

Thecus 1U4600

FW v3.00.08

User's Manual

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About This Manual

All information in this manual has been carefully verified to ensure its correctness. In case of an error, please provide us with your feedback. Thecus Technology Corporation reserves the right to modify the contents of this manual without notice.

Product name: Thecus 1U4600

Manual Version: 1.0

Release Date: October 2009

Limited Warranty

Thecus Technology Corporation guarantees all components of Thecus 1U4600 are thoroughly tested before they leave the factory and should function normally under general usage. In case of any system malfunctions, Thecus Technology Corporation and its local representatives and dealers are responsible for repair without cost to the customer if the product fails within the warranty period and under normal usage. Thecus Technology Corporation is not responsible for any damage or loss of data deemed to be caused by its products. It is highly recommended that users conduct necessary back-up practices.

Safety Warnings

For your safety, please read and follow the following safety warnings:

-  Read this manual thoroughly before attempting to set up your 1U4600.
-  Your 1U4600 is a complicated electronic device. DO NOT attempt to repair it under any circumstances. In the case of malfunction, turn off the power immediately and have it repaired at a qualified service center. Contact your vendor for details.
-  DO NOT allow anything to rest on the power cord and DO NOT place the power cord in an area where it can be stepped on. Carefully place connecting cables to avoid stepping or tripping on them.
-  Your 1U4600 can operate normally under temperatures between 0°C and 40°C, with relative humidity of 20% – 85%. Using the 1U4600 under extreme environmental conditions could damage the unit.
-  Ensure that the 1U4600 is provided with the correct supply voltage (AC 100V ~ 240V, 50/60 Hz, 3A). Plugging the 1U4600 to an incorrect power source could damage the unit.
-  Do NOT expose the 1U4600 to dampness, dust, or corrosive liquids.
-  Do NOT place the 1U4600 on any uneven surfaces.
-  DO NOT place the 1U4600 in direct sunlight or expose it to other heat sources.
-  DO NOT use chemicals or aerosols to clean the 1U4600. Unplug the power cord and all connected cables before cleaning.
-  DO NOT place any objects on the 1U4600 or obstruct its ventilation slots to avoid overheating the unit.
-  Keep packaging out of the reach of children.
-  If disposing of the device, please follow your local regulations for the safe disposal of electronic products to protect the environment.

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Chapter 1: Introduction

Overview

Thank you for choosing the Thecus 1U4600 IP Storage Server. The Thecus 1U4600 is an easy-to-use storage server that allows a dedicated approach to storing and distributing data on a network. Data reliability is ensured with RAID features that provide data security and recovery—over six Terabyte of storage is available using RAID 5 and RAID 6. Gigabit Ethernet ports enhance network efficiency, allowing the 1U4600 to take over file management functions, increase application and data sharing and provide faster data response. The 1U4600 offers data mobility with a disk roaming feature that lets you hot swap working hard drives for use in another 1U4600, securing the continuity of data in the event of hardware failure. The 1U4600 allows data consolidation and sharing between Windows (SMB/CIFS), UNIX/Linux, and Apple OS X environments. The 1U4600's user-friendly GUI supports multiple languages.

Product Highlights

File Server

First and foremost, the 1U4600 allows you to store and share files over an IP network. With a Network Attached Storage (NAS) device, you can centralize your files and share them easily over your network. With the easy-to-use web-based interface, users on your network can access these files in a snap.

To learn about the Web User Interface, go to
Chapter 5: Using the 1U4600 > [Using WebDisk](#).

FTP Server

With the built-in FTP Server, friends, clients, and customers can upload and download files to your 1U4600 over the Internet with their favorite FTP programs. You can create user accounts so that only authorized users have access.

To set up the FTP Server, refer to
Chapter 4: System Network> [FTP](#) .

iTunes Server

With the built-in iTunes server capability, the 1U4600 enables digital music to be shared and played anywhere on the network!

To set up the iTunes Server, refer to
Chapter 4: Application Server>[iTunes Configuration](#).

Media Server

With the built-in Media Server capability, the 1U4600 provides media streaming service to stand-alone networked home media adapters that support the UPnP AV protocol or are Digital Living Network Alliance (DLNA) standard compliant.

To set up the Media Server, refer to
Chapter 4: System Network >Media Server.

