection user.
Client	The client information of the connection.
Server	The server information of the connection.

In **iSCSI service** tab, it displays the connection of the iSCSI service.

This table shows the available options and their descriptions.

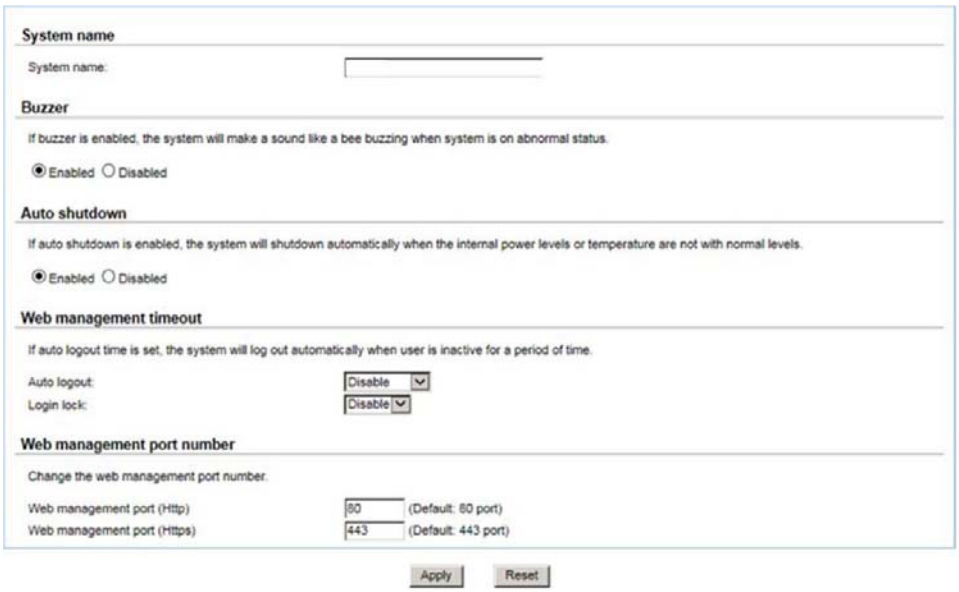
Column Name	Description
No.	
Initiator name	It displays the host computer name.
Initiator IP	It displays the IP address of the host computer.
Target name	It displays the controller name.
InitialR2T	InitialR2T (Initial Ready to Transfer) is used to turn off either the use of a unidirectional R2T command or the output part of a bidirectional command. The default value is Yes.
Immed.data	Immed. data (Immediate Data) sets the support for immediate data between the initiator and the target. Both must be set to the same setting. The default value is Yes.
MaxOutR2T	MaxDataOutR2T (Maximum Data Outstanding Ready to Transfer) determines the maximum number of outstanding ready to transfer per task. The default value is 1.
MaxDataBurstLen	MaxDataBurstLen (Maximum Data Burst Length) determines the maximum SCSI data payload. The default value is 256kb.

System Configuration

The **System Configuration** menu option is for accessing the **System**, **Time**, **Account**, **Mail setting**, **Messenger**, **SNMP**, **System log server**, and **UPS** options.

System

The **System** option is used to setup the system name, system indication, buzzer and auto shutdown. The default system name is composed of the model name and the serial number of this system.



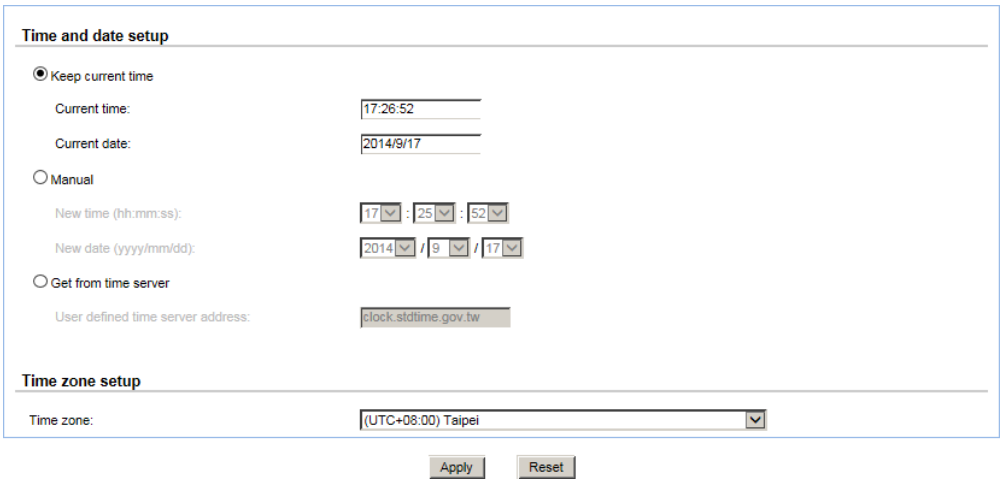
The options are available in this tab:

- **System name:** To change the **System name**, highlight the old name and type in a new one.
- **Buzzer:** Enable it to let the system make a sound like a bee buzzing when the system is abnormal.
- **Auto shutdown:** Enable it to let the system shutdown automatically when the voltage or temperature is out of the normal range. For better data protection, it is recommended to check **Auto Shutdown**.
- **Web management timeout:** When the auto logout option is enabled, you will be logged out of the admin interface after the time specified. There are Disable (default), 5 minutes, 30 minutes and 1 hour options. When the login lock is enabled, the system allows only one user to login to the web UI at a time. There are Disable (default) and Enable options.
- **Web management port number:** If the default port numbers of HTTP and HTTPS are not allowed on the network, they can be changed here.

When it is done, click **Apply** button.

Time

The **Time** option is used to setup the system time and NTP (Network Time Protocol) server setting.



The options are available in this tab:

- **Time and date setup:** Change the current date, time and time zone settings. Click **Manual** radio button and select the current date and time. Or click **Get from time server** radio button and enter the IP address of NTP (Network Time Protocol) server to synchronize the time from a time server.
- **Time zone setup:** To change time zone settings.

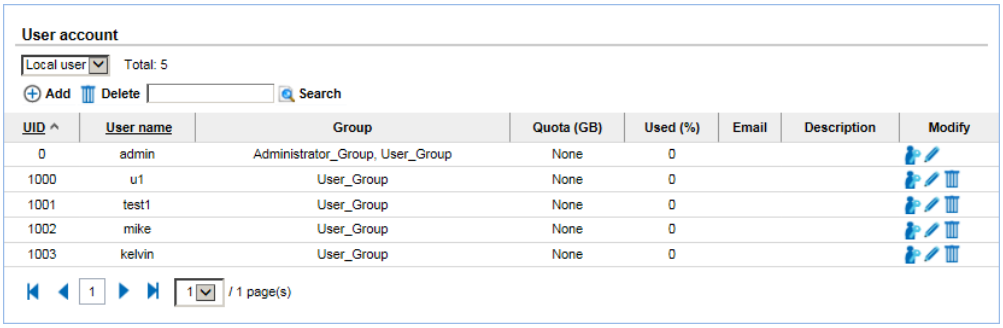
When it is done, click **Apply** button.

Account

The **Account** option is used to setup users and groups in the system. It is for accessing the **User account**, **Group account**, and **Import/Export account** option tabs.

The **User account** tab provides the function to manage local user accounts such as add, delete, edit, change password or view the status of the users. Local user accounts and domain user accounts are displayed separately by selecting the drop down list.

Domain user accounts are only for display purpose. You cannot edit domain account or change the password of domain account.



This table shows the column descriptions.

Column Name	Description
UID	The user ID.
User name	The account name.
Group	The user belongs to the groups.
Quota (GB)	User quota space.
Used (%)	The percentage of the quota usage.
Email	User's email.
Description	User's description.

The options are available in this tab:

- **Add:** Add a user account.
- **Delete:** Multi select the user accounts to be deleted.
- **Search:** Enter a keyword to search.

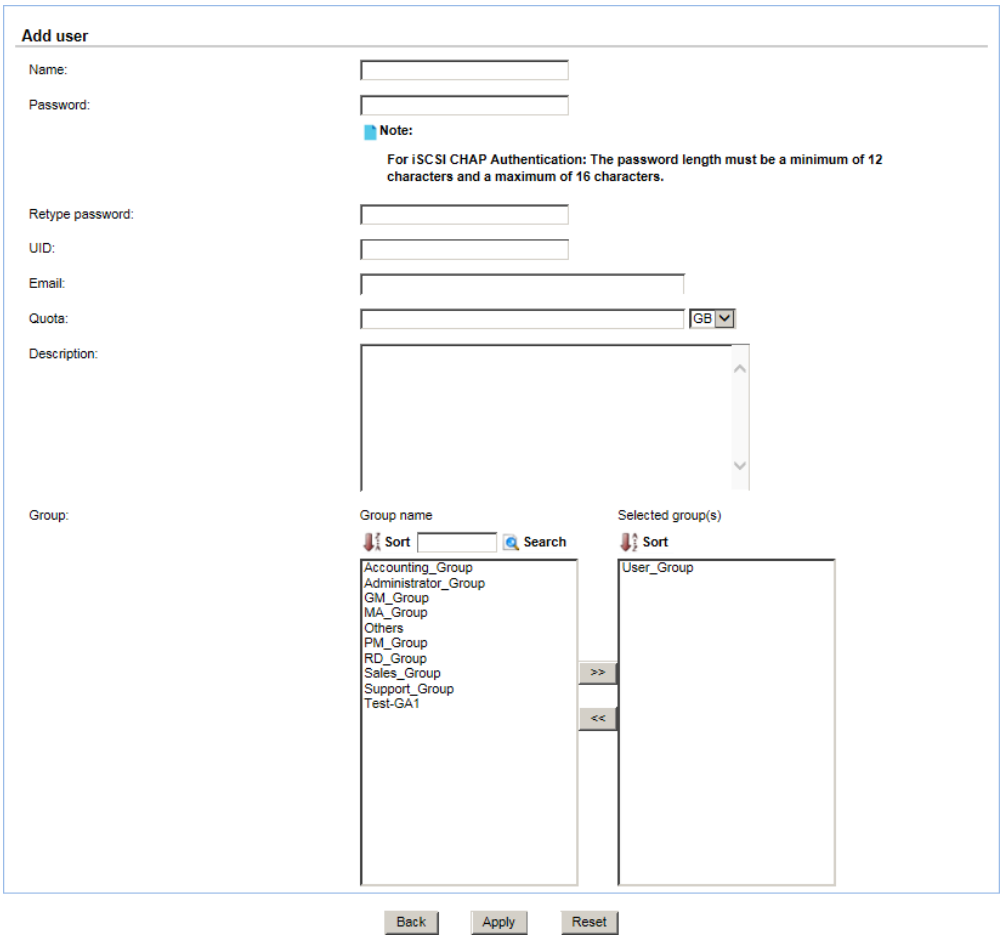
The options are available in the Modify column:

- **Change password:** Change the user's password.
- **Edit:** Edit the user.
- **Delete:** Delete the user.

Please be aware that before you can create local accounts, a storage pool with home directory function enabled must be created first. Otherwise, you will not be able to create local account and all functions will be grey out. For each local account created, the system will automatically create a personal folder in the home directory with the capacity limit specified in account creation. The user can access his/her home directory right away.

Take an example of creating an account.

1. Click **Add** button.



2. Enter **Name**, **Password**, and **Retype password**. The other fields are optional.
3. Click **Apply** button to create an account.

UID is open for user assignment. If UID input is left blank, the system will assign an ID automatically. User-assigned ID has a range 1000 ~ 60000.

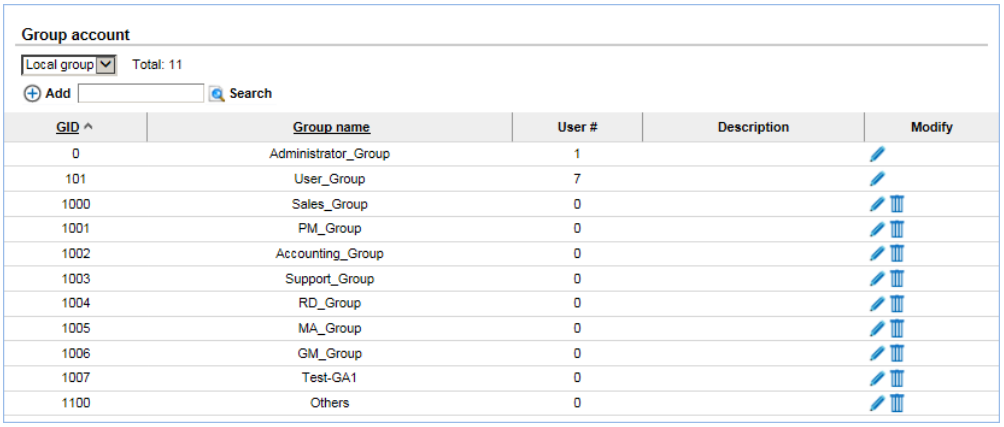
TIP:
The password is required to be at least 12 and up to 16 alphanumeric characters. This is because of UnifiedAUTH mechanism that will integrate with iSCSI CHAP account. iSCSI CHAP account requires that the password needs to be 12 to 16 characters.

If the system is using Active Directory or LDAP as directory service, you may see the domain users as below. Please be aware that no modification (add, delete, edit, change password) can be made to domain users. This can only be done on the AD server or LDAP server.

The syntax to represent a domain user is:

<domain name>+<user account>

The **Group account** tab provides the function to manage local groups such as add, delete, edit, or view the status of the groups. Local groups and domain groups are displayed separately by selecting the drop down list.



This table shows the column descriptions.

Column Name	Description
GID	Group ID (user assigned range 1000 ~ 60000).
Group name	The group name.
#User	The number of users that belong to this group.
Description	Group's description.

The options are available in this tab:

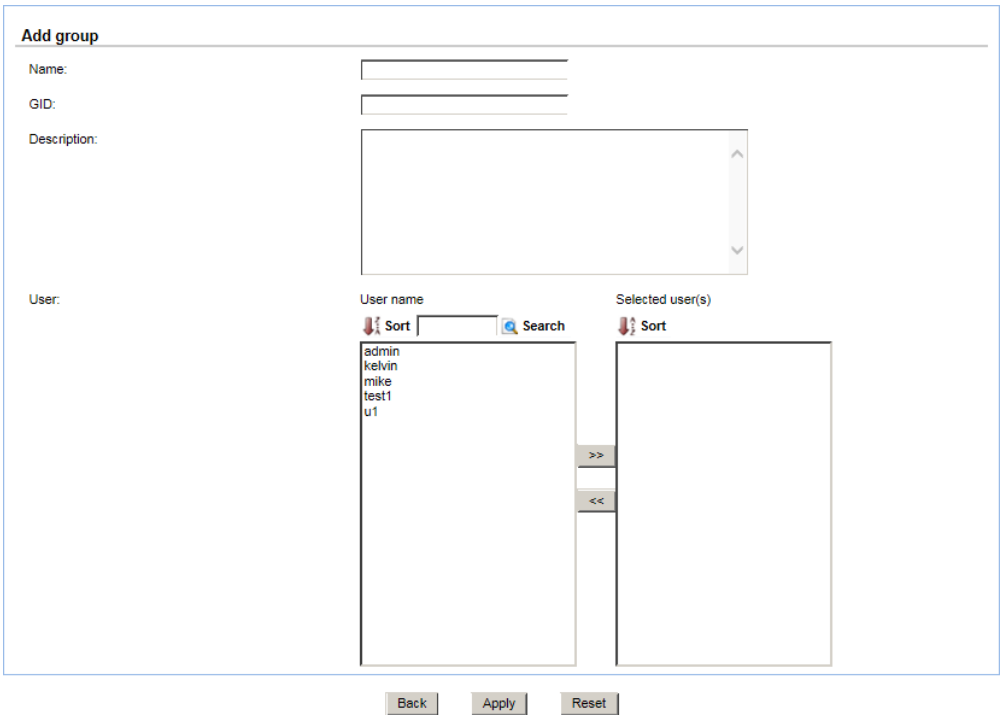
- **Add:** Add a group account.
- **Search:** Enter a keyword to search.

The options are available in the Modify column:

- **Edit:** Edit the group.
- **Delete:** Delete the group.

Take an example of creating a group.

1. Click **Add** button.



2. Enter the **Name**. The other fields are optional.
3. Click **Apply** button to create a group.

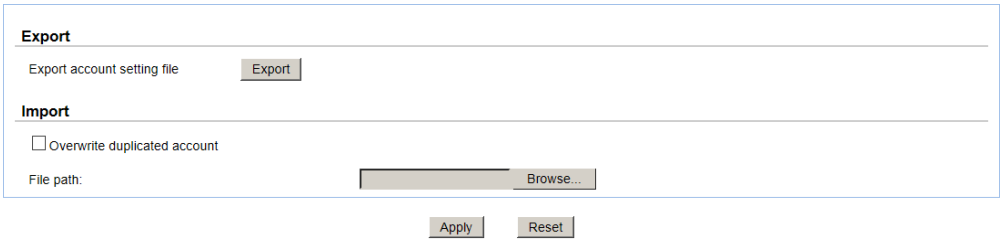
GID is open for user assignment. If GID input is left blank, the system will assign an ID automatically. User-assigned ID has a range 1000 ~ 60000.

If the system is using Active Directory or LDAP as directory service, you may see the domain groups as below. Please be aware that no modification (add, delete, edit) can be made to domain groups. This can only be done on the AD server or LDAP server.

The syntax to represent a domain user is:

<Domain name>**+**<group name>

The **Import/Export account** tab provides the function to import/export accounts.



The options are available on this tab:

- **Export:** Export all users and groups to a file.
- **Overwirte duplicated account:** Check this to overwirte duplicated account.
- **Import:** Import all users and groups from a file.

The import/export file is a pure text file with the following format. Each attribute is separated by a colon. For group account between two colons, each user is separated by a comma. Before importing account file, you may create several accounts and export the account file first to get familiar with the format.

[Users]

user name:user password:quota:UID:email:desc

[Groups]

group name:user1,user2...:GID:desc

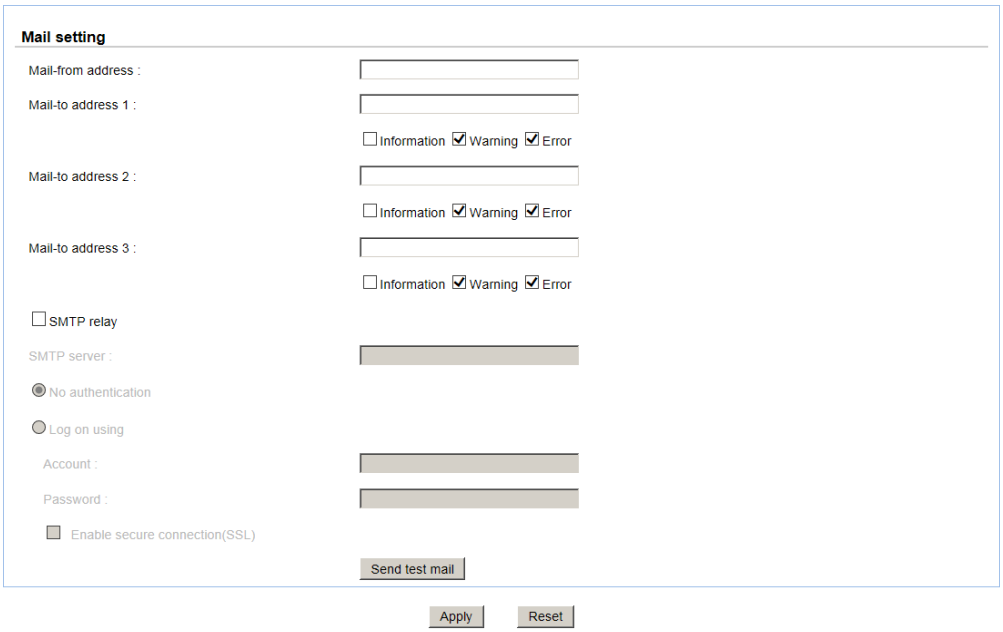
Please be aware that the actual password will not be exported. In exported file, the password will be replaced with a dummy password 1234. When the same account name (case sensitive) exists during importin, it will not overwrite the existing account information unless “overwrite duplicated account” is checked. When overwriting an user account, UID remains unchanged. When overwriting a group account, GID remains unchanged and the original group members remain plus adding any new group members.

Mail Setting

The **Mail setting** option is used to enter up to three mail addresses for receiving the event notifications. Fill in the necessary fields and click **Send test mail** to test whether it is workable. Some mail servers check the **Mail-from address** and need the SMTP relay setting for authentication.

TIP:
Please make sure the DNS server IP is well-setup in **Network configuration -> DNS Setting**. So the event notification mails can be sent successfully.

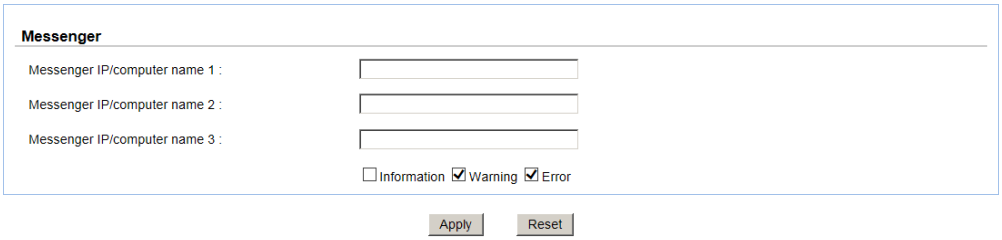
You can also select which levels of event logs which you would like to receive. The default setting only includes WARNING and ERROR event logs.