Backup Server

Don't leave precious data to chance. With advanced backup capabilities, you can easily upload mission critical files to the 1U4600, and even automate your backup tasks for true peace-of-mind.

To find out how to backup your files with the 1U4600, refer to
Chapter 4: Backup >Nsync.

Printer Server

With the 1U4600's Printer Server, you can easily share an IPP printer with other PCs connected to your network.

To set up the Printer Server, refer to
Chapter 4: Application Server>Printer Information.

Multiple RAID

1U4600 supports multiple RAID volumes on one system. So, you can create RAID 0 for your non-critical data, and create RAID 5 for mission-critical data. Create the RAID levels depending on your needs.

To configure RAID modes on the 1U4600, refer to
Chapter 4: Storage Management >RAID Information.

Dual Mode Support

1U4600 is not only a file server, but it also supports iSCSI initiators. Your server can access 1U4600 as a direct-attached-storage over the LAN or Internet. There is no easier way to expand the capacity of your current application servers. All the storage needs can be centrally managed and deployed. This brings ultimate flexibility to users.

To set up an iSCSI volume, refer to
Chapter 4: Storage Management > Space Allocation > Allocating Space for iSCSI Volume.

Superior Power Management

1U4600 supports schedule power on/off. With this feature, administrator can set at what time to turn on or off the system. This feature is a big plus for people who want to conserve energy. Wake-On-LAN enables administrator to remotely turn on the system without even leaving their own seat.

To schedule system on and off, refer to
Chapter 4: System Management> Scheduled Power On/Off

Package Contents

Your 1U4600 package should contain the following items:

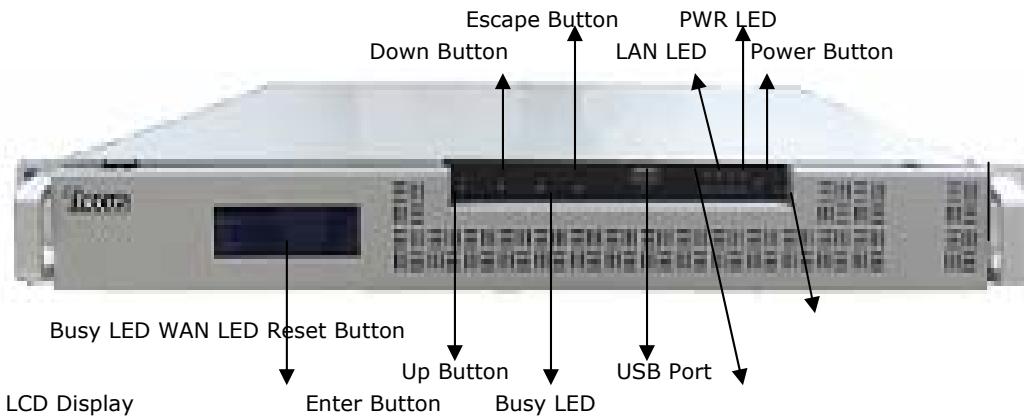
- 1U4600 Unit x1
- Power Cord
 - 1U4600S x1
 - 1U4600R x2
- USB Cable x1
- QIG (Quick Installation Guide) x1
- CD-Title x2 (DriveClone5 Pro CD & Universal CD)
- Ethernet Cable x1
- Screw Kit & Key-Luck x1
- HDD Compatibility list Card x1
- Multiple Languages Warranty Card x1



Please check to see if your package is complete. If you find that some items are missing, contact your dealer.

Front Panel

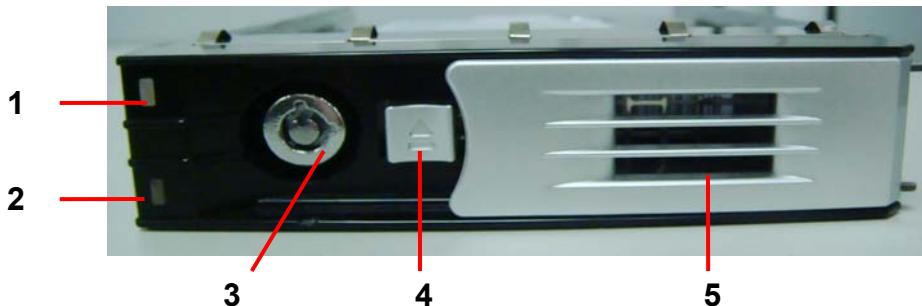
The Thecus 1U4600's front panel has the device's controls, indicators, and hard disk trays:



| Front Panel | |
|-------------------|---|
| Item | Description |
| WAN LED | <ul style="list-style-type: none"> • Solid green: network link • Blinking green: network activity |
| LAN LED | <ul style="list-style-type: none"> • Solid green: network link • Blinking green: network activity |
| Busy LED | <ul style="list-style-type: none"> • Blinking orange: system startup or system maintenance; data currently inaccessible |
| USB Port | <ul style="list-style-type: none"> • USB 2.0 port for compatible USB devices, such as digital cameras, USB disks, and USB printers |
| Power Button | <ul style="list-style-type: none"> • Power on/off 1U4600 • Solid blue: Device is powered on • Blinking blue: eSATA hard disk is connected and active |
| Reset Button | <ul style="list-style-type: none"> • Resets the 1U4600 • Press for five seconds during boot process to reset IP address and admin password |
| HDD Trays | <ul style="list-style-type: none"> • Four 3.5" SATA HDD trays • Locks are provided for added security |
| LCD Display | <ul style="list-style-type: none"> • Displays current system status and warning messages • Displays hostname, WAN/LAN IP address, RAID status, and current time |
| Up Button ▲ | <ul style="list-style-type: none"> • Push to scroll up when using the LCD display |
| Down Button ▼ | <ul style="list-style-type: none"> • Push to scroll down when using the LCD display |
| Enter Button ↴ | <ul style="list-style-type: none"> • Push to confirm information entered into the LCD display |
| Escape Button ESC | <ul style="list-style-type: none"> • Push to leave the current LCD menu |

Hard Disk Trays

Each of the 1U4600's hard disk trays has



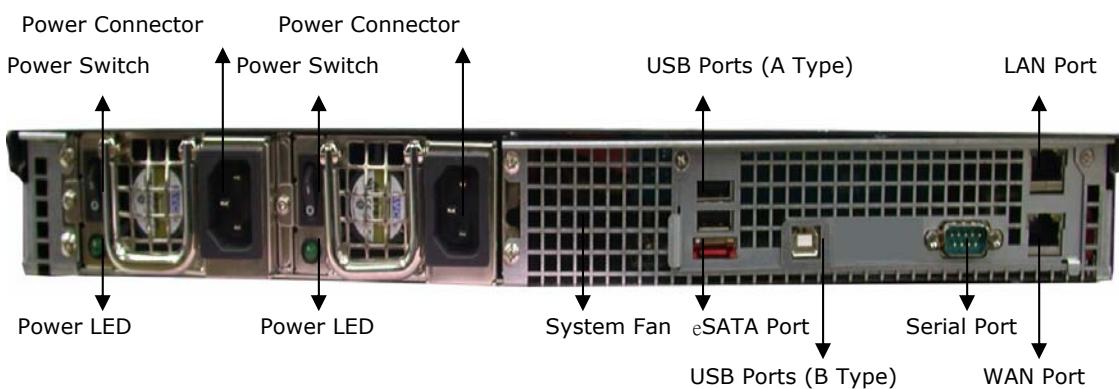
a lock, a latch, and two LED indicators:

| Hard Disk Trays | |
|------------------------|--|
| Item | Description |
| 1.HDD Power LED | • Solid blue: hard disk is powered on |
| 2.HDD Access/Error LED | • Blinking green: system is accessing data on the hard disk |
| 3.Lock | • Use the lock to physically secure the hard disk to the unit |
| 4.Latch | • Use to open and remove or close and secure the tray |
| 5.Handle | • Pull out HDD tray |

Rear Panel

1U4600R

The rear panel of the 1U4600R houses most of the USB and Ethernet connections, as well as the eSATA port, system fan, and power connector. See the table below for descriptions of each:

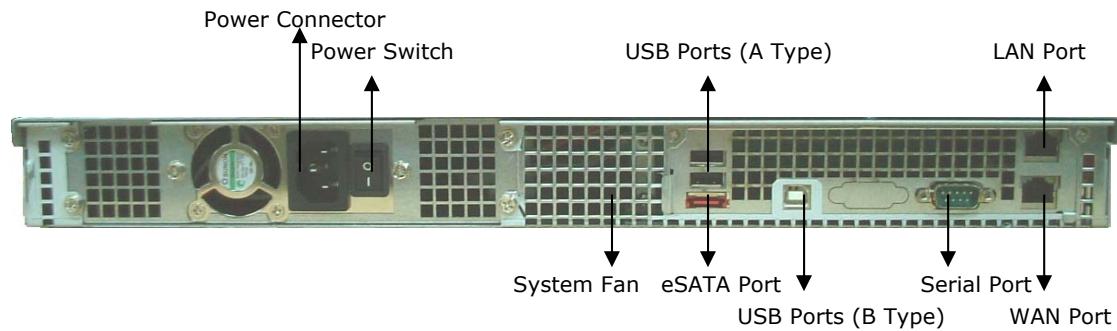


| 1U4600 Back Panel | |
|-------------------|--|
| Item | Description |
| eSATA Port | • eSATA port for high-speed storage expansion |
| USB Ports | • USB 2.0 ports for compatible USB devices, such as digital cameras, USB disks, and USB printers |
| WAN Port | • WAN port for connecting to an Ethernet network through a switch or router |
| LAN Port | • LAN port that can be used for connection sharing |

| | |
|-----------------|--|
| Power Switch | • Switch for power supply |
| System Fan | • System fan that exhausts heat from the unit |
| Serial Port | • This port is for factory use only |
| Power Connector | • Connect the included power cords to these connectors |

1U4600S

The rear panel of the 1U4600S is similar to the 1U4600R, but with a single power connector:



Chapter 2: Hardware Installation

Overview

Your 1U4600 is designed for easy installation. To help you get started, the following chapter will help you quickly get your 1U4600 up and running. Please read it carefully to prevent damaging your unit during installation.

Before You Begin

Before you begin, be sure to take the following precautions:

1. Read and understand the **Safety Warnings** outlined in the beginning of the manual.
2. If possible, wear an anti-static wrist strap during installation to prevent static discharge from damaging the sensitive electronic components on the 1U4600.
3. Be careful not to use magnetized screwdrivers around the 1U4600's electronic components.

Hard Disk Installation

The 1U4600 supports four standard 3.5" Serial ATA (SATA) hard disks. To install a hard disk into the 1U4600, follow the steps below:

1. Remove a hard disk tray from the 1U4600.
2. Slide the new SATA hard disk into the tray and fasten the screws.
3. Insert the hard disk and tray back into the 1U4600 until it snaps into place and lock it with a key if desired.
4. The LED blinks green when the hard disk is accessed. If the Error LED flashes red it signals a problem.

NOTE

If your HDD was part of a RAID 1 or 5 array previously, it automatically rebuilds. If you replace all the drives with higher capacity drives, you need to go to Administrator login and format the drives.

Cable Connections

To connect the 1U4600 to your network, follow the steps below:

1. Connect an Ethernet cable from your network to the WAN port on the back panel of the 1U4600.



2. Connect the provided power cord into the universal power socket on the back panel. Plug the other end of the cord into a surge protector socket. Press the power supply switch to turn on the power supply.

NOTE

If you are installing the 1U4600R, be sure to connect both power cables. If you do not, the system will assume one power supply has failed, and an alarm will sound. For more information, refer to Chapter 8: Troubleshooting.



3. Press the power button on the Front Panel to boot up the 1U4600.

Checking System Status

After making connections on the 1U4600 and powering up, check whether the system status is normal or has trouble by observing indicators on the front panel and hard disk trays.

System Status Normal

The system status is normal if:

1. The WAN and LAN LEDs glow green (assuming both are connected).
2. The Power LED on the Front Panel glows blue.
3. The HDD Power LED on each HDD tray glows blue (assuming all disks are installed).
4. The default IP address of the WAN port is 192.168.1.100.

Chapter 3: First Time Setup

Overview

Once the hardware is installed, physically connected to your network, and powered on, you can configure the 1U4600 so that it is accessible to your network users. There are two ways to set up your 1U4600: using the **Thecus Setup Wizard** or the **LCD display**. Follow the steps below for initial software setup.

Thecus Setup Wizard

The handy Thecus Setup Wizard makes configuring 1U4600 a snap. To configure the 1U4600 using the Setup Wizard, perform the following steps:

1. Insert the installation CD into your CD-ROM drive (the host PC must be connected to the network).
2. The Setup Wizard should launch automatically. If not, please browse your CD-ROM drive and double click on **Setup.exe**.