When it is done, click **Apply** button.

Messenger

The **Messenger** option is used to setup pop-up messages via Windows messenger (not MSN).



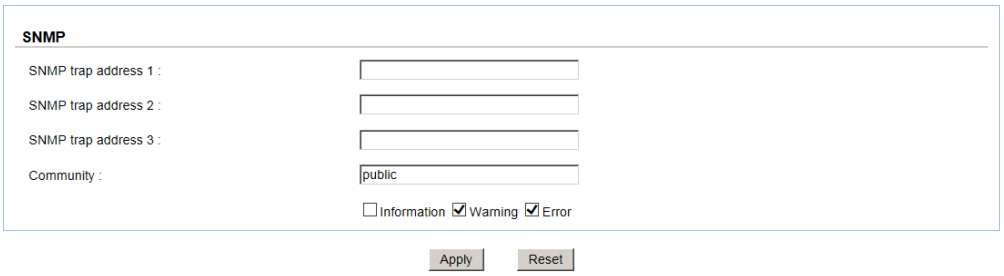
The options are available in this tab:

- **Messenger:** You must enable the Messenger service in Windows (**Start -> Control Panel -> Administrative Tools -> Services -> Messenger**). It allows up to three Messenger addresses. You can choose the alert levels which you would like to receive. The default setting only includes WARNING and ERROR event logs.

When it is done, click **Apply** button.

SNMP

The **SNMP** option is used to setup SNMP traps (for alerting via SNMP).



The options are available in this tab:

- **SNMP trap address:** It allows up to three SNMP trap addresses. The default community setting is public. You can choose the alert levels which you would like to receive. The default setting only includes WARNING and ERROR event logs.

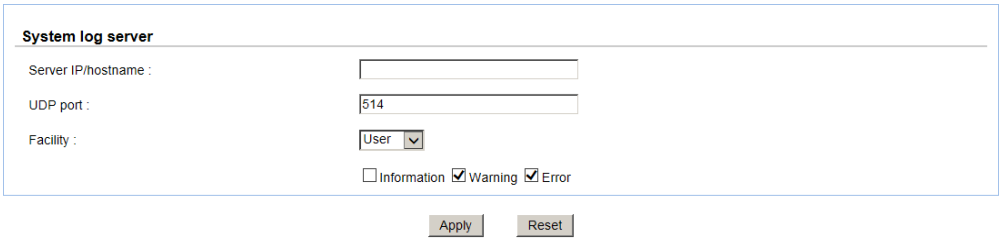
  There are many SNMP tools available on the internet.

  - SNMPc: http://www.snmpc.com/
  - Net-SNMP: http://net-snmp.sourceforge.net/

When it is done, click **Apply** button.

System Log Server

The **System log server** option is used to setup alerts via the syslog protocol.



The options are available in this tab:

- **Server IP/hostname:** Fill in the necessary fields for syslog service. The default port is 514. You can choose the alert levels which you would like to receive. The default setting only includes WARNING and ERROR event logs.

  There are some syslog server tools available on the internet for Windows.

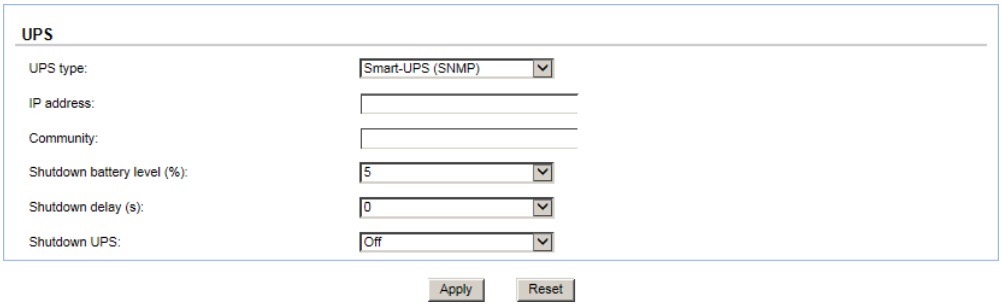
  - WinSyslog: http://www.winsyslog.com/
  - Kiwi Syslog Daemon: http://www.kiwisyslog.com/

  Most UNIX systems have built-in syslog daemon.

When it is done, click **Apply** button.

UPS

The **UPS** option is used to set up a UPS (Uninterruptible Power Supply).



Currently, the system only supports and communicates with Smart-UPS series with network function by APC (American Power Conversion Corp, http://www.apc.com/).

TIP:
Connection with other vendors of UPS can work well, but they have no such communication features with the system.

Now we support the network UPS via SNMP. First, connect the network cable to UPS well. And then set up the shutdown values for when the power goes out.

This table shows the available options and their descriptions.

Options	Description
UPS Type	Select UPS Type: • None: No UPS or other vendors. • Smart-UPS (SNMP): APC Smart-UPS with network function.
IP address	The IP address of the network UPS.
Community	The SNMP community of the network UPS.
Shutdown battery level (%)	When the battery level goes down and lower than the configured threshold, the system will auto shutdown. This function will be disabled if the configured threshold is set to “0”.
Shutdown delay (s)	When there is the power outage happening, if the power cannot be recovered within the configured time, such as 30 seconds, the system will auto shutdown at the moment. This function will be disabled if the configured seconds is set to “0”.
Shutdown UPS	The status of shutdown UPS: • ON: The system will send the command to shut down the connected UPS if one of the above functions is triggered when the power outage is happening. • OFF: Disable this function.

The system will shut down either **Shutdown battery level (%)** or **Shutdown delay (s)** reaches the condition. User should set these values carefully.

Network Configuration

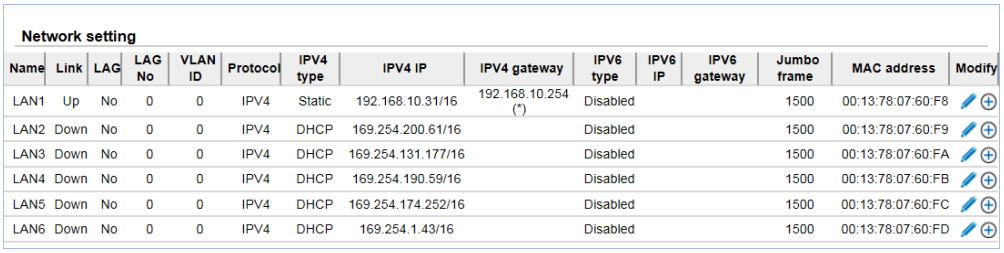
The **Network configuration** menu option is for accessing the **Network Setting**, **DNS Setting**, and **IP Filter Setting** options.

Network Setting

The **Network setting** option is for accessing the **LAN** ports. It is used to change IP addresses of network ports. The various controllers have different network port configurations:

- **724UX:** 7 x GbE ports per controller.
- **724UX 10G:** 2 x 10GbE ports (SFP+) + 7 x GbE ports per controller.

Each port must be assigned its own IP address. They need to be configured in multi-homed mode, or a present link aggregation / trunking mode. When multiple LAN ports are set up in link aggregation or trunking mode, all the LAN ports share the same IP address.


Network setting

Name	Link	LAG	LAG No	VLAN ID	Protocol	IPV4 type	IPV4 IP	IPV4 gateway	IPV6 type	IPV6 IP	IPV6 gateway	Jumbo frame	MAC address	Modify
LAN1	Up	No	0	0	IPV4	Static	192.168.10.31/16	192.168.10.254 (*)	Disabled			1500	00:13:78:07:60:F8	
LAN2	Down	No	0	0	IPV4	DHCP	169.254.200.61/16		Disabled			1500	00:13:78:07:60:F9	
LAN3	Down	No	0	0	IPV4	DHCP	169.254.131.177/16		Disabled			1500	00:13:78:07:60:FA	
LAN4	Down	No	0	0	IPV4	DHCP	169.254.190.59/16		Disabled			1500	00:13:78:07:60:FB	
LAN5	Down	No	0	0	IPV4	DHCP	169.254.174.252/16		Disabled			1500	00:13:78:07:60:FC	
LAN6	Down	No	0	0	IPV4	DHCP	169.254.1.43/16		Disabled			1500	00:13:78:07:60:FD	

Every LAN port can be managed by Web UI and JetCentral which is a central management software. In addition, GbE and 10GbE LAN ports cannot link aggregation each other either. The following table describes the relationship with the service and the network ports.

This table shows the column descriptions.

Column Name	Description
Name	Port name.
Ling	Link up or down.
LAG	Link aggregation status.
LAG No	Link aggregation number.
VLAN ID	VLAN number.
Protocol	Use IPv4 or IPv6.

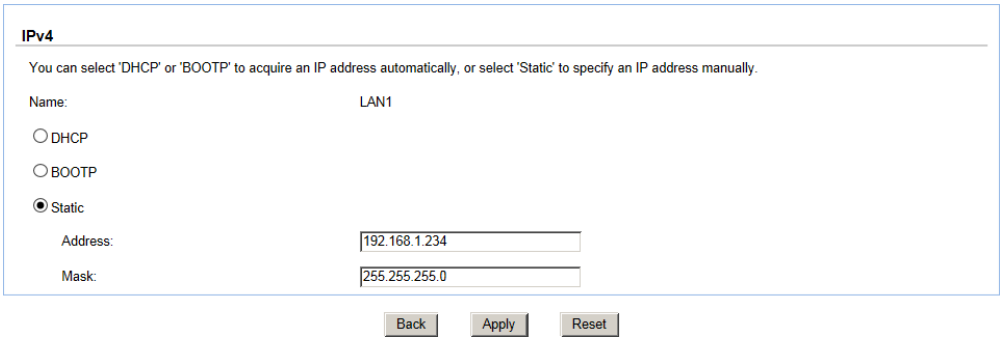
IPV4 Type	IPv4 address mode: • Static: static address. • DHCP: DHCP assigned address.
IPV4 IP	IPv4 address.
IPV4 Gateway	Gateway that uses IPv4 address.
IPV6 Type	IPv6 address mode: • Static: static address. • Auto: RA (router advertisement" calculated address. • DHCP: DHCPv6 assigned address.
IPv6 IP	IPv6 address.
Gateway6	Gateway that uses IPv6 address.
Jumbo frame	Jumbo frame size
MAC Address	MAC address

The options are available in this tab:

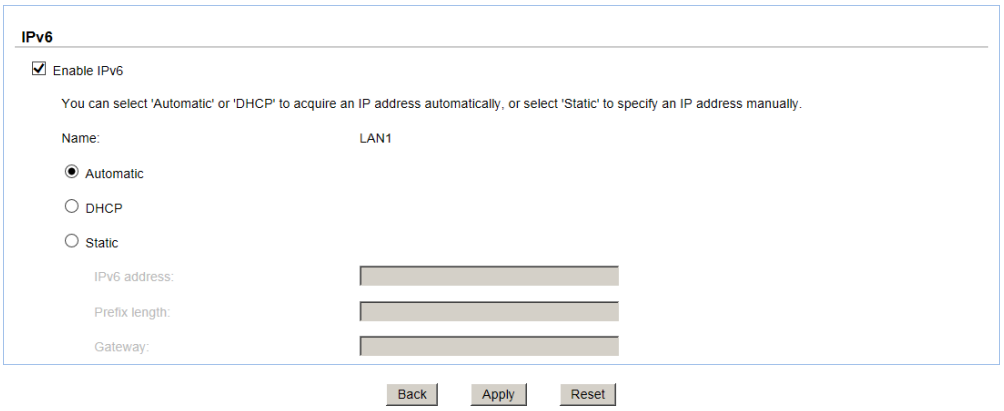
- **Edit:** Set IPv4 address, IPv6 address, VLAN ID, Default gateway and Jumbo frame.
- **Create link aggregation:** Set link aggregation or multi-homed.

The options are available on **Edit** icon:

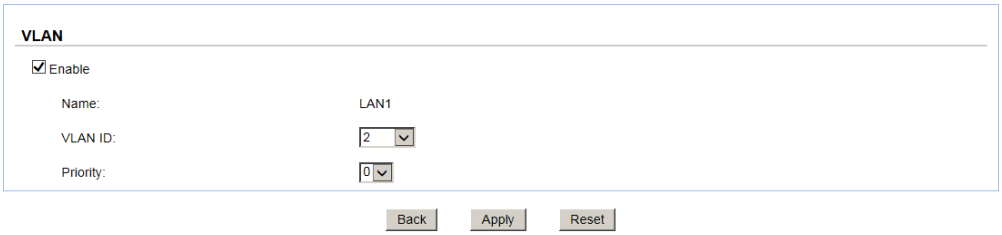
- **IPv4:** There are three options: **DHCP**, **BOOTP** or specify a **Static** IP address. The default LAN1 IP address is 192.168.1.234/255.255.255.0.



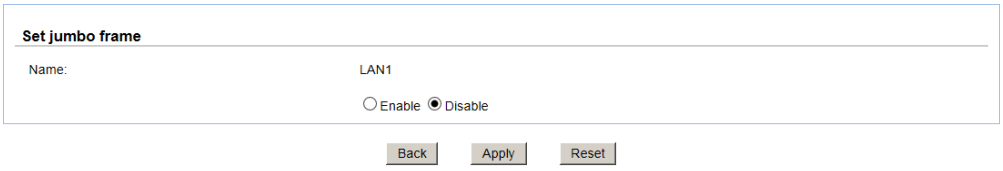
- **IPv6:** There are three options: **Automatic**, **DHCP**, or **Static** for specifying IPv6 address. The default is **Automatic**.



- **VLAN ID:** Setup VLAN ID and priority if necessary.

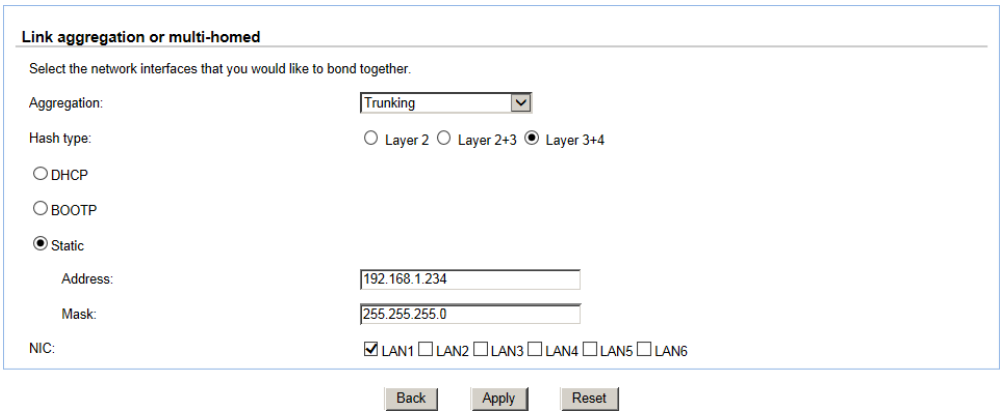


- **Jumbo frame:** Enable or disable jumbo frame on the port.



The option is available on **Create link aggregation** icon:

- **Link aggregation:** Select the aggregation mode. Assign an IP address by **DHCP**, **BOOTP** or specify a **Static** IP address. At last, select the network interfaces which you want to bond together.



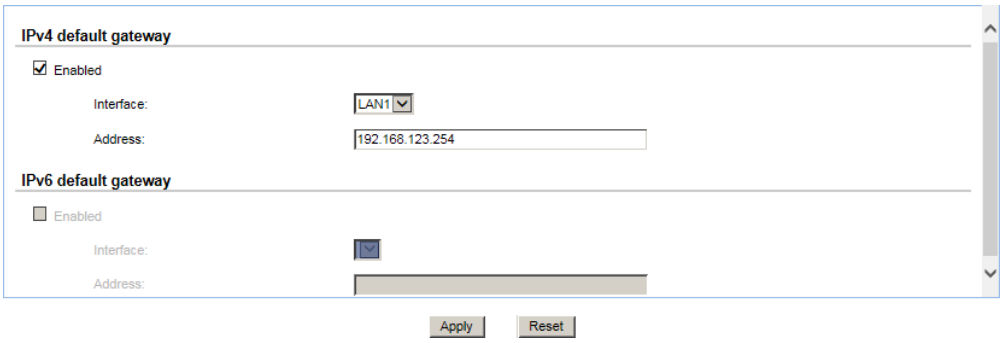
TIP:

Aggregation mode:

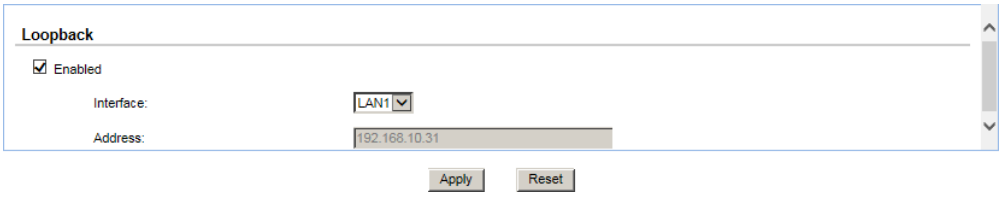
- **Round-Robin:** Transmit network packets in sequential order from the first available network interface (NIC) slave through the last. This mode provides load balancing and fault tolerance.
- **Active Backup:** Only one NIC slave in the bond is active. A different slave becomes active if, and only if, the active slave fails. The single logical bonded interface's MAC address is externally visible on only one NIC (port) to avoid distortion in the network switch. This mode provides fault tolerance.
- **Trunking:** Transmit network packets based on [(source MAC address XOR'd with destination MAC address) modulo NIC slave count]. This selects the same NIC slave for each destination MAC address. This mode provides load balancing and fault tolerance.
- **Broadcast:** Transmit network packets on all slave network interfaces. This mode provides fault tolerance.
- **LACP:** IEEE 802.3ad Dynamic link aggregation (802.3ad) Creates aggregation groups that share the same speed and duplex settings. Utilizes all slave network interfaces in the active aggregator group according to the 802.3ad specification.
- **Transmit Load Balancing:** The bonding driver mode that does not require any special network-switch support. The outgoing network packet traffic is distributed according to the current load (computed relative to the speed) on each network interface slave. Incoming traffic is received by one currently designated slave network interface. If this receiving slave fails, another slave takes over the MAC address of the failed receiving slave.
- **Adaptive Load Balancing:** It includes transmit load balancing plus receive load balancing for IPV4 traffic, and does not require any special network switch support. The receive load balancing is achieved by ARP negotiation. The bonding driver intercepts the ARP Replies sent by the local system on their way out and overwrites the source hardware address with the unique hardware address of one of the NIC slaves in the single logical bonded interface such that different network-peers use different MAC addresses for their network packet traffic.

(* Reference from http://en.wikipedia.org/wiki/Link_aggregation)

The **Default gateway** tab provides the function to enable or disable the port as default gateway.

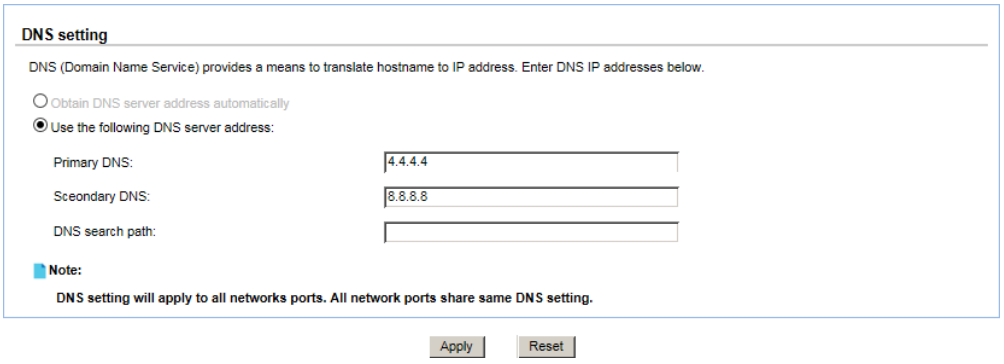


The **Loopback** tab provides the function to set lookback interface. If it is enabled, it supports mail, SNMP, and system log server.



DNS Setting

The **DNS setting** option is for accessing the **DNS (Domain Name Service) setting**. It is used to change DNS IP addresses.

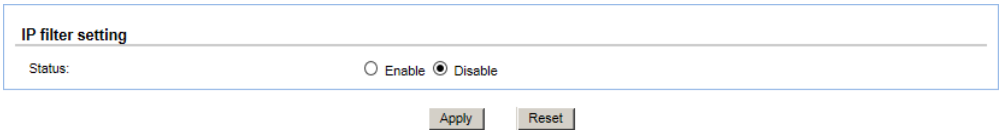


The options are available on this tab:

- **Primary DNS:** The IP address of DNS server can be entered or changed here. The DNS settings will be applied to all network ports, which mean you ONLY need to select one of the network ports and start DNS setting.
- **Secondary DNS:** Optional.
- **DNS search path:** It is a list of domains to try when the system tries to translate a machine name into an IP address. It provides more flexibility than the simple domain statement.

IP Filter Setting

The **IP Filter Setting** option is for accessing **IP filter setting** and **IP filter rule**. It provides the basic firewall function. Please be aware that IP filter rule cannot be enabled or disabled separately. Once IP filter function is enabled, all rules will be applied.



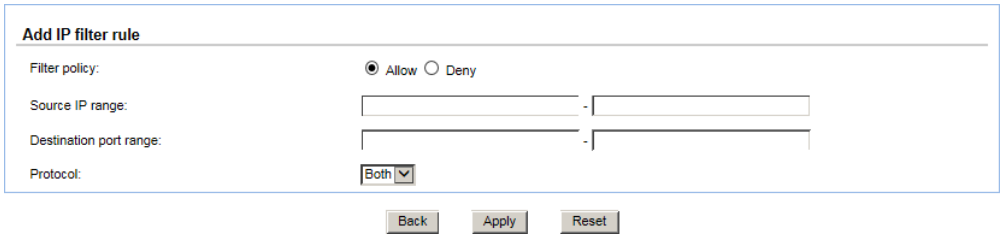
The options are available on **IP filter setting** tab:

- **Status:** The IP filter function enables or disables.

The **IP filter rule** tab provides the function to set IP filter rules.

The options are available on this tab:

- **Add IP filter rule:** Define filter policy, IP ranges, port ranges and protocol.

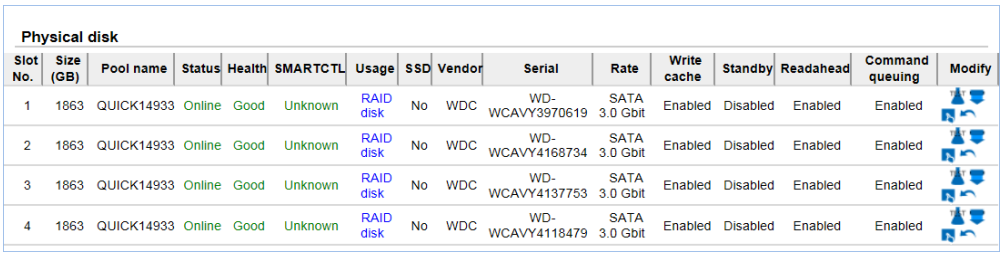


Storage Configuration

The **Storage configuration** menu option is for accessing the **Physical disk**, **Pool**, **ZFS**, **Share, LUN**, and **Snapshot** options.

Physical Disk

The **Physical disk** option gives you the hard drive status.



Physical disk

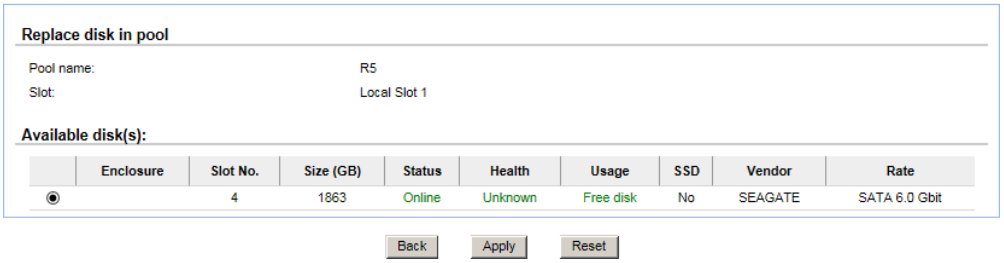
Slot No.	Size (GB)	Pool name	Status	Health	SMARTCTL	Usage	SSD	Vendor	Serial	Rate	Write cache	Standby	Readahead	Command queuing	Modify
1	1863	QUICK14933	Online	Good	Unknown	RAID disk	No	WDC	WD-WCAVY3970619	SATA 3.0 Gbit	Enabled	Disabled	Enabled	Enabled	
2	1863	QUICK14933	Online	Good	Unknown	RAID disk	No	WDC	WD-WCAVY4168734	SATA 3.0 Gbit	Enabled	Disabled	Enabled	Enabled	
3	1863	QUICK14933	Online	Good	Unknown	RAID disk	No	WDC	WD-WCAVY4137753	SATA 3.0 Gbit	Enabled	Disabled	Enabled	Enabled	
4	1863	QUICK14933	Online	Good	Unknown	RAID disk	No	WDC	WD-WCAVY4118479	SATA 3.0 Gbit	Enabled	Disabled	Enabled	Enabled	

This table shows the column descriptions.

Column Name	Description
Slot No.	The position of a hard drive.
Size (GB)	Capacity of hard drive.
Pool Name	Pool name.
Status	The status of the hard drive: • Online: the hard drive is online. • Rebuilding: the hard drive is being rebuilt. • Degraded: one of the RAID set is at degraded mode. • Failed: one of the RAID set is at failed mode. • Importing: the system is loading data from the disks, which means the pool is not ready for use yet.
Health	The health of the hard drive: • Good: the hard drive is good. • Failed: the hard drive is failed. • Error alert: S.M.A.R.T. error alert. • Read errors: the hard drive has unrecoverable read errors. • Reserved: the disk is one of the member disks of a RAID group. It contains RAID group and pool information, but the original RAID group and pool can't be found. Either you put this disk at its original slot or set this disk as a free disk.
SMARTCTL	The SMART of the hard drive: • Unknown: the SMART of the hard drive is unknown. • NoError: the SMART of the hard drive has no error. • HasError: the SMART of the hard drive has error.
Usage	The usage of the hard drive: • RAID disk: This hard drive has been set to a RAID group. • Free disk: This hard drive is free for use. • Dedicated spare: This hard drive has been set as dedicated spare of a pool.
SSD	HDD or SSD.
Vendor	Hard drive vendor.
Serial	Hard drive serial number.
Rate	Hard drive rate: • SAS 6Gb/s. • SAS 3Gb/s. • SATA 6Gb/s. • SATA 3Gb/s. • SATA 1.5Gb/s.
Write cache	Hard drive write cache is enabled or disabled. The default value is Enabled.

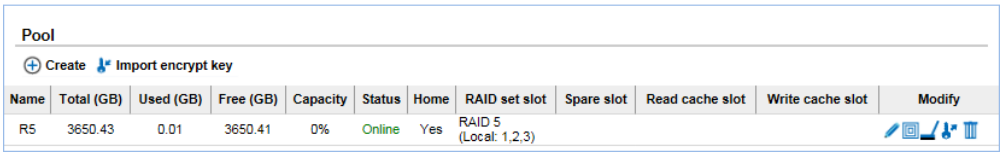
The options are available in the Modify column:

- **Start/Stop SMARTCTL self-test:** Start or stop SMART self-test.
- **Download SMARTCTL log:** Download SMART self-test log.
- **Set free disk:** Set the hard drive be free for use.
- **Replace disk:** Replace the hard drive of the pool to another free hard drive.



Pool

The **Pool** option provides various functions to manage storage pool such as create, expand, and set home directory, delete, or view the status of the pools.



This table shows the column descriptions.

Column Name	Description
Name	Pool name.
Total (GB)	Total capacity of this pool.
Used (GB)	Used capacity of this pool.
Free (GB)	Free capacity of this pool.
Capacity	The percentage or the capacity.
Dedup (This option is only visible when it supports deduplication.)	The status of the deduplication.
Status	The status of the pool: • Online: the pool is good. • Failed: the pool fails. • Rebuild: the pool is being rebuilt.
Home	The home directory is in the pool. • Yes: the home directory is in the pool. • No: the home directory is not in the pool
RAID set slot	The physical disk slots of the RAID set.

Spare slot	The spare physical disk slot.
Read cache slot	The SSD drives that are used as read cache (L2ARC).
Write cache slot	The SSD drives that are used as write cache (ZIL).

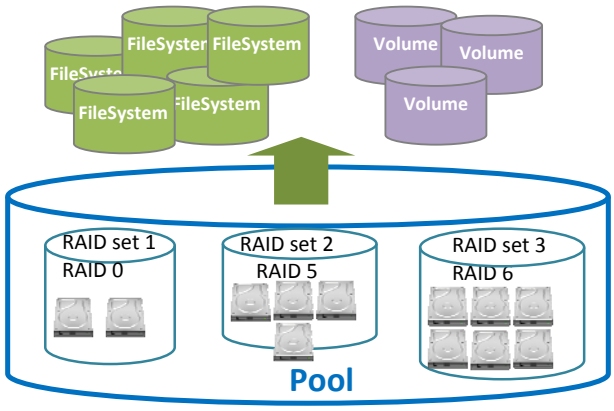
The options are available in this tab:

- **Create:** Create a pool.
- **Import encrypt key:** Import encrypt key file for security. (*This option is only visible when it supports pool encrypt.*)

The options are available in the Modify column:

- **Edit:** Edit the pool settings.
- **Expand:** Add more RAID sets to the same pool to expand the capacity.
- **Scrub:** Perform pool scrubbing manually to make sure there is no defect in the hard drive.
- **Export encrypt key:** Export encrypt key file. (*This icon is only visible when it supports pool encrypt and is enabled.*)
- **Delete:** Delete the pool. The pool can be deleted when there is no file system or volume in it except UserHome directory.

A storage pool can be made of up to 512 RAID sets, which can use different RAID levels. File systems for file sharing and volumes for iSCSI LUNs are created from the storage pool. Please check the following graph.

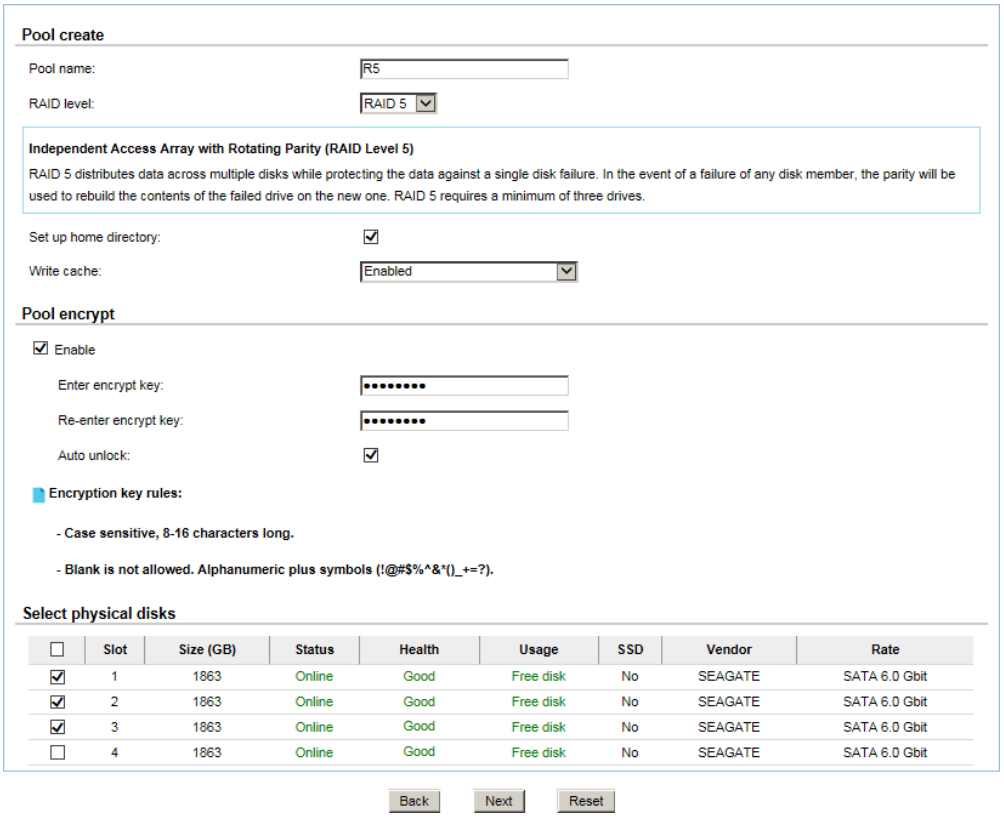


Take an example of creating a pool**.**

1. Click the **Create** button.
2. Enter a **Pool Name**.
3. Use the drop-down list to select a **RAID level**.
4. Check the **Set up Home Directory** if the pool contains home directory.
5. Optionally, configure the following:

- **Write Cache:** It's to enable or disable the write cache option of hard drives.

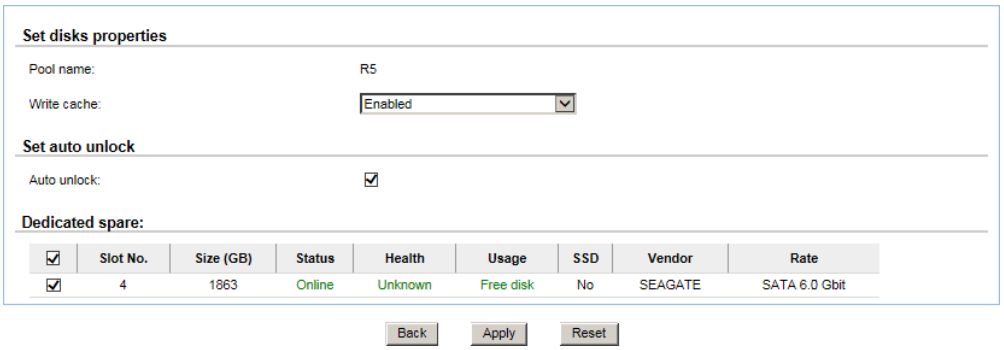
6. Check Enable for **Pool encrypt** and enter the encrypt key if necessary. Check **Auto unlock** will unlock the pool when next reboot. Otherwise, it cannot be used except entering the encrypt key on every reboot.
7. Select disks from below, and then click **Next** button.



8. At the confirmation message, click **Apply** button.

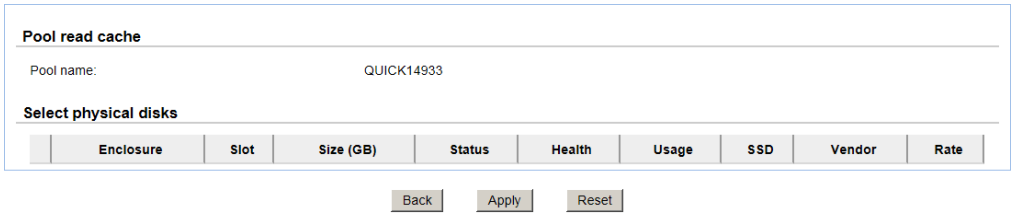
Take an example of set the disk properties and dedicated spare disk.

1. Dedicated spare disk is applied to specific storage pool. Make sure you have free hard drives for this. Click **Edit** icon in Modify field.
2. Enable or disable the properties of write cache.
3. Select the free disk to use as dedicated spare disk for this pool.
4. Click **Apply** button.

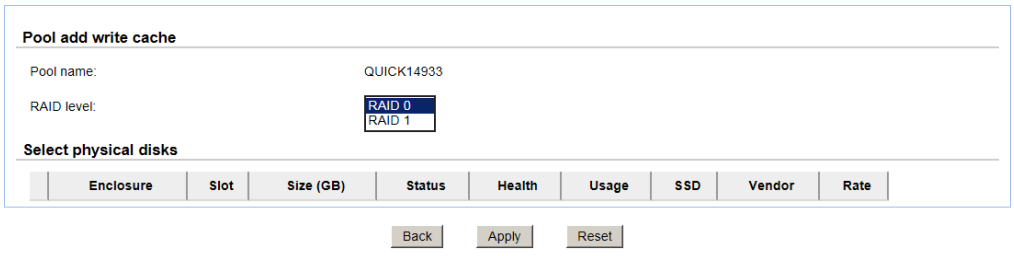


Take an example of set **Read cache** and **Write cache**.

1. Make sure you have added proper SSD drives to the system.
2. Click **Edit** icon in Modify field and **Read Cache / Write Cache** tab. Select the SSD drive(s) you want to use for read cache or write cache. Only qualified SSD drives will be listed for user selection. Others will be filtered out.
3. Click **Apply** button.



4. Repeat step 1~3 to set the write cache. The write cache can be set as RAID 0 or RAID 1.



TIP:
Only SSD drives can be used as SSD cache, which includes read cache (L2ARC) and write cache (ZIL, ZFS Intent Log).

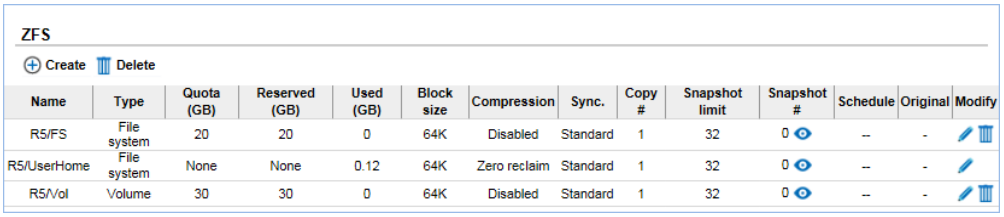
TIP:
All the file systems and volumes created inside the pool can benefit from the addition of SSD cache.

Take an example of expand the pool**.**

1. Make sure you have free hard drives for this. Click **Expand** icon in Modify field.
2. Pool name can't be changed since this is to expand the current pool, not creating a new pool. Select the RAID level and physical disks, and the click **Next** button.
3. At the confirmation message, click **Apply** button.
4. You may see that the capacity of Pool becomes larger. In the RAID set slot column, it shows the RAID set members of the pool.

ZFS

The **ZFS** option provides functions to manage ZFS datasets such as create, edit, delete, take snapshot, auto snapshot or view the status of the ZFS.



This table shows the column descriptions.

Column Name	Description
Name	The name of the file system or volume.
Type	File system or volume.
Quota (GB)	The Quota of the file system or volume.
Reserved (GB)	Reserved capacity of the file system or volume.
Used (GB)	Used capacity of the file system or volume.
Block size	The block size of ZFS.
Dedup (This option is only visible when it supports deduplication.)	The status of the deduplication.
Compression	The status of the compression.
Sync.	The status of the sync.
Copy #	The number of the copies. (More explanation in Tip.)
Snapshot limit	The number of the maximum snapshots.
Snapshot #	The number of the snapshots
Schedule	The status of the schedule.
Original	The original file system or volume of the clone.

The options are available in this tab:

- **Create:** Create a file system or a volume.

- **Delete:** Delete the selected file systems or volumes.

The option is available in the Snapshot # column:

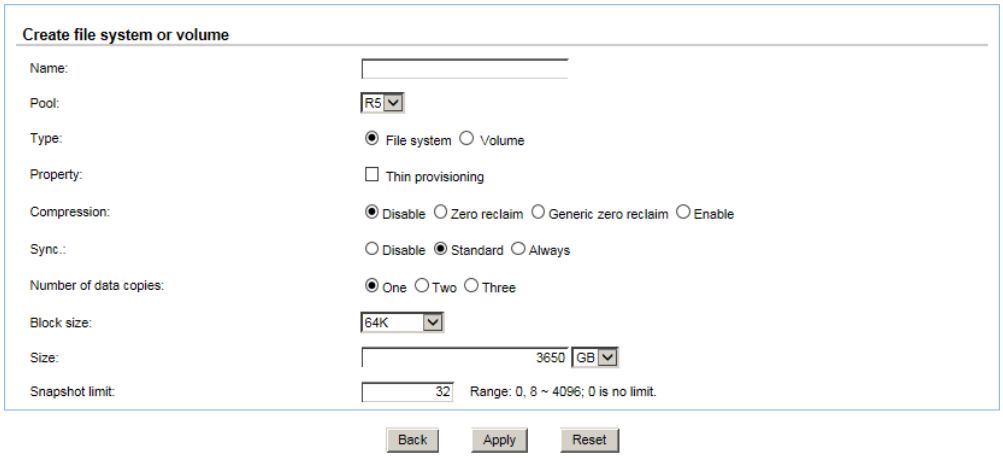
- **View snapshot:** list all the snapshots in the ZFS.

The options are available in the Modify column:

- **Edit:** Edit the ZFS settings.
- **Delete:** Delete the ZFS file system or volume.

Take an example of creating a file system or a volume.

1. Click the **Create** button.



2. Enter a **Name** for the file system or volume.
3. Use the drop-down list to select a **Pool**.
4. Select **Type**, **Property**, **Compression type**, **Sync**, and **Number of data copies**.
5. Use the drop-down list to select a **Block size**.
6. Enter the **Size** for the file system or volume.
7. Enter a **Snapshot limit** for snapshot usage.
8. Click **Apply** button.

TIP:
"Type" has two options – "File system" and "Volume".

- **File system:** File level access and folder sharing. To use with data services such as CIFS, NFS, AFP, FTP, and WebDAV.
- **Volume:** Block level access. To use with iSCSI target function.

TIP:
"Compression" options:

- **Disabled:** No compression at all. Default value.
- **Zero Reclaim:** When the data block contains all zeros, no physical space will be consumed. The block will be marked specifically.
- **Generic Zero Reclaim:** This is JetStor patent filing technology that will reclaim data blocks with special patterns such as all 0's, all 1's. Theoretically, it will have better storage efficiency.
- **Enabled:** This will always enable lossless data compression function using LZJB algorithm.

TIP:
"Sync" means synchronous I/O, which is similar to the definition of write-through. Synchronous I/O is that every file system transaction is written and flushed to stable storage devices by a system call return. The application needs to wait for the physical data update completion before it could issue another command. Latency will be longer and performance will suffer.

If you don't know how to use this setting, please leave it as default.

- **Disabled:** All write commands become asynchronous. It will ignore the synchronous transaction demands of applications such as database or NFS.
- **Standard:** The default value. It depends on the applications.
- **Always:** All write commands become synchronous even if the application issues asynchronous transactions.

The "Sync" option will be grey out if "volume" is selected instead of file system. This is because synchronous write function is not supported in iSCSI block access for the time being.

TIP:
"Number of data copies" in Create File System or Volume UI is used to create mirroring of data to avoid data corruption. When the original file corrupts, the system will use the extra "copy" to recover the corrupt file.

The value of two means that when you copy a 10MB file, it will take up 20MB space. The value of three means that it will take up extra double space to store the same data in the same storage pool.

Users will not be able to see the actual extra copies. They are controlled by the file system.

Thin provisioning

The following are the thin provision features:

- Dynamic allocating space to store user data.
- Applied to both file system and volume.
- Remove stranded or reserved-but-unused capacity. Improve storage efficiency.

How to use thin provisioning?

1. Create a file system with thin provisioning turned ON. The **Size** option will be grey out. Because the upper size limit is the available size of the storage pool, there is no quota size or reserved size.
2. Check the network drive property. The size is the remaining pool size. So it's dynamic.
3. Copy some files to the share. There is no pre-allocated space (reserved size). The used size reflects just the exact amount of the files being copied.

Deduplication

The following are the deduplication features:

- Inline, block level redundancy remover.
- Applied to both file system and volume.
- Dedup function can be turned ON and OFF on the fly during I/O.
- Deduplication size limit: dedup performance is highly dependent on the size of memory. When the size limit has reached, deduplication function on all storage pools will be disabled automatically and grey out.

Memory size	Deduplication size limit
4GB	87GB
8GB	137GB
16GB	371GB

TIP:
Starting from FW 1.0.3, there will be deduplication size limit imposed on enabling deduplication to avoid performance degradation.

- Deduplication size limit can be removed by the following means:
  - **Per pool basis:** Add read cache (L2ARC) using SSD drives.
  - **Per system basis:** Add more memory to the system or delete deduplicated data to release space.

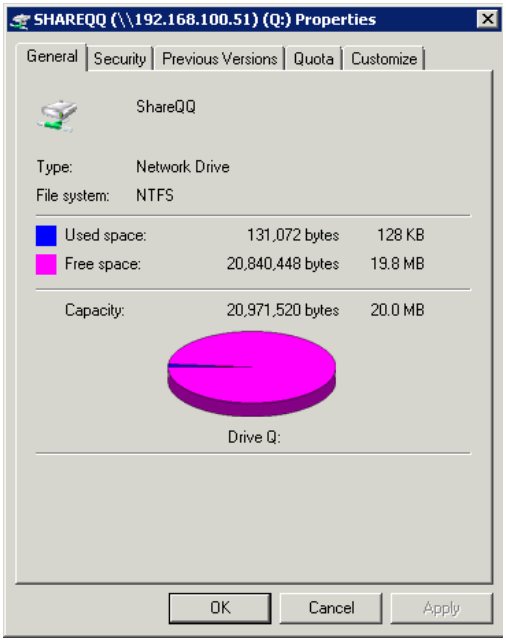
Compression

The following are the compression features:

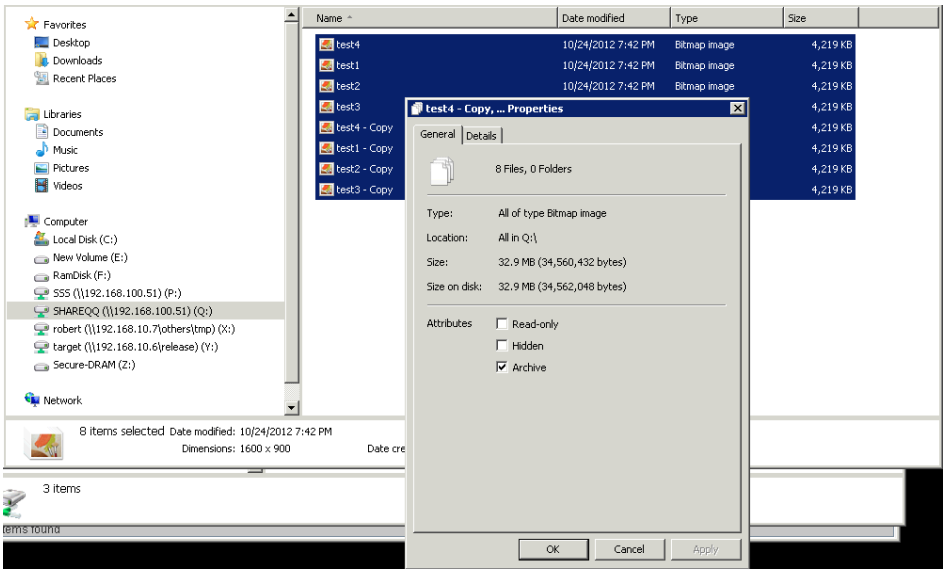
- Compression algorithm adopts LZJB.
- Applied to both file system and volume.
- Compression can be turned ON and OFF on the fly during I/O.

How to use compression with shares?

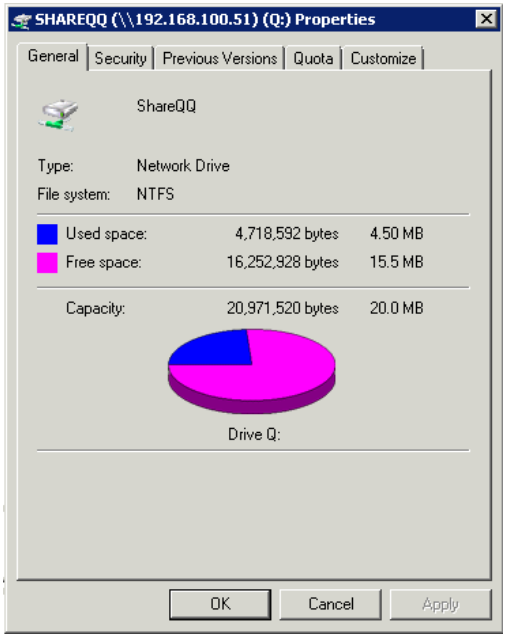
1. For example, create a file system of 20MB with compression turned ON.
2. Map the share in Windows as a network drive. And check the drive property.



3. Copy several bitmap files that are over the size of 20MB.



4. Check the network drive property again. The actual space taken is less than 20MB, which means **Compression** is functioning.

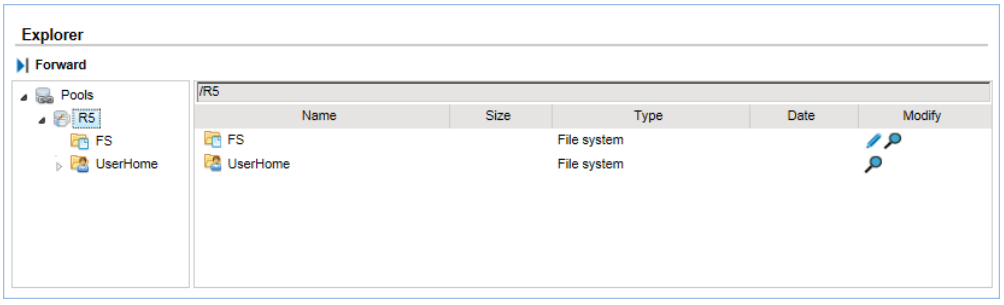


Share

The **Share** option provides to manage the permission of the file system and view the status of each file system. There are **Explorer** and **Share** tabs.

Explorer

The **Explorer** tab provides a simple file explorer to create, edit, search, and delete the folders of the file systems. It also browses the whole storage pool structure.



The options are available in this tab:

- **Forward:** Forward to the previous folder.
- **Create folder:** Create a folder on the file system.

The options are available in the Modify column:

- **Edit:** Edit the share permission of the folder.
- **Search:** Search the user-specified file in the pool. If it is found, the path will be displayed. So user can locate the file more easily.

Take an example of editing the folder for CIFS, NFS, AFP and FTP.

1. Click the **Edit** icon of the folder.
2. Click the check box to share the folder by **CIFS, NFS, AFP, FTP** protocols.
3. If select CIFS protocol, it can enable ACL (Access Control List) support and anonymous access.
4. If select NFS protocol, it has to set the **NFS access control rules**. Use **Add** button to add the rules and **Delete** button to delete them.

TIP:

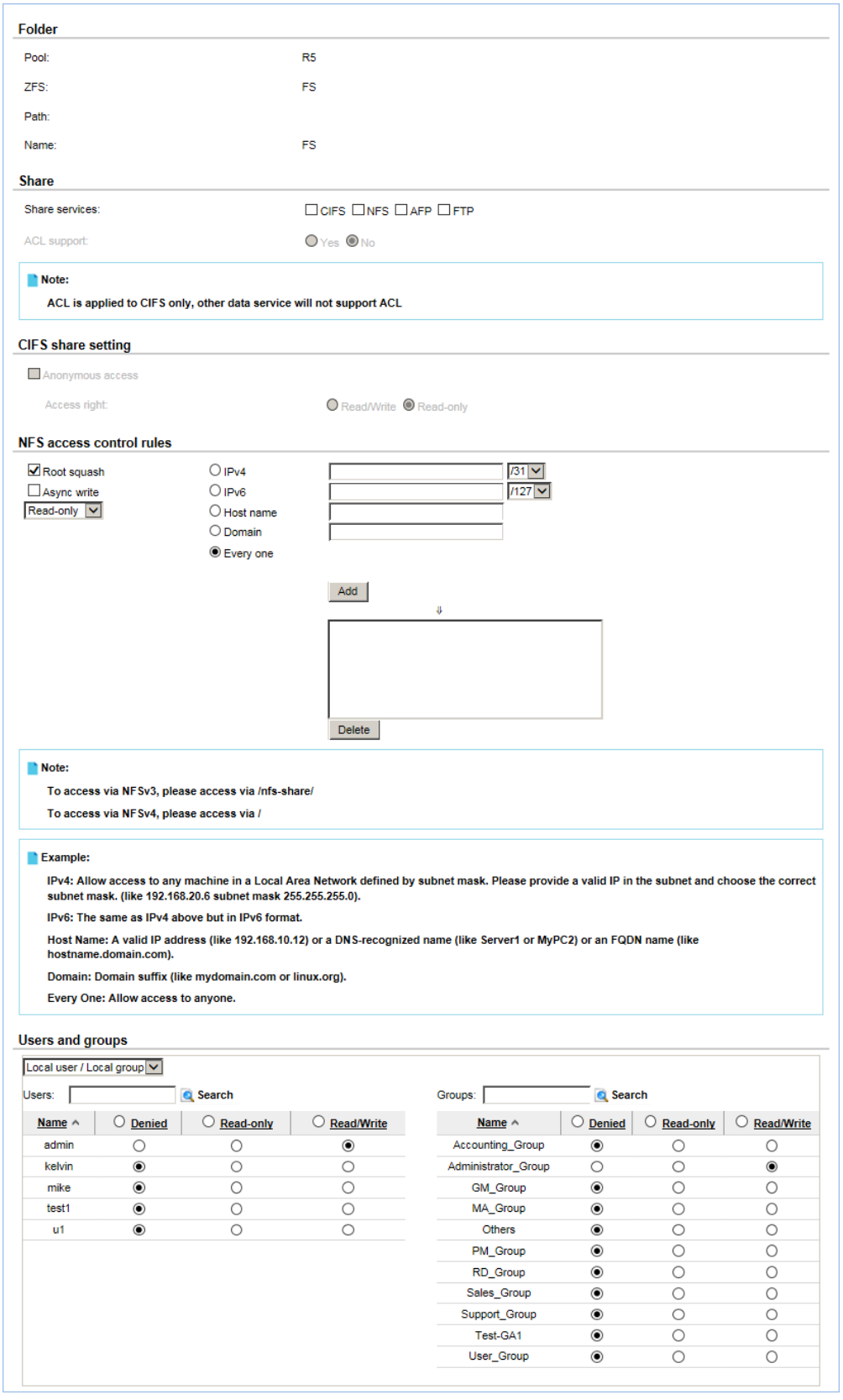
NFS access control rules:

- **Root squash:** Uncheck this to use no_root_squash setting.
- **Async write:** Check this to use asynchronous write function. The performance will be better than synchronous write.
- **Read only and Read/Write:** Set the read/write permission.
- **IPv4:** Allow a group of computers that are in a certain IP range to access the share.
  - The number (1~31) in the drop down list represent the network mask value. It stands for the total number of binary "1" in the network mask. For example, a network mask of 255.255.0.0 in binary form will become 11111111.11111111.0.0. So number 16 will stand for a network mask of 255.255.0.0.
  - Simply provide a valid IP address within your destination range.
- **IPv6:** Same meaning as IPv4 above. Instead it accepts IPv6 address only.
- **Hostname:** Use this option to specify a specific computer for access. There are 3 forms allowed. Putting in an invalid form or value will cause IO error or inability to access the share. Please be careful.
  - A valid IP address
  - A DNS recognized name : the system name or machine name
  - FQDN name : Fully Qualified Domain Name
- **Domain:** Use this option if you want to allow all the computers in a certain network domain to have access to the share.
- **Everyone:** Allow access to computers from all kinds of IP addresses.

CAUTION:

Please be aware that users will have only read permission to their own home directory shares using NFS service. This is due to security purpose and the nature of NFS protocol. This is to avoid that a user uses a matching UID to access someone else home directory.

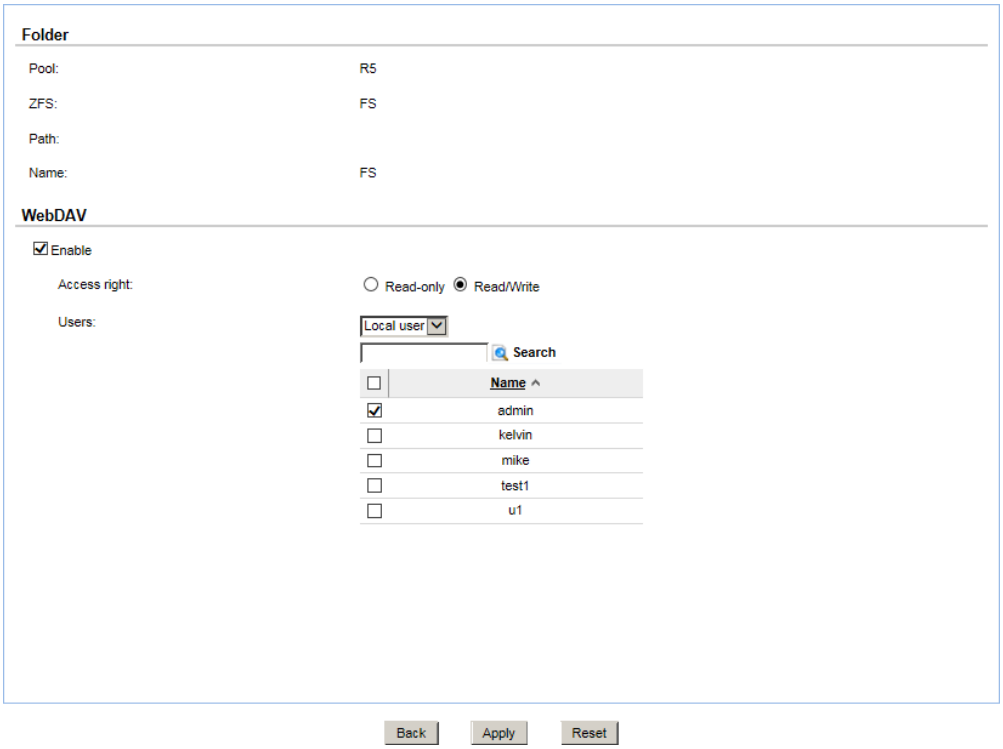
5. Select the permission of the **Users and groups**. And check the radio box for **Denied**, **Read-only** or **Read/Write**.
6. Click **Apply** button.



CAUTION:
Be careful of the rules you put in. Users need to have basic knowledge about how to set up NFS exports parameters. The system will not do validation check for you. It's up to user's discretion to provide the correct rules.

Take an example of editing the folder for WebDAV.

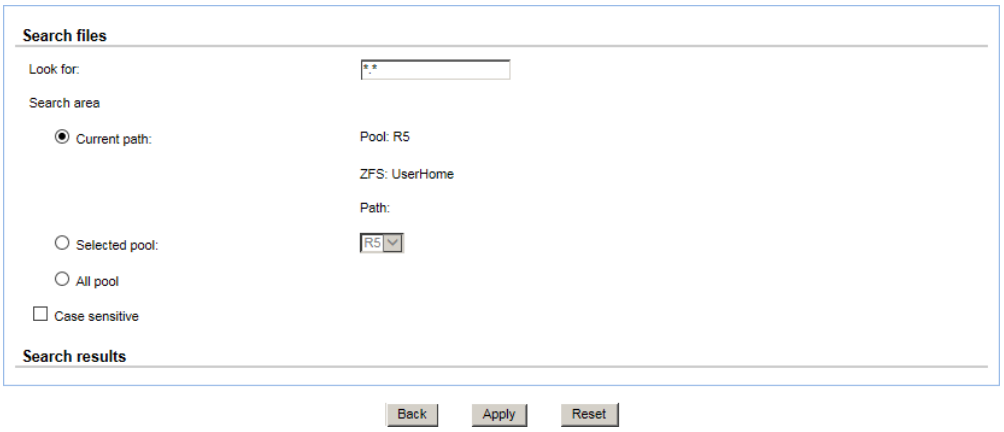
1. Click the **Edit** icon of the folder.
2. Click **WebDAV** tab.



3. Click the check box to share the folder by **WebDAV** protocol.
4. Select the permission of the **Users and groups**. Check the radio box of **Access right** for **Read-only** or **Read/Write**. And then select the users.
5. Click **Apply** button.

Take an example of searching the files.

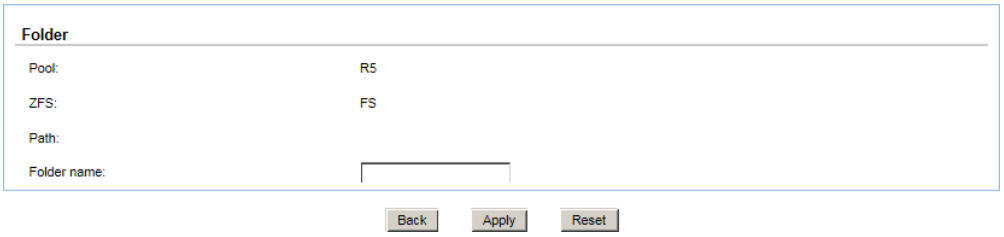
1. Click the **Search** icon.



2. Enter a file name which wants to be searched. It can use wildcard “*”.
3. Click **Apply** button.
4. The results will be displayed in the **Search results** area.

Take an example of creating a folder.

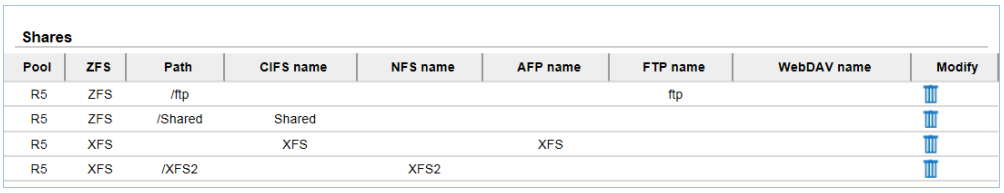
1. In a file system, click the **Create folder** button.



2. Enter a folder name.
3. Click **Apply** button.

Share

The **Share** tab of the operation area provides to remove the share or view the status of the shares.



This table shows the column descriptions.

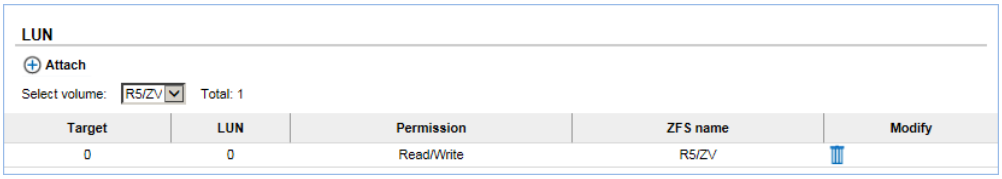
Column Name	Description
Path	Share directory.
Pool	Pool name.
ZFS	ZFS name.
CIFS name	Share name for CIFS.
NFS name	Share name for NFS.
AFP name	Share name for AFP.
FTP name	Share name for FTP.
WebDAV name	Share name for WebDAV.

The option is available in the Modify column:

- **Delete:** Delete the share.

LUN

The **LUN** option provides functions to manage iSCSI volumes such as attach, detach or view the status of logical unit numbers for each volume.



This table shows the column descriptions.

Column Name	Description
Target	The number of the target.
LUN	The number of the LUN assigned.
Permission	The permission level: • Read/Write. • Read-only.
ZFS name	The name of the volume assigned to this LUN.

The option is available in this tab:

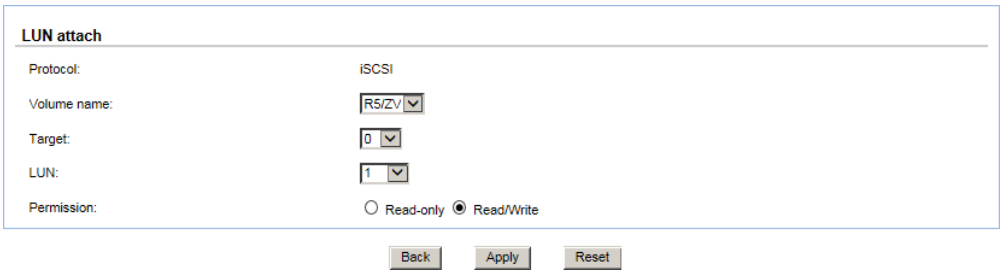
- **Attach:** Attach a logical unit number from a volume.

The option is available in the Modify column:

- **LUN Detach:** Detach a logical unit number from a volume.

Take an example of attaching a LUN.

1. Click the **Attach** button.

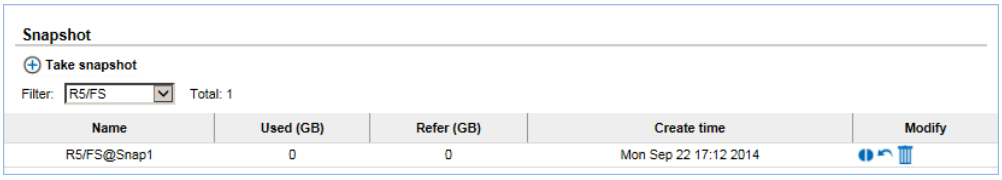


2. Select the volume from the drop-down list.
3. Select the Target number from the drop-down list.
4. Select the LUN number from the drop-down list.
5. Choose the Permission level.
6. Click **Apply** button.

Snapshot

The **Snapshot** option provides functions to manage snapshot activities such as take snapshot, rollback, clone, delete, or view the status of the snapshots.

Snapshot can only be applied to the whole file system or volume. Snapshot cannot be applied to specific shared folders.



This table shows the column descriptions.

Column Name	Description
Name	The snapshot name.
Used (MB)	The amount of snapshot space that has been used.
Refer (GB)	The refer capacity of the file system or volume.
Created time	The time the snapshot is created.

The option is available in this tab:

- **Take Snapshot:** Take a snapshot.

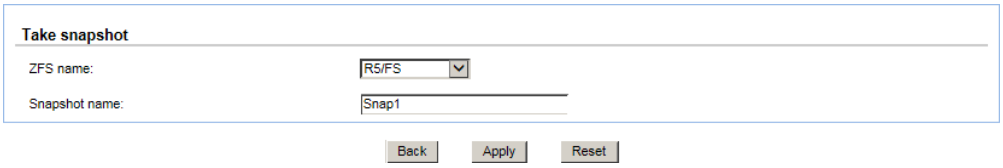
The options are available in the Modify column:

- **Clone:** Clone the file system or volume.
- **Rollback:** Rollback the snapshot file system or volume.

- **Delete:** Delete the snapshot file system or volume.

Take an example of taking a snapshot.

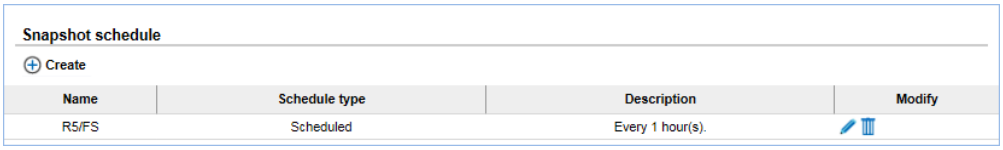
1. Click the **Take snapshot** button.



2. Use the drop-down list to select a **ZFS name**.
3. Enter a **Snapshot name** for the snapshot.
4. Click **Apply** button.

Snapshot Schedule

The **Snapshot schedule** tab provides the functions to set schedule snapshots.



This table shows the column descriptions.

Column Name	Description
Name	The snapshot name.
Schedule type	Disabled or Scheduled.
Description	Schedule details.

The option is available in this tab:

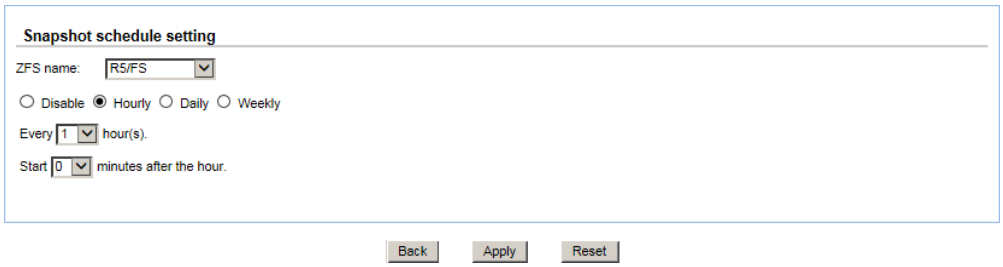
- **Create:** Set the snapshot schedule on a file system or a volume.

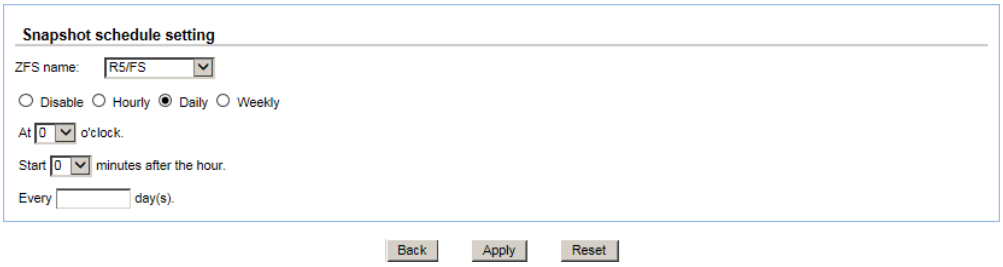
The options are available in the Modify column:

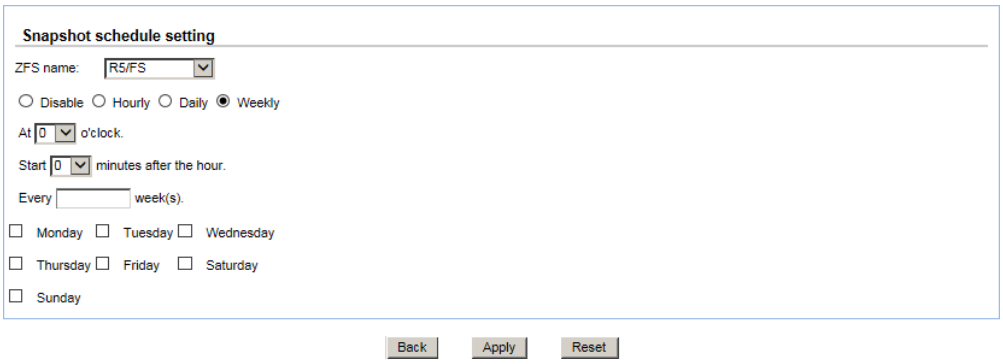
- **Edit:** Modify the schedule settings.
- **Delete:** Delete the schedule snapshot.

Take an example of setting a schedule snapshot.

1. Click the **Create** button.







2. Select the ZFS name.
3. Select the radio box for Hourly, Daily or Weekly. According to the different schedule type, input the proper parameters.

Service Configuration

The **Service configuration** menu option is for accessing the **Directory service**, **CIFS**, **NFS**, **AFP**, **FTP, WebDAV, iSCSI, Rsync, Backup** and **AntiVirus** options.

Directory Services

The **Directory services** option provides three directory services. Default is **Standalone**, which supports local account only. The others are **Active Directory** service for Microsoft Windows domain networks and **LDAP** (Lightweight Directory Access Protocol) services.

JetStor **UnifiedAUTH** mechanism is the backbone of all the directory services. It simplifies the use of all the data services (CIFS, NFS, AFP, FTP, WebDAV, iSCSI) and frees the users from memorizing different account/password sets for different data services. The benefits are:

- Easier use of all data services
- Simplified management

Only one directory service can be enabled at all time. No two directory services can be enabled at the same time. Switching directory service will result in losing Access Control List of all shares from the previous directory service.

Select a radio button to change the directory service:

- **Standalone**

  Standalone support local user/group accounts only. It's the default setting.

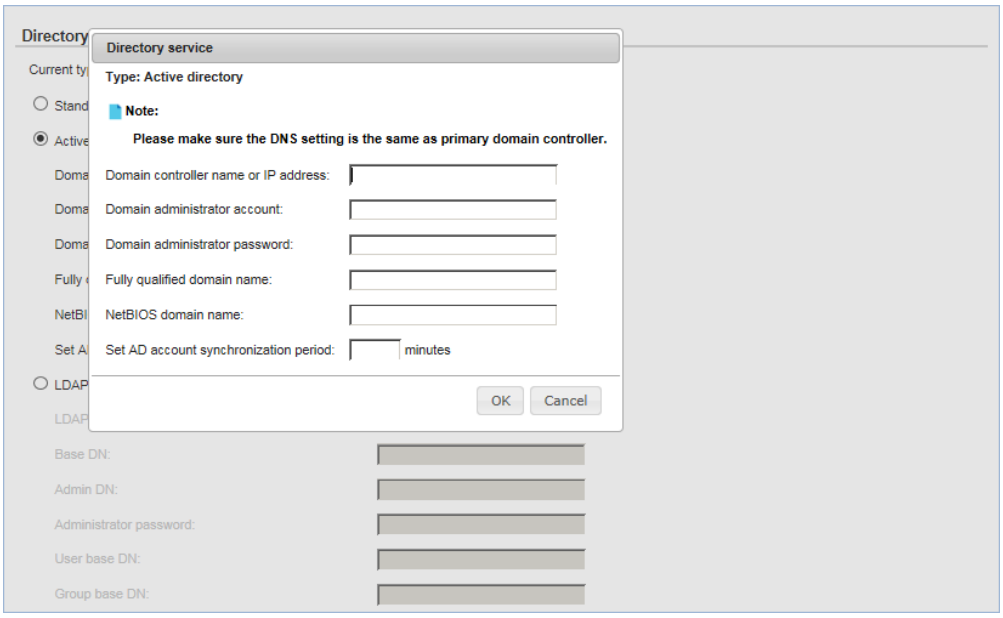
  When it is done, click **Apply** button.

- **Active Directory**

  Active Directory service supports Windows Server 2003 and 2008 Active Directory to manage the accounts. The maximum number of AD users and groups is 65536.

  Enter the settings of Active Directory above. When it is done, click **Apply** button. If the information is correct, the AD accounts will be added in **System configuration -> Account -> User account -> Domain user** and **Group account -> Domain group**. It will take some time to download the accounts at the first time. And then it will synchronize with the server automatically. Or you may set the duration in minutes for how often 724UX should synchronize with the AD server.

TIP:
In order to make sure you can successfully login Active Directory server, please make sure the following two requirements are met.
Primary DNS (Domain Name Server) setting is identical to that of the Active Directory server.
The system time is synchronous with that of the Active Directory server with less than 1 minute tolerance.



- **LDAP**

  LDAP (Light-weighted Directory Access Protocol) service supports LDAP version3 to manage the accounts. The maximum number of LDAP users and groups is 65536.

  Enter the settings of LDAP above. When it is done, click **Apply** button. If the information are correct, the accounts will be added to **System configuration -> Account -> User account -> Domain user** and **Group account -> Domain group**.

  Base DN: The base distinguished name (DN) indicates where in the LDAP directory you wish to load users and groups. It is the top level of the LDAP directory tree to be used when searching for resources. Suppose that all user accounts and groups are located in the "Users" folder under your domain. In LDAP form, it is **cn=Users,dc=<your domain>**. Let's say your domain is **aaa.bbb.com.** The Base DN you should put in is **cn=Users,dc=aaa,dc=bbb,dc=com**.

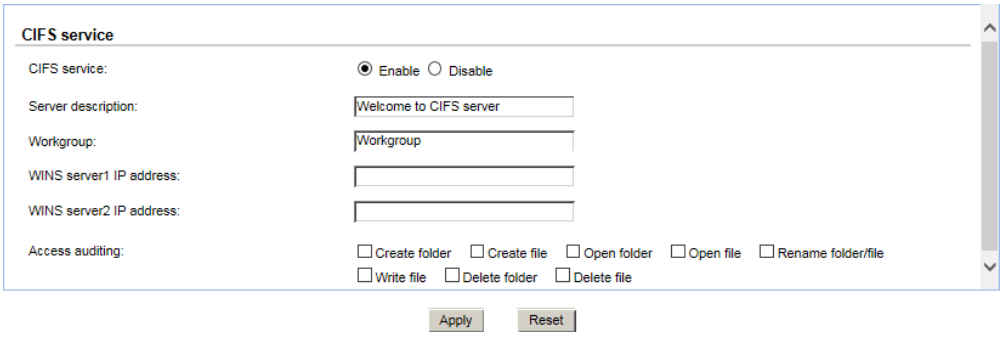
  Admin DN: By default, the administrator DN is in the form **cn=Administrator,dc=<your domain>**. Using previous example, The Admin DN should be put in is **cn=Administrator,dc=aaa, dc=bbb,dc=com**.

TIP:
Please contact your LDAP server administrator for the correct login parameters for Base DN, Admin DN, User base DN, and Group base DN.

CIFS Service

The **CIFS** (Common Internet File System) option is used to setup CIFS protocol. The CIFS is a network protocol that offers file services for Windows computers. JetStor unified storage provides CIFS capability without the need for a Windows server in the network. Starting this service will open the following ports on the JetStor unified storage system:

- TCP 139 (smbd)
- TCP 445 (smbd)
- UDP 137 (nmbd)
- UDP 138 (nmbd)



This table shows the row descriptions.

Row Name	Description
CIFS Service	Enable or Disable.
Server description	Default is “Welcome to CIFS server”. Maximum length is 256 characters.
Workgroup	Default is “Workgroup”. Maximum length is 16 characters.
WINS server1 IP address	WINS Server IP Address. Default is empty. If it’s empty, the name resolution priority is DNS only. Otherwise, the name resolution priority is WINS server first, and then DNS.
WINS server2 IP address	The same as above.
Access auditing	If necessary, check the boxes to log the user behaviors. They can be monitored in “/ Monitor / Event log / Service log” page.

When it is done, click **Apply** button.

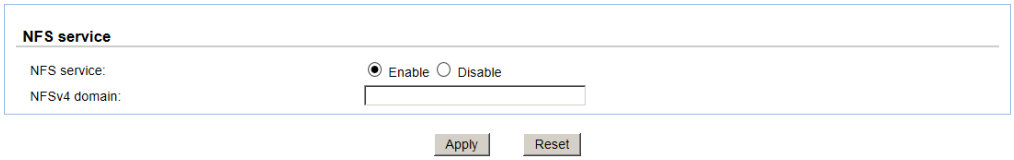
CAUTION:
Enabling access auditing may reduce the performance.

NFS Service

The **NFS** (Network File System) option is used to setup NFS protocol. NFS is a protocol for sharing files and directories on a network among Linux machines and Unix machines.

Starting this service will open the following ports on the JetStor unified storage system:

- TCP 111 (rpcbind)
- TCP 2049 (nfsd)
- UDP 111 (rpcbind)
- Additionally, mountd and rpcbind will each bind to a randomly available UDP port.



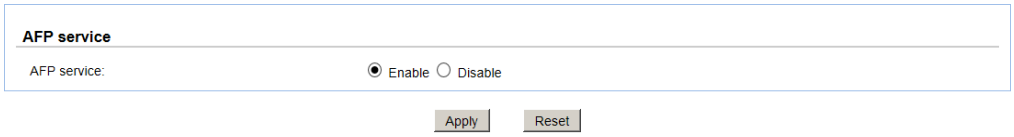
If you are using NFSv4 protocol, please make sure NFSv4 domain is provided in order to have ID mapping function working correctly. When it is done, click **Apply** button.

AFP Service

The **AFP** (Apple Filing Protocol) option is used to setup AFP protocol. The AFP is a network protocol that offers file sharing services for Mac computers.

Starting this service will open the following ports on the JetStor unified storage system:

- TCP 548 (afpd)
- TCP 4799 (cnid_metadata)
- UDP 5353 and a random UDP port (avail).

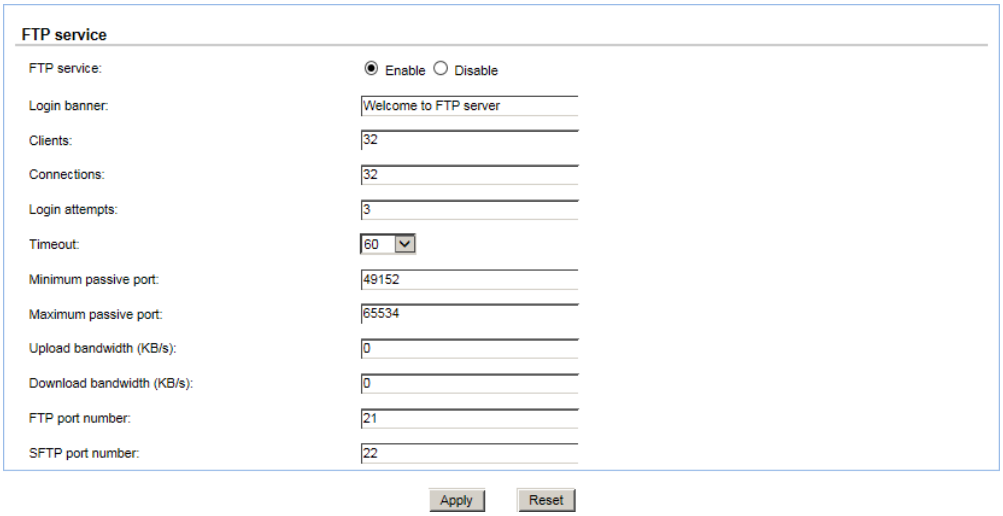


Enable or Disable the AFP protocol, and then click **Apply** button.

FTP Service

The **FTP** (File Transfer Protocol) option is used to setup FTP protocol. It allows you to configure the FTP server so that users can browse and download data using their web browser or FTP client

software. FTP is easy to use and it is cross-platform. All major operating systems have FTP client function.



This table shows the row descriptions.

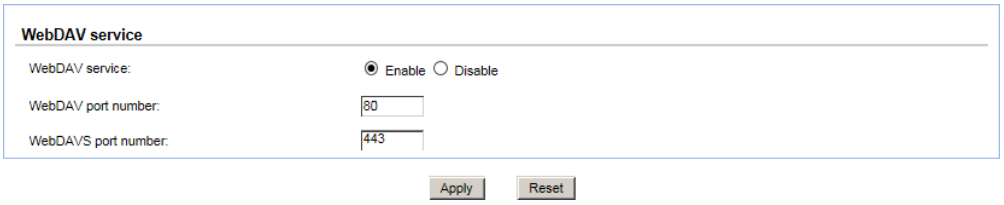
Row Name	Description
FTP service	Enable or Disable.
Login banner	Configurable login banner. Default is “Welcome to FTP server”. Max characters are 256.
Clients	The maximum number of simultaneous clients, default is 20, range is 1 ~ 4096.
Connections	The maximum number of connections per IP address, default is 32, range is 1 ~ 32.
Login attempts	The maximum number of attempts before client is disconnected, default is 3, range is 3 ~ 32.
Timeout	The maximum client idle time in seconds before client is disconnected, default is 60 (sec), valid values are 30, 60, 300, 600, 1800, 3600.
Minimum passive port	The minimum passive port, default is 49152, range is 1024 ~ 65535.
Maximum passive port	The maximum passive port, default is 65534, range is 1024 ~ 65535.
Upload bandwidth(KB/s)	The upload bandwidth, in KB/s, default is 0 (no limit).
Download bandwidth(KB/s)	The download bandwidth, in KB/s, default is 0 (no limit).
FTP port number	The port number of FTP.
SFTP port number	The port number of Secure FTP.

When it is done, click **Apply** button.

WebDAV Service

The **WebDAV** (Web Distributed Authoring and Versioning) option is used to setup WebDAV protocol. It is an extension of HTTP v1.1 protocol that allows users to manage files across different operating system platforms. Starting this service will open the following ports on the JetStor unified storage system:

- TCP 80 (http)
- TCP 443 (https)



This table shows the row descriptions.

Row Name	Description
WebDAV service	Enable or Disable.
WebDAV port number	The port number of WebDAV.
WebDAVS port number	The port number of WebDAVS.

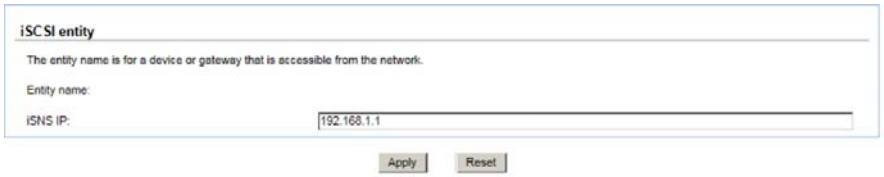
When it is done, click **Apply** button.

iSCSI Service

The **iSCSI** (Internet SCSI) option is used to setup iSCSI entity name for block-based access. iSCSI is a protocol standard that allows the consolidation of storage data. iSCSI allows the system to act like a storage area network (SAN) over an existing Ethernet network. Specifically, it exports disk devices over an Ethernet network that iSCSI clients (called initiators) can attach to and mount.

iSCSI Entity

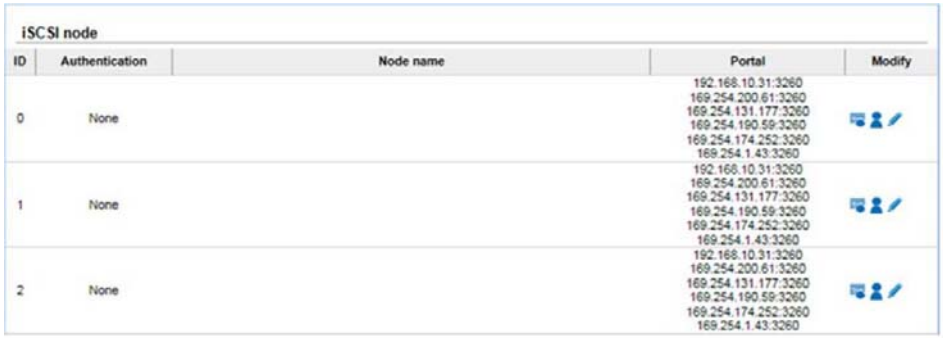
This tab can modify iSNS (Internet Storage Name Service) IP address.



Enter the iSNS IP if necessary, and then click **Apply** button.

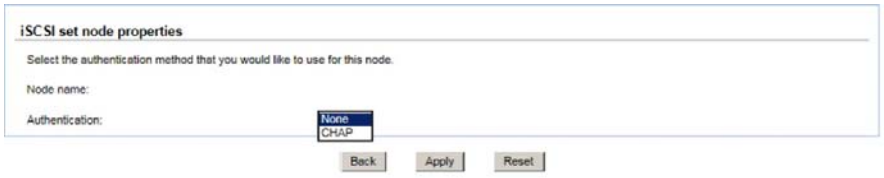
iSCSI Node

This tab can manage iSCSI node.



The options are available in the Modify column:

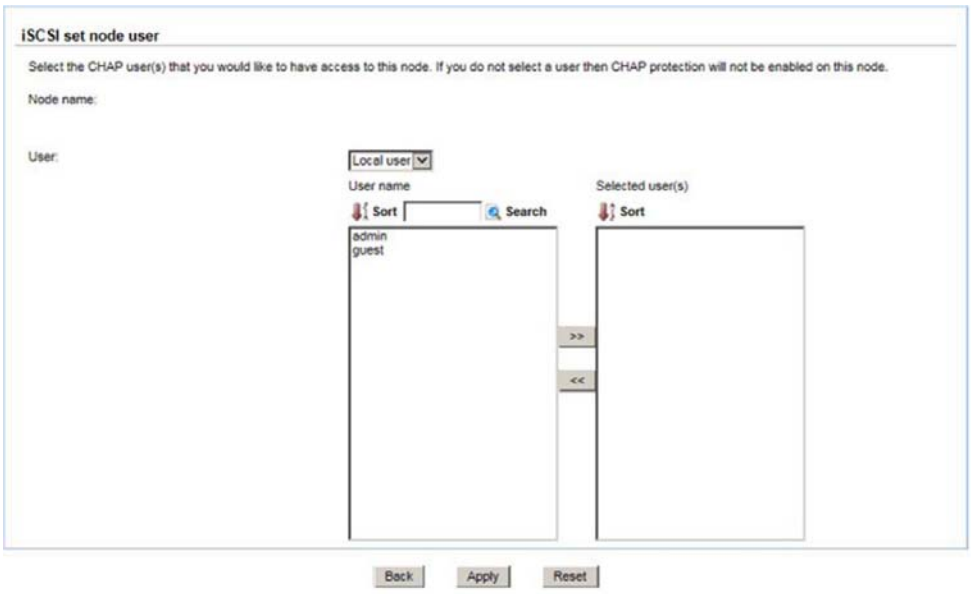
- **Set properties:** Set the authentication method of the iSCSI node.



CHAP (Challenge Handshake Authentication Protocol) is a strong authentication method used in point-to-point for user login. It's a type of authentication in which the authentication server sends the client a key to be used for encrypting the username and password. CHAP enables the username and password to transmit in an encrypted form for protection.

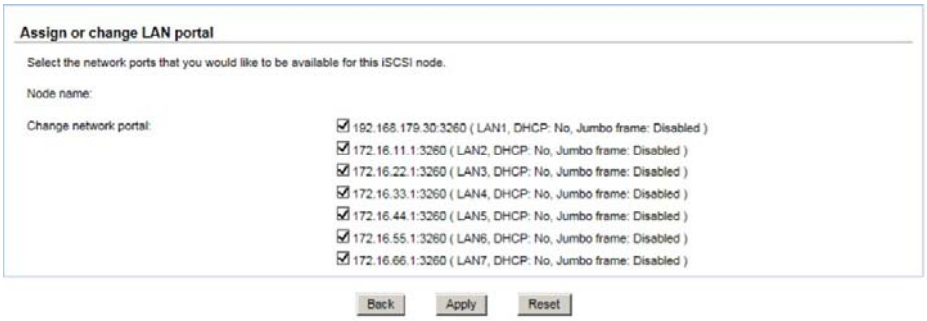
If you want to use CHAP authentication, select **CHAP** from the drop-down list, and then click **Apply** button.

- **Set user:** Set the iSCSI CHAP users.



Select the CHAP user(s) which will be used and click **>>** button. It can be more than one, but it must be at least one for CHAP to work. When it's done, click **Apply** button.

- **Change network portal:** Change the network portal of the iSCSI node.



Check or uncheck the ports to enable or disable the network portals. When it's done, click **Apply** button.

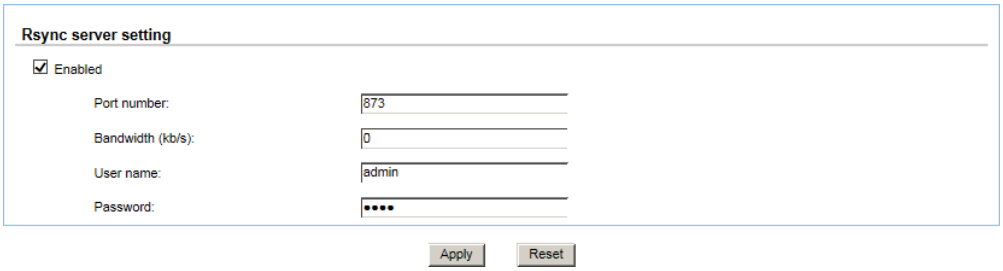
Rsync Service

The **Rsync** option is used to setup rsync server service. It is a file synchronization and file transfer program for Unix-like systems that minimizes network data transfer by using a form of delta encoding called the rsync algorithm. Starting this service will open the following ports on the JetStor unified storage system:

- TCP 873 (rsync)

Rsync Server Setting

This tab can setup rsync server setting.



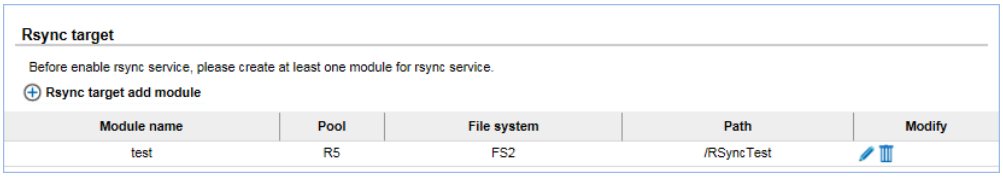
This table shows the row descriptions.

Row Name	Description
Port number	The port number of rsync.
Bandwidth(KB/s)	The bandwidth of rsync service, in KB/s, default is 0 (no limit).
User name	The username of rsync service.
Password	The password of rsync service.

When it is done, click **Apply** button.

Rsync Target

This tab can setup rsync server setting.



This table shows the column descriptions.

Column Name	Description
Module name	The name of the rsync target.
Pool	The name of the pool.
File system	The name of the file system.
Path	The path of the file system.

The option is available in this tab:

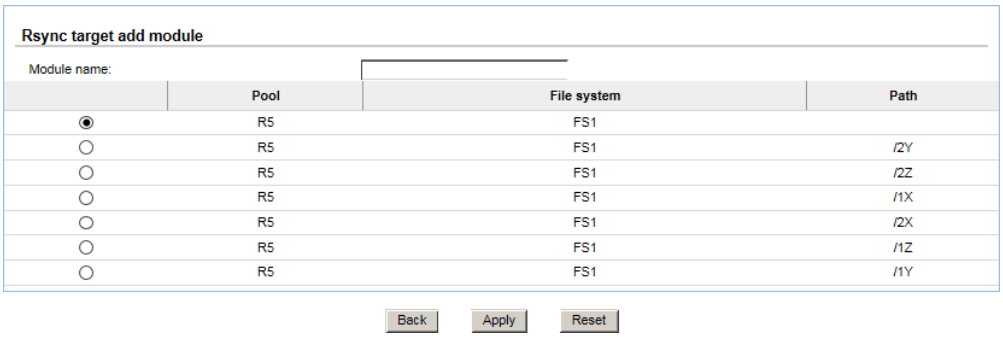
- **Rsync target add module:** Add an rsync target module.

The options are available in the Modify column:

- **Edit:** Edit the target module.
- **Delete:** Delete the target module.

Take an example of adding an rsync target module.

1. Click the **Rsync target add module** button.



2. Enter a **Name** for the rsync target module.
3. Select a file system which the data stores.
4. Click **Apply** button.

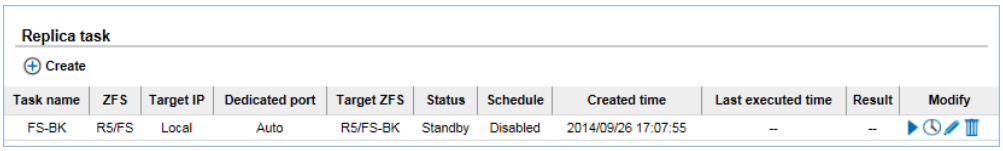
Backup Service

The **Backup** option provides functions to set up the backup services. Currently, it supports Replication, Amazon S3 and Rsync client services.

Both Amazon S3 and replication services are applied to the whole file system or volume, which is the right next level to the storage pool. These services cannot be applied to a specific shared folder, but Rsync service can.

Replication

The **Replication** tab is used to setup the replication service. It support local cloning and remote replication to other JetStor unified storage arrays. There is no limit to the number of how many local cloning and remote replication tasks can be created. If you experience slow system performance, please reduce the replication tasks. It supports one-to-one replication task but not one-to-many. The same replication source cannot coexist in different tasks. The max task number is limited as 16 tasks.



This table shows the column descriptions.

Column Name	Description
Task name	The task name.
ZFS	The source name of the file system or volume.
Target IP	Local or the remote target IP.
Dedicated port	The dedicated port to transmit.
Target ZFS	The target name of the file system or volume.
Status	Standby or Running.
Schedule	Disabled or scheduled.
Created time	The created time of the task.
Last executed time	The last executed time.
Result	The physical disk slots of the RAID set.

The option is available in this tab:

- **Create:** Add a replication task.

The options are available in the Modify column:

- **Start:** Start the task.
- **Stop:** Stop the task.
- **Schedule:** Schedule the task.
- **Delete:** Delete the task.

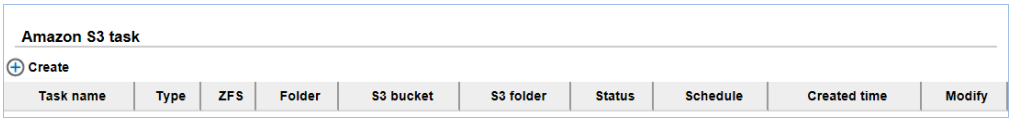
Take an example of adding a task.

1. Click **Create** button.
2. Enter the **Task name**, and select a file system or volume to replicate. Then click **Next** button.
3. Select **Local system** or **Remote system**. Remote replication needs to enter the target IP, username and password. Select a dedicated port to transmit. And then click **Next** button.
4. Select the target pool and enter a name. And then click **Next** button.
5. At the confirmation message, click **Apply** button.

Amazon S3

The **Amazon S3** tab is used to setup the popular cloud backup service provided by Amazon. Before using the service, you must register an Amazon S3 account first at http://aws.amazon.com/s3/.

There is no limit to the number of how many Amazon S3 tasks can be created. If you experience slow system performance, please reduce the Amazon S3 tasks.



This table shows the column descriptions.

Column Name	Description
Task name	The task name.
Type	Upload or download.
ZFS	The source name of the file system.
Folder	The folder name.
S3 bucket	The S3 bucket name.
S3 folder	The S3 folder name.
Status	Standby or Running.
Schedule	Disabled or scheduled.
Created time	The created time of the task.

The option is available in this tab:

- **Create:** Add a backup task to Amazon S3 service.

The options are available in the Modify column:

- **Edit:** Edit the task.
- **Start:** Start the task.
- **Stop:** Stop the task.
- **Schedule:** Schedule the task.
- **Delete:** Delete the task.

Take an example of adding a task.

1. Click **Create** button.
2. Enter the **Task name**, select a **Local path**, and enter the folder.
3. Select a **Backup type**, Upload or Download, enter the **Access key**, **Private Key** and the **Bucket/Folder** for Amazon S3 settings. Check the box when you need to delete extra files in the destination folder.
4. Click **Test connection** button to test the connection if necessary.
5. Click **Apply** button to create a task.

AntiVirus Service

The **AntiVirus** option is for accessing the **AntiVirus service**, **AntiVirus scan filter**, **AntiVirus task**, **AntiVirus update**, and **AntiVirus report** option tabs. It uses McAfee antivirus engine which is an American global computer security software company.

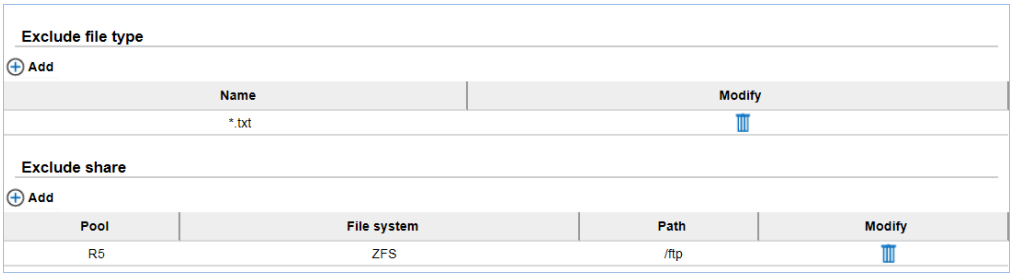
AntiVirus Service

This tab can enable or disable antivirus service.

Check Enable or Disable radio button, and then click **Apply** button.

AntiVirus Scan Filter

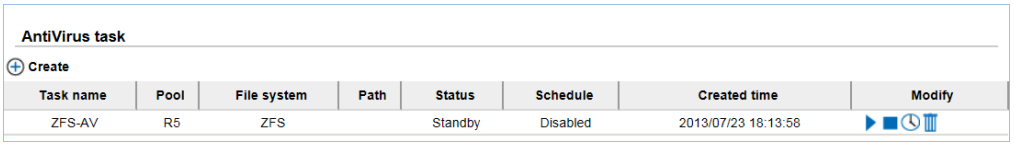
This tab manages what files exclude to be scanned.



Click **Add** button of the **Exclude file type**, add a text for file extension, then click **Add** button. These file extension will be skipped when executing antivirus scanning. So does **Exclude share**.

AntiVirus Task

This tab manages the antivirus tasks.



This table shows the column descriptions.

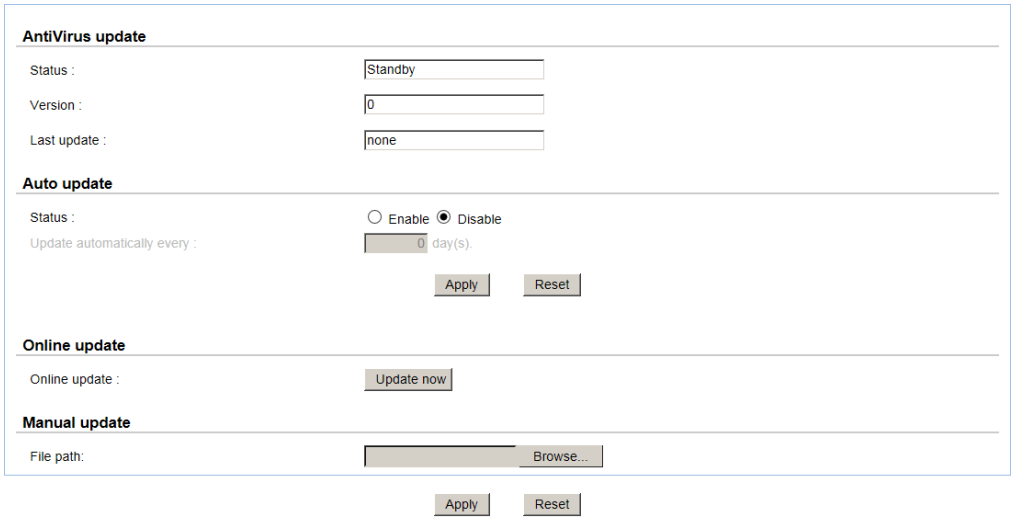
Column Name	Description
Task name	The task name.
Pool	The pool name.
File system	The file system name.
Path	The path of the file system.
Status	Standby or Running.
Schedule	Disabled or scheduled.
Created time	The created time of the task.

The options are available in this tab:

- **Create:** Add an antivirus task.
- **Start:** Start the task.
- **Stop:** Stop the task.
- **Schedule:** Schedule the task.
- **Delete:** Delete the task.

AntiVirus Update

This tab manages the update of virus pattern files.

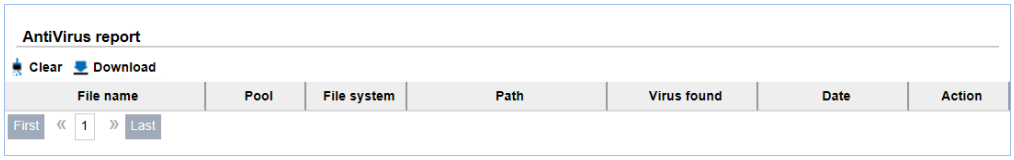


Click **Enable** radio button to enable **Auto update**, enter a number for how many days the update execute automatically. Click **Apply** button to take effect.

Or click **Update Now** button for update immediately. If you get the update file, it also can be updated manually.

AntiVirus Report

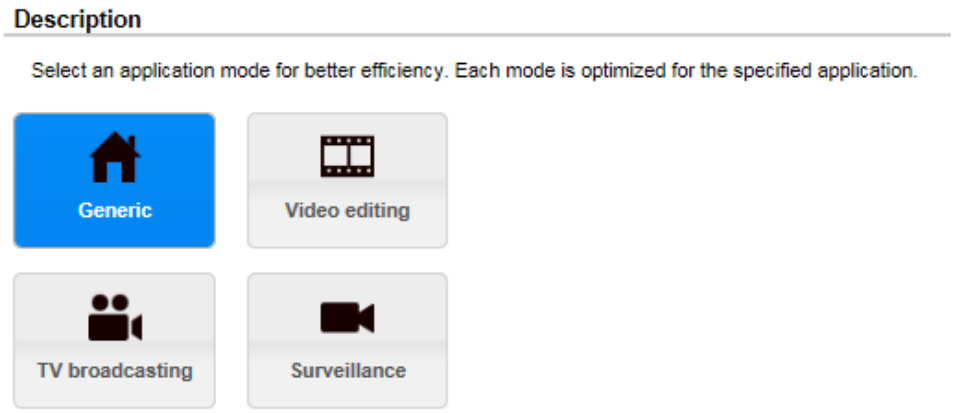
This tab displays the report of the infected files.



Click **Download** button to save the report.

Application

The **Application** menu option is for accessing the **Generic**, **Video editing**, **TV broadcasting**, and **Surveillance** options. Each mode is optimized for the specified application. The default is **Generic** mode.



Maintenance

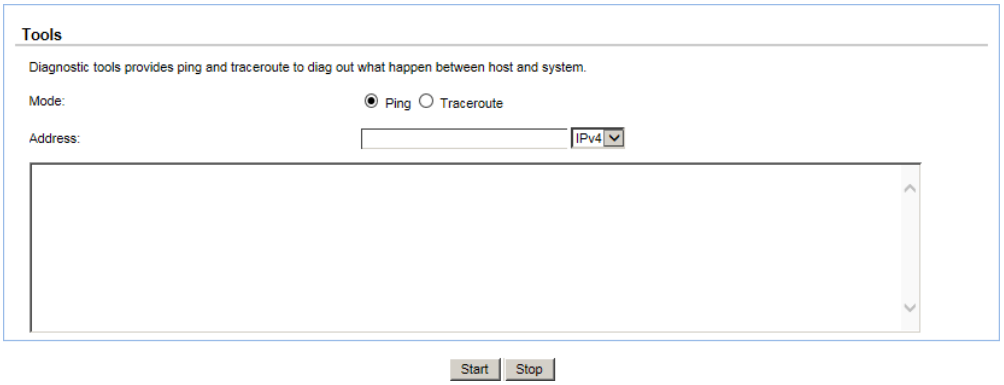
The **Maintenance** menu option is for accessing the **Diagnostic**, **Download**, **Reset to factory default**, **Firmware upgrade**, **Import and export**, **Reboot**, and **Shutdown** options.

Diagnostic

Diagnostic option provides two services. There are **Tools** and **ARP**.

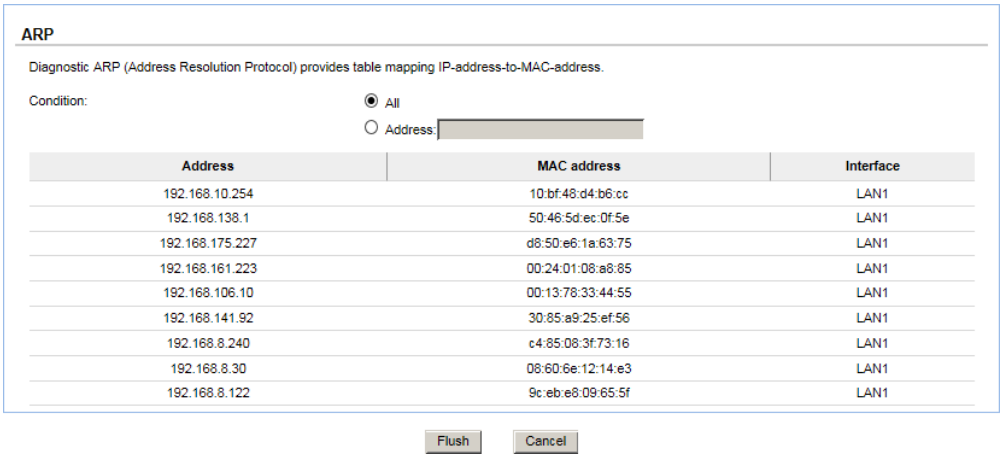
Tools

The **Tools** tab provides to ping and trace route to diag out what happen between the host and the system.



ARP

The **ARP** (Address Resolution Protocol) tab provides table mapping IP address to MAC address.

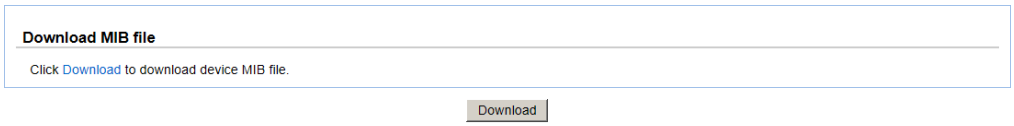


Download

Download option provides two services. There are **Download MIB file** and **Download system information**.

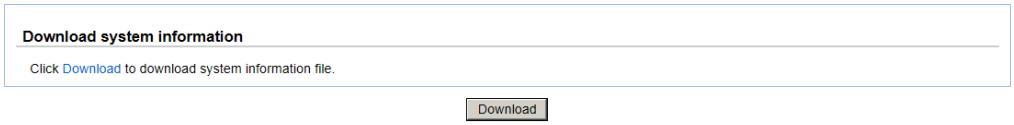
Download MIB File

The **Download MIB file** tab provides to download MIB file for SNMP usage.



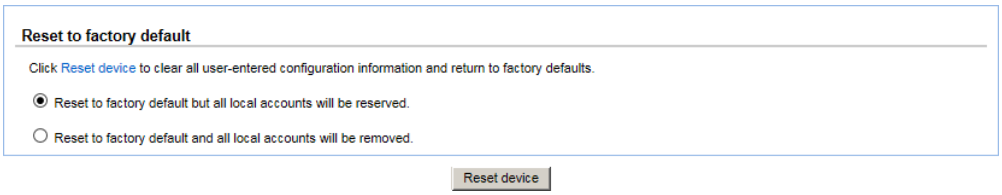
Download System

The **Download system** tab will download a compressed file to your local drive. It contains event logs, debug information, and system configuration data. Please send this compressed file to us when you need technical assistance.



Reset to Factory Default

The **Reset to factory default** option allows users to reset the system configurations back to the factory default settings.



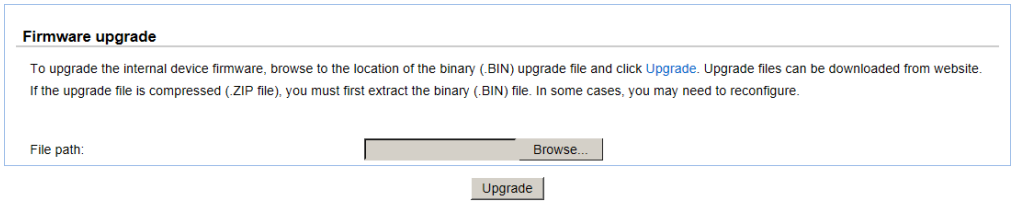
Select the options which all local accounts are reserved or not, and then click **Reset device** button. It will perform the following major tasks

- LAN1 IP Address: 192.168.1.234
- **User Name: admin**
- **Password: 00000000**
- Set default directory service to Standalone.
- Clear all access right settings for shares.
- Clear all snapshot, replication, backup tasks.
- Clear all user/group accounts by option.

Please be aware that “Reset to factory defaults” will not delete the user data in UserHome file system. If you create a local user account with the same name, the system will see it as the same user and use the original user account folder.

Firmware Upgrade

The **Firmware Upgrade** is used to upgrade controller firmware.



Please prepare new controller firmware file named "xxxx.bin" in local hard drive, then click **Browse** to select the file. Click **Upgrade** button to start upgrading the firmware. When upgrading, there is a percentage displayed. After finished upgrading, the system must reboot manually to make the new firmware took effect.

Firmware Upgrade via USB

Starting from FW1.2.0, upgrading firmware using USB flash drive is supported. Below are the instructions of how to use this function and some requirements.

1. Copy the checksum file (md5sum.txt) and firmware file (*.bin or *.flash) to the root of USB drive.
2. In the root of USB drive, create a pure text file named AutoRun.ini with the following content.
   [upgrade]
   upgrade_md5file = md5sum.txt
3. Insert USB drive to the USB port shown below in different models.
4. The system will detect USB drive and the firmware. If the setting is correct, firmware upgrading will start automatically. The web UI does not have a progress meter.
5. If upgrading is successful, the hard drive LED will blink for 10 seconds and the buzzer will be on for 10 seconds. If upgrading fails, the hard drive LED and the buzzer will be on for 2 seconds and off for 2 seconds for 3 times.

Some requirements:

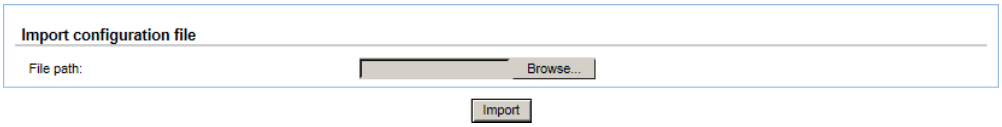
- USB drive file system supports NTFS and FAT32 only.
- Firmware file name cannot be renamed.
- During firmware upgrading, USB drive cannot be plugged out.
- If firmware version is the same, upgrading will not start.

Import and Export

Import and export option provides two services. There are **import** and **Export**.

Import

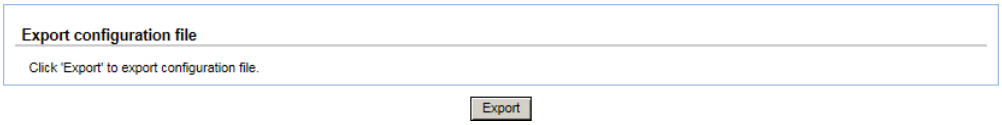
The **Import** tab provides to import the configuration file.



Please prepare configuration file in local hard drive, then click **Browse** to select the file. Click **Import** button.

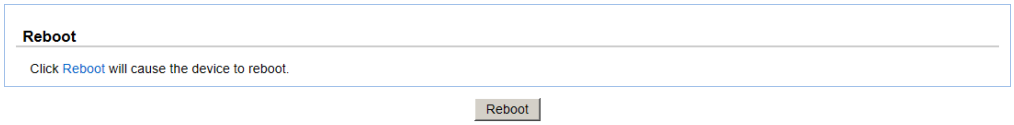
Export

The **Export** tab provides to export the configuration file.



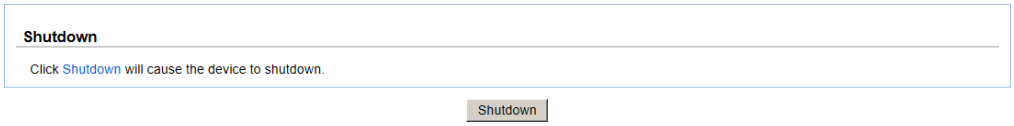
Reboot

The **Reboot** option is used to reboot the system.



Shutdown

The **Shutdown** option is used to shut down the system. Before powering off the system, it is highly recommended to execute **Shutdown** function to flush the data from cache onto the physical disks. The step is important for data protection.



5 Access Shares from Your Operating System

Introduction

There are five data services provided by JetStor Unified Storage. This chapter will show you how to access shares from different operating systems. We will introduce CIFS/Samba, NFS, AFP, FTP, and WebDAV. Before you can access the shares, please make sure that you have enable file sharing services and related settings in Sharing of Chapter 4.

CIFS and Windows

There are several ways to access a network share in Microsoft Windows operating systems. It all follows Windows UNC (Universal Naming Convention) format.

Syntax:

\\<NAS system name>\<share name>

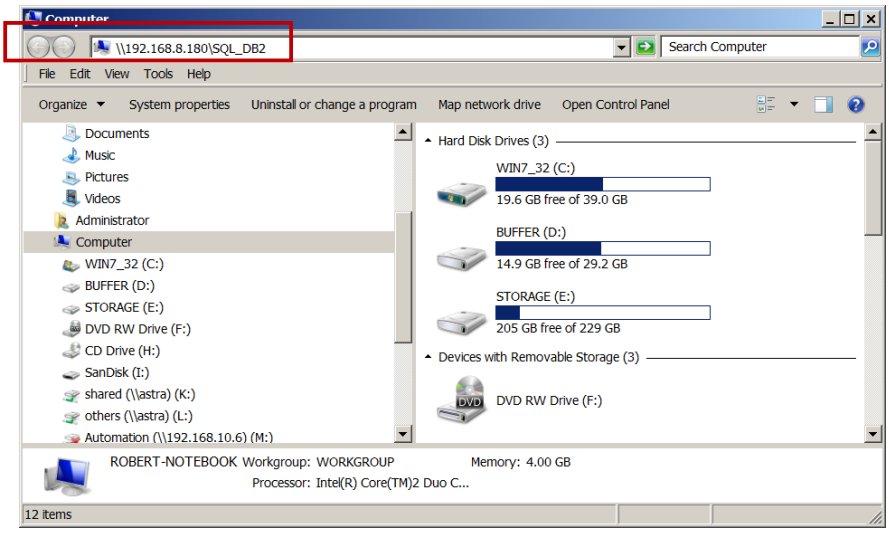
\\<IP address of NAS>\<share name>

<NAS system name> can be found from menu bar **System Configuration -> System**.

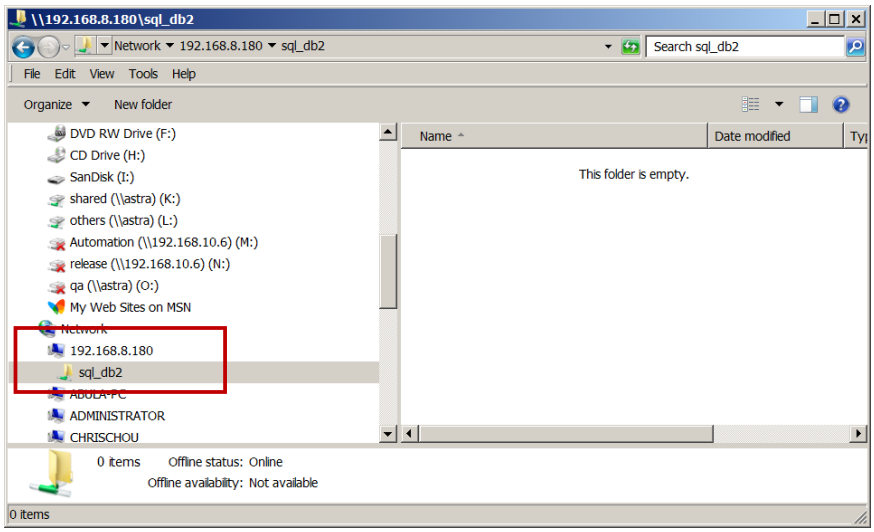
<IP address of NAS> is the IP address of one of the network ports. It can be found from menu bar **Network Configuration -> Network Setting**.

Method 1: The Address Input in Explorer

Open a Windows Explorer from **Start** button or by pressing **Start key + E**. In the address input, put in the share path and press Enter. Please refer to the screenshot below.

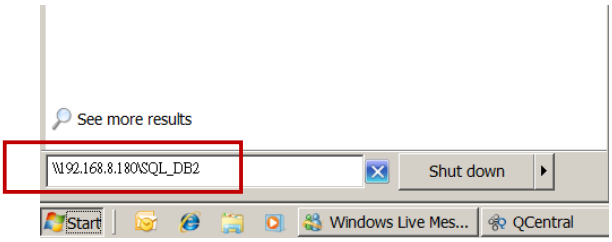


Windows will pop up a dialog requesting for account and password. Please put in your account and password. When the authentication is clear, the share is ready for you to use as follows:



Method 2: The Command Line Input from Start Button

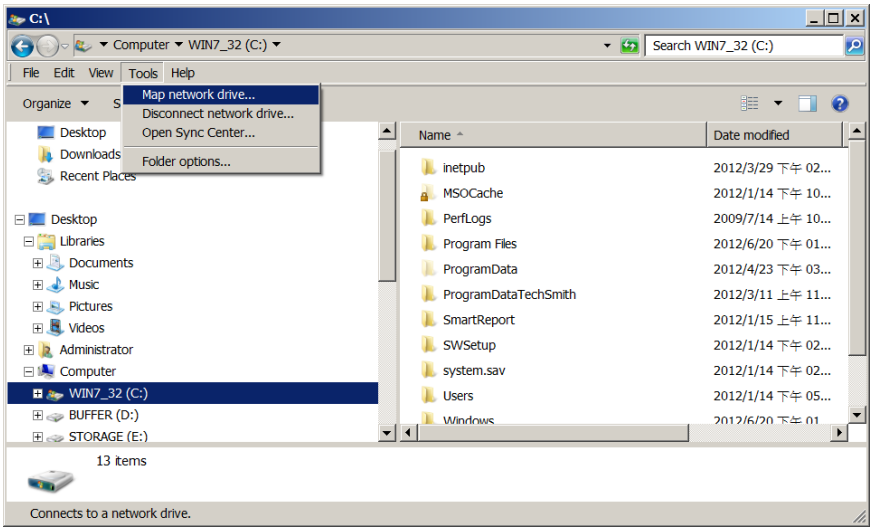
Click **Start** button to bring up the start menu. In the command line input, put in the share path and press **Enter**. The rest is the same as described in Option 1.



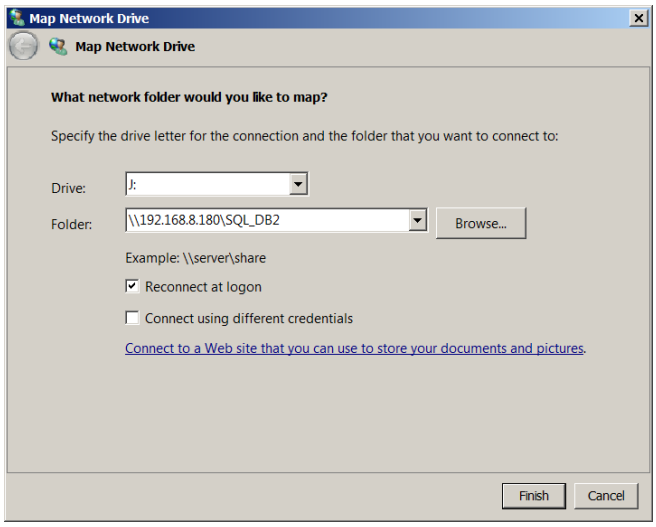
Method 3: Map a Network Drive in Explorer

Please follow the steps below to map a network share from JetStor unified storage to a drive letter. The network share will be automatically mapped the next time you boot your Windows.

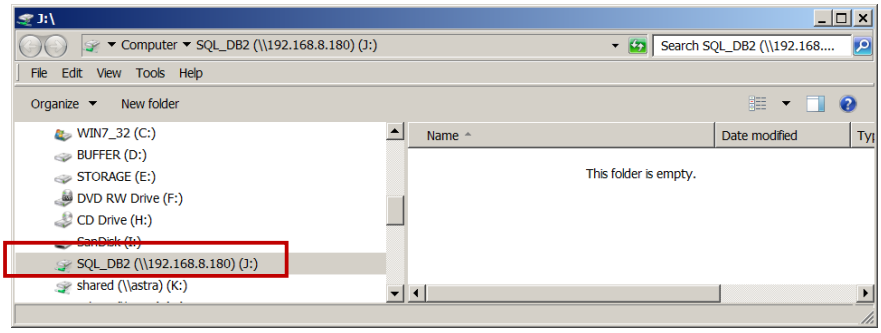
1. Open a Windows Explorer from **Start** button or by pressing **Start key + E**. Go to **Tools** and select **Map network drive**.



2. Select the drive letter you like. Put in the share path in **Folder**. Make sure you check **Reconnect at logon**. Click **Finish**.



3. You may find a new drive with the letter you just selected in Explorer. You may start using the new drive then.



NFS and Linux

JetStor Unified Storage supports NFS version 3 and version 4. If version 4 connections cannot be established, the system will automatically try to establish the connection using version 3 protocols. Before using the NFS shares, please make sure the NFS settings of the shares are properly configured.

Redhat Linux 5

When mounting a file system in Redhat Linux 5, Redhat Linux 5 uses NFS version 3 by default. Use the following syntax to mount an NFS share. Please make sure you add the keyword – **nfs-share** before the share name. It represents the absolute path that the end user doesn't need to know.

 # mount <IP address of NAS>:/nfs-share/<share name> <mount point>

For example:

mount 192.168.8.180:/**nfs-share**/SQL_DB2 /mnt/nas

Redhat Linux 6

The default attempt will try to use NFS version 4 protocol to set up connection in Redhat Linux 6. Use the following syntax to mount an NFS share.

 # mount <IP address of NAS>:/<share name> <mount point>

For example:

mount 192.168.8.180:/SQL_DB2 /mnt/nas

Open Solaris 10/11

Open Solaris 10/11 will use NFS version 4 as default. Use the following syntax to mount an NFS share.

 # mount -F nfs -o rw <IP address of NAS>:/<share name> <mount point>

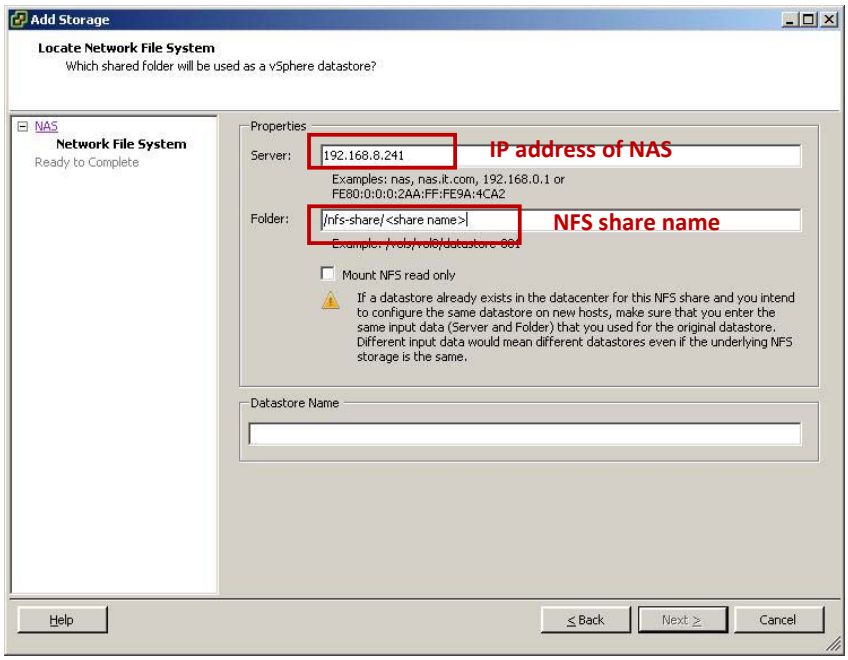
For example:

mount -F nfs -o rw 192.168.8.180:/SQL_DB2 /mnt/nas

NFS and vShpere5

If you want to use JetStor Unified Storage as vSphere 5 storage through NFS connection, please make sure you export the NFS share with read/write access rights. In the vSphere 5 UI setting for NFS share, please use the following syntax as shown in the screenshot below.

/nfs-share/<share name>



AFP and Mac OS X

In **Finder**, go to **Go** and select **Connect to Server**. Put in the network port IP address that you want to access. Click **Connect**.

It will bring up a window requesting account and password. Please put in your account and password. Click **Connect**.

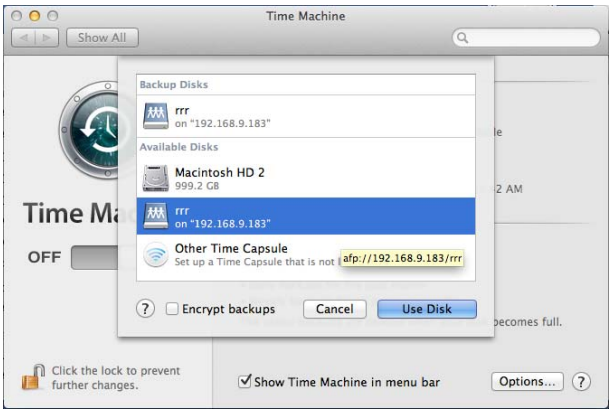
A window with all accessible shares for AFP protocol will pop up for you to select the share you want to connect to. Click **OK**.

There you go. The share is ready for you to access.

Apple Time Machine Support

It's very easy and straight forward to use Apple Time Machine with JetStor unified storage. Simply follow the same instructions above to create AFP shares on the Mac machine and do the steps below.

1. Go to Time Machine function.
2. Turn on Time Machine. Click **Select Disk**.
3. Select the share and put in account and password again.
4. Start Time Machine operation.

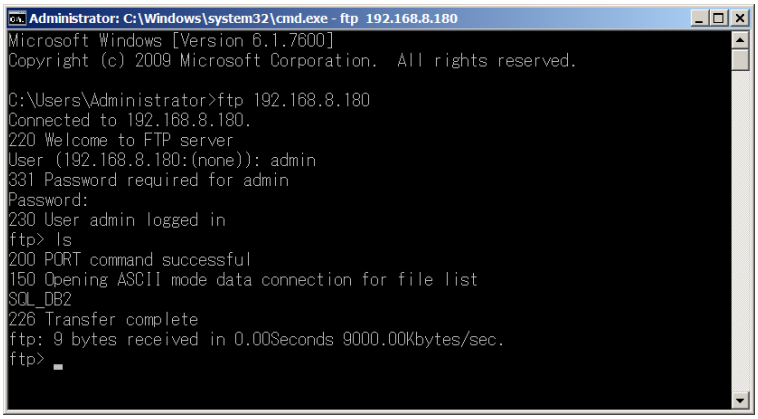


FTP

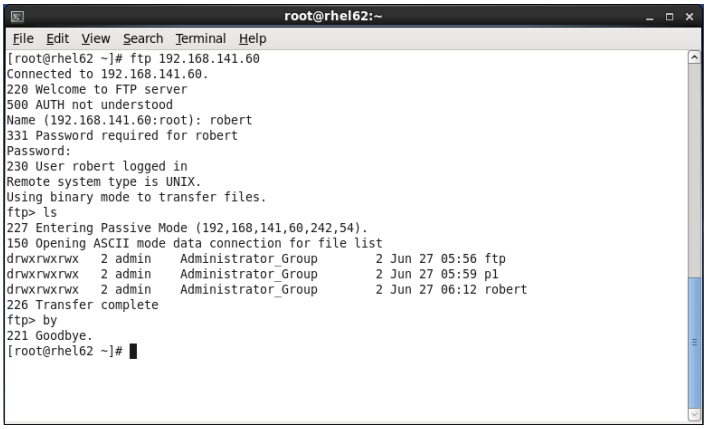
FTP is the basic file transfer tool provided in almost all operating systems. You may use FTP function through command line shell, FTP client, or web browsers.

Method 1: Using Command Line Shell

In Windows XP or Windows 7, open a command line window and use FTP command – “ftp”. Enter your account and password. The share is available for you to access.



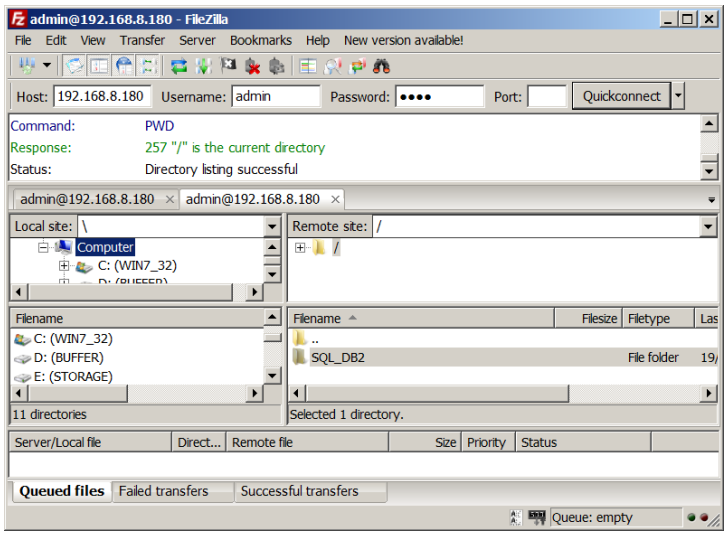
In Redhat Linux, it looks like the screenshot below.



Method 2: Using FTP Client Application

There are a lot of FTP client tools in Windows platform such as WSFTP, FileZilla. In Linux X-Window environment, there are gFTP, WXftp, and LLNL XFTP.

For example, using FileZilla in Windows looks like the screenshot below.



WebDAV

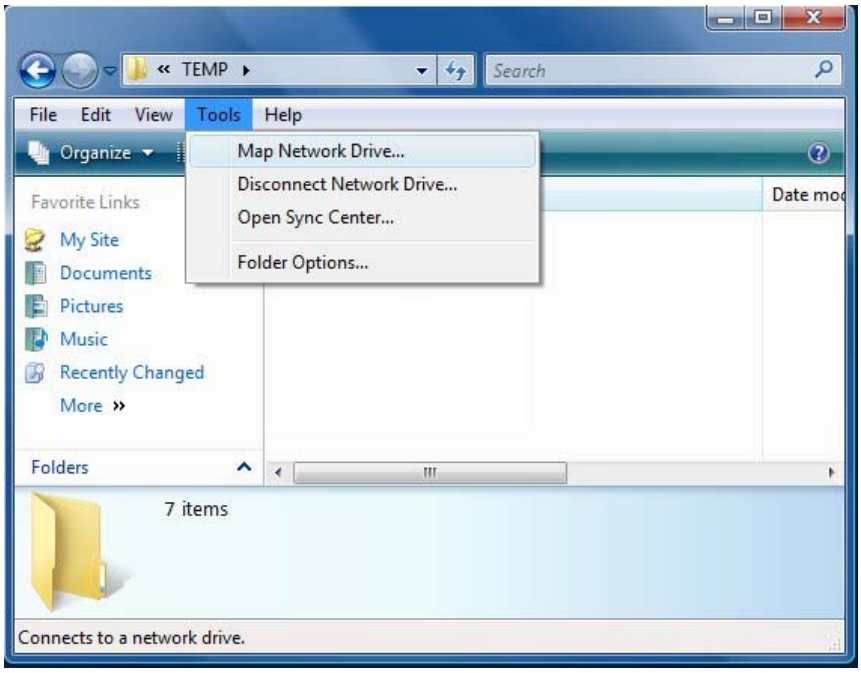
WebDAV service supports the following operating systems:

- 32bit Windows : Windows XP SP2, Windows 7 SP1, Windows Server 2008 SP1
- 64bit Windows operating systems have issues to support WebDAV service. We recommend using 3rd party WebDAV client applications.
- 32bit Redhat Linux 5 and 6
- 64bit Redhat Linux 6

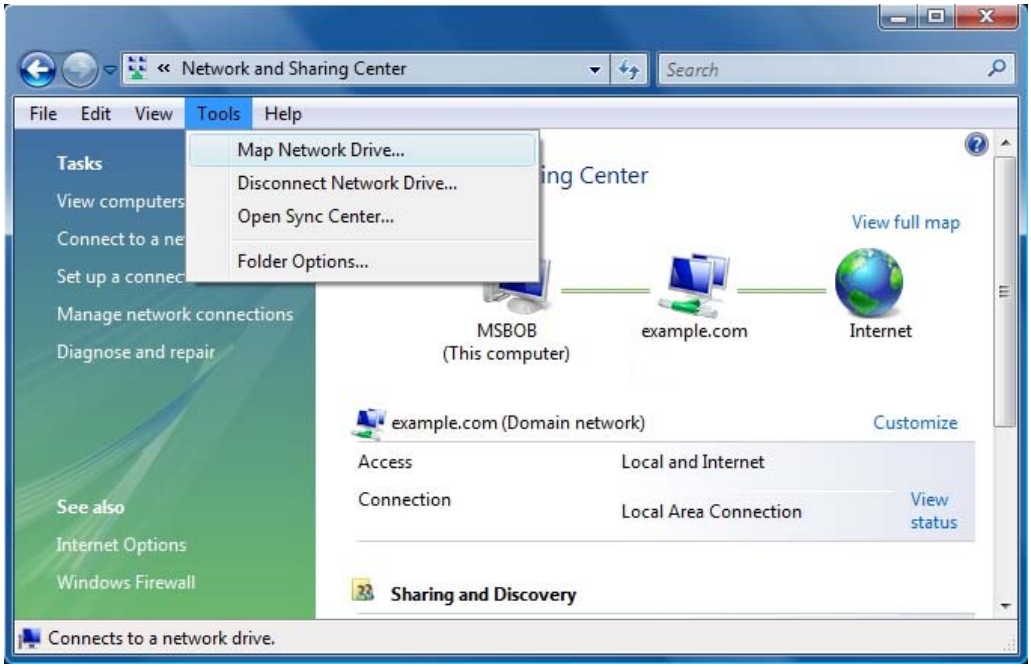
If you are using Windows XP or Vista, you may need to install a Windows update KB907306. If you are using Windows 7, please make sure **WebClient** service is enabled through **Component Services**. For more related information, please check WebDAV client interoperability at http://svnbook.red-bean.com/en/1.6/svn.webdav.clients.html

Method 1: Windows 7 Using Map Network Drive Wizard

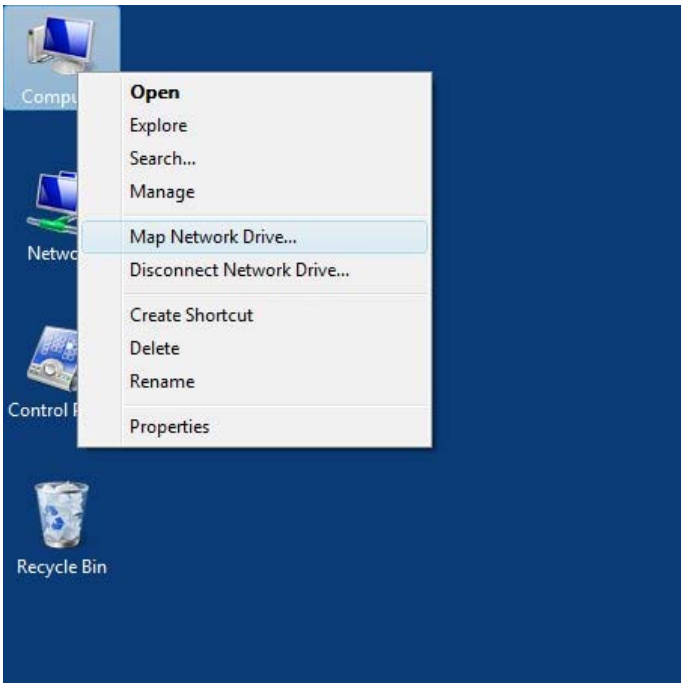
From Windows Explorer, go to **Tools** and select **Map Network Drive**.



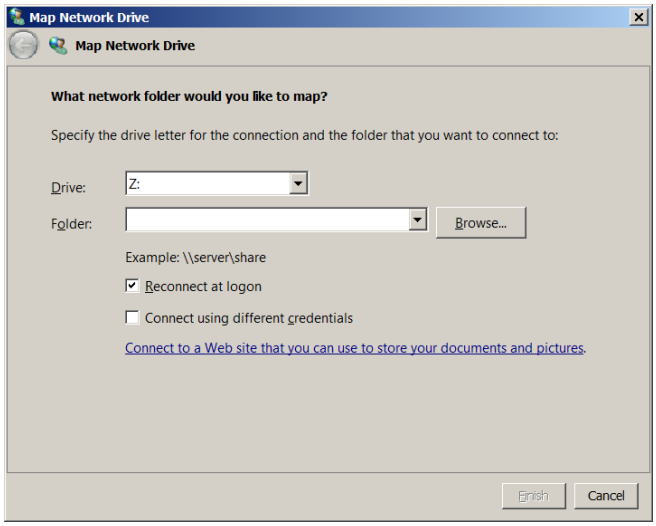
From Network and Sharing Center in the Control Panel, go to **Tools** and select **Map Network Drive**.



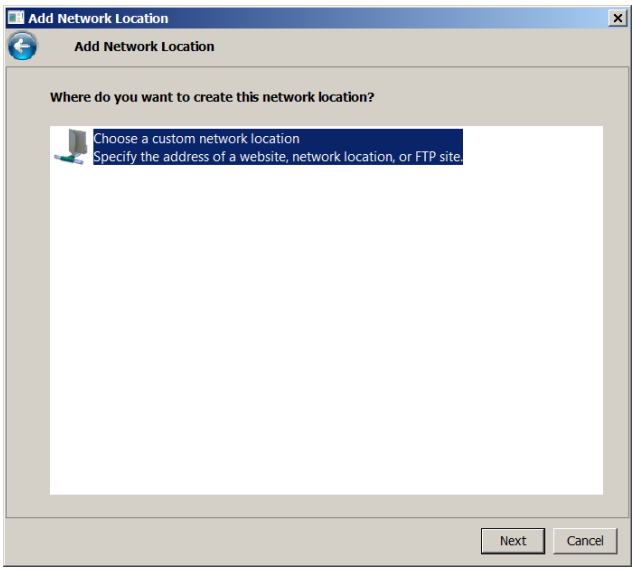
From the **Computer** icon on **Desktop**, right click on **Computer** icon and select **Map Network Drive**.



When the wizard appears, click **Connect to a Web site that you can use to store your documents and pictures**.



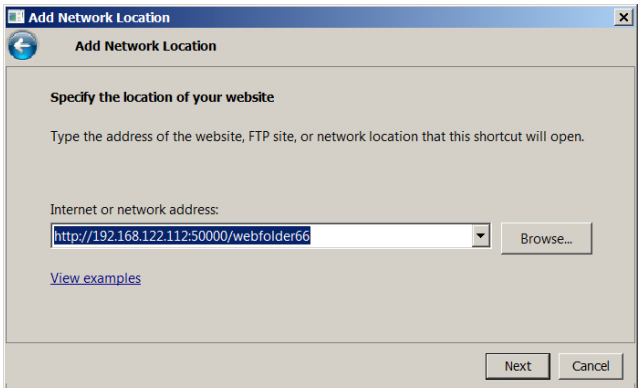
Follow the instructions and click **Next** button. Select **Choose a custom network location** and then click **Next** button again.



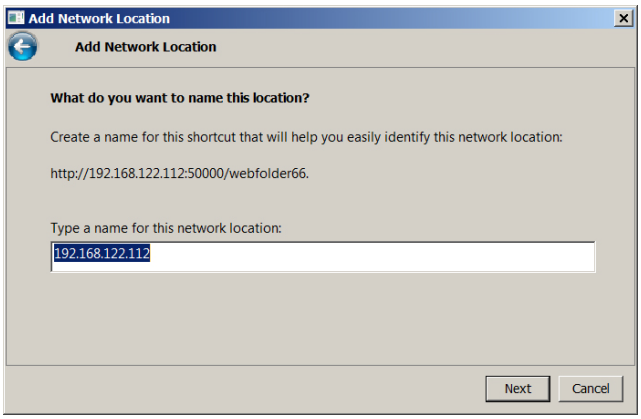
In **Internet or network address** input, put in the WebDAV share in the following syntax.

http://<IP address>: 50000/<WebDAV share>

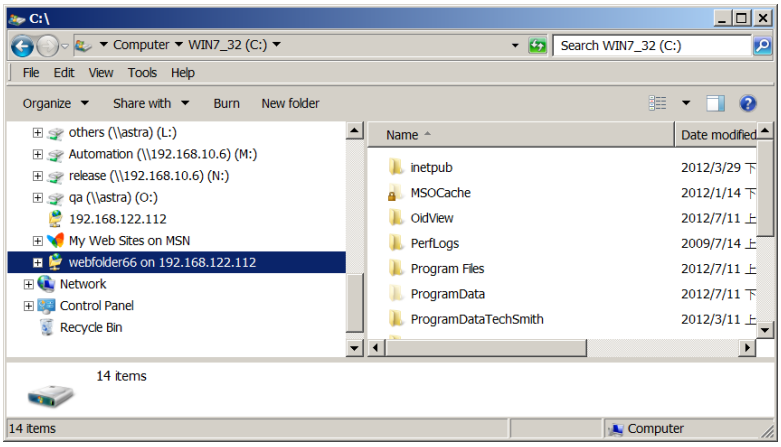
Please make sure you put in the port number **50000**.



Put in the required account and password information. You may name the network location. Here we simply use the default as 192.168.122.112.



You may access the web folder now.



Method 2: Using 3rd Party WebDAV Client Application

Recommended tools include WebDrive, NetDrive, or Bitkinex.

7 Advanced Operations

Terminal Operations

There are two terminal operations to manage and debug the storage system, described on the following.

Serial Console

Use console cable (NULL modem cable) to connect from console port of the storage system to RS 232 port of the management PC. The console settings are on the following:

- Baud rate: 115200, 8 data bit, no parity, 1 stop bit, and no flow control.
- Terminal type: vt100

The initial defaults for administrator login are:

- **User name: admin**
- **Password: 00000000**

Secure Shell Remote Access

SSH (secure shell) software is required for remote login. The SSH client software is available at the following web site:

- SSH Tectia Client: http://www.ssh.com/
- PuTTY: http://www.chiark.greenend.org.uk/

The default management IP address is 192.168.1.234/255.255.255.0, please configure your computer IP address at the same subnet of the system (e.g.: 192.168.1.1/255.255.255.0). The remote control settings are on the following:

- Host IP: *<IP Address>* (e.g.: 192.168.1.234)
- Port: 2222
- **User Name: admin**
- **Password: 00000000**

TIP:
JetStor system supports SSH for remote access only. When using SSH, the IP address and password are required for login.

Console UI

When login to the system, there is a prompt, type **help** and press **Enter** button. It will display help description.

```
console> help
  info          Print system information
  ifconfig      Setting eth0 IP address
  reset_network Reset all of network port to Manufactory setting
  restart_http  Restart HTTP service for management
  list_port     List the port number of service used
  dump_sysinfo  Dump system information to USB
  diag          Print diagnostic message
  reboot        Reboot system
  shutdown      Shut down system
  exit          Exit
  help          Help description
console>
```

The options are available on the console UI:

- info**:** Print the system information.

```
console> info
  [System]
    Product:       724UX
    Name:          JetStor NAS 724UX
    Version:       1.2.3
  [Network]
    LAN0 => MAC 00:13:78:xx:xx:xx  Addr:192.168.x.x  Mask:255.255.0.0
    LAN1 => MAC 00:13:78:xx:xx:xx  Addr:169.254.x.x  Mask:255.255.0.0
    LAN2 => MAC 00:13:78:xx:xx:xx  Addr:169.254.x.x  Mask:255.255.0.0
    LAN3 => MAC 00:13:78:xx:xx:xx  Addr:169.254.x.x  Mask:255.255.0.0
```

- ifconfig**:** Setup the IP address of the management port.

```
 console> ifconfig
   Setting eth0 IP address usage:
         ifconfig IP MASK [GATEWAY]
         ifconfig DHCP
```

- reset_network**:** Reset all of network ports to factory default setting.
- restart_http**:** If the web UI is abnormal, restart HTTP service for management.
- list_port**:** List the port number of the services.

```
console> list_port
  [Service]            [Port]
    http               => 80
    https              => 443
    ssh                => 2222
    ftp                => 21
    sftp               => 22
    webdav             => 50000
    webdavs            => 8888
```

- dump_sysinfo**:** Connect a USB flash via USB port at the rear of the system; use this command to dump the system information to USB device. If there is no USB device found, it will display the warning message.

  ```
  console> dump_sysinfo
  No USB found, please insert USB
  ```

- diag**:** Print the diagnostic messages.
- reboot: Reboot the system.
- shutdown: Shutdown the system.
- exit: Exit the console UI.
- help: Display the help description.

Glossary and Acronym List

Common Terminology

Item	Description
RAID	Redundant Array of Independent Disks. There are different RAID levels with different degree of data protection, data availability, and performance to host environment.
PD	The Physical Disk belongs to the member disk of one specific RAID group.
Pool	A collection of removable media. One pool consists of one or several RAID sets.
ZFS	ZFS is a combined file system and logical volume manager designed by Sun Microsystems. The features of ZFS include data integrity verification against data corruption modes, support for high storage capacities, integration of the concepts of file system and volume management, snapshots and copy-on-write clones, continuous integrity checking.
LUN	Logical Unit Number. A logical unit number (LUN) is a unique identifier which enables it to differentiate among separate devices (each one is a logical unit).
GUI	Graphic User Interface.
RO	Set the volume to be Read-Only.
DS	Dedicated Spare disks. The spare disks are only used by one specific RG. Others could not use these dedicated spare disks for any rebuilding purpose.
DG	DeGraded mode. Not all of the array's member disks are functioning, but the array is able to respond to application read and write requests to its virtual disks.
SCSI	Small Computer Systems Interface.
SAS	Serial Attached SCSI.
S.M.A.R.T.	Self-Monitoring Analysis and Reporting Technology.
WWN	World Wide Name.
HBA	Host Bus Adapter.
NIC	Network Interface Card.
BBM	Battery Backup Module

Data Service Terminology

Item	Description
CIFS	Common Internet File System. CIFS operates as an application-layer network protocol mainly used for providing shared access to files, printers, serial ports, and miscellaneous communications between nodes on a network.
SMB	Server Message Block. Same as CIFS.
NFS	Network File System. NFS is a distributed file system protocol originally, allowing a user on a client computer to access files over a network in a manner similar to how local storage is accessed.
AFP	Apple Filing Protocol, formerly AppleTalk Filing Protocol. AFP is a

	proprietary network protocol that offers file services for Mac OS X and original Mac OS. In Mac OS X, AFP is one of several file services supported including Server Message Block (SMB), Network File System (NFS), File Transfer Protocol (FTP), and WebDAV. AFP currently supports Unicode file names, POSIX and access control list permissions, resource forks, named extended attributes, and advanced file locking. In Mac OS 9 and earlier, AFP was the primary protocol for file services.
FTP	File Transfer Protocol. FTP is a standard network protocol used to transfer files from one host or to another host over a TCP-based network, such as the Internet.
WebDAV	Web Distributed Authoring and Versioning. WebDAV is an extension of the Hypertext Transfer Protocol (HTTP) that facilitates collaboration between users in editing and managing documents and files stored on World Wide Web servers.
Deduplication	Data deduplication is a specialized data compression technique for eliminating duplicate copies of repeating data.
Thin Provisioning	Thin provisioning is the act of using virtualization technology to give the appearance of having more physical resources than are actually available. The term thin provisioning is applied to disk later in this article, but could refer to an allocation scheme for any resource.

iSCSI Terminology

Item	Description
iSCSI	Internet Small Computer Systems Interface.
LACP	Link Aggregation Control Protocol.
MPIO	Multi-Path Input/Output.
MC/S	Multiple Connections per Session
MTU	Maximum Transmission Unit.
CHAP	Challenge Handshake Authentication Protocol. An optional security mechanism to control access to an iSCSI storage system over the iSCSI data ports.
iSNS	Internet Storage Name Service.

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