NOTE

For MAC OS X users, double click on Thecus Setup Wizard .dmg file.

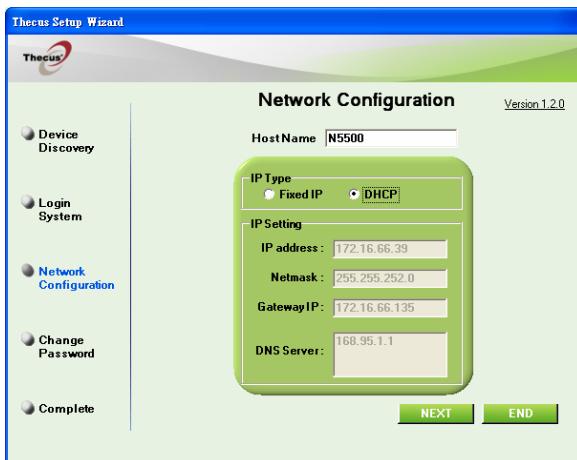
3. The Setup Wizard will start and automatically detect all Thecus storage devices on your network. If none are found, please check your connection and refer to [Chapter 7: Troubleshooting](#) for assistance.



4. Select the 1U4600 that you like to configure.
5. Login with the administrator account and password. The default account and password are both "admin".



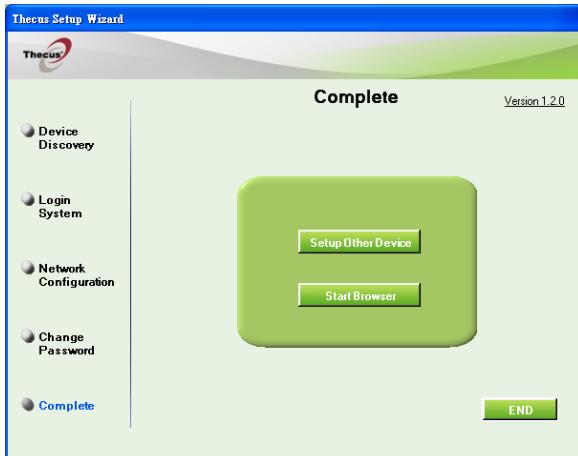
6. Name your 1U4600 and configure the network IP address. If your switch or router is configured as a DHCP Server, configuring the 1U4600 to automatically obtain an IP address is recommended. You may also use a static IP address and enter the DNS Server address manually.



7. Change the default administrator password.



8. Finished! Access the 1U4600 Web Administrator Interface by pressing the **Start Browser** button. You can also configure another 1U4600 at this point by clicking the **Setup Other Device** button. Press **Exit** to exit the wizard.



NOTE

The Thecus Setup Wizard is designed for installation on systems running Windows XP/2000 or Mac OSX or later. Users with other operating systems will need to install the Thecus Setup Wizard on a host machine with one of these operating systems before using the unit.

LCD Operation

The 1U4600 is equipped with an LCD on the front for easy status display and setup. There are four buttons on the front panel to control the LCD functions.

LCD Controls

Use the **Up (▲)**, **Down (▼)**, **Enter (↓)** and **Escape (ESC)** keys to select various configuration settings and menu options for 1U4600 configuration.

The following table illustrates the keys on the front control panel:

| LCD Controls | | |
|--------------|-------------|---|
| Icon | Function | Description |
| ▲ | Up Button | Select the previous configuration settings option. |
| ▼ | Down Button | USB copy confirmation display. |
| ↓ | Enter | Enter the selected menu option, sub-menu, or parameter setting. |
| ESC | Escape | Escape and return to the previous menu. |

There are two modes of operation for the LCD: **Display Mode** and **Management Mode**.

Display Mode

During normal operation, the LCD will be in **Display Mode**.

| Display Mode | |
|------------------|----------------------------------|
| Item | Description |
| Host Name | Current host name of the system. |
| WAN | Current WAN IP setting. |
| LAN | Current LAN IP setting. |
| Link Aggregation | Current Link Aggregation status |
| System Fan | Current system fan status. |
| CPU Fan | Current CPU fan status |
| 2009/05/22 12:00 | Current system time. |

| | |
|-----------|--|
| Disk Info | Current status of disk slot has been installed |
| RAID | Current RAID status. |

The 1U4600 will rotate these messages every one-two seconds on the LCD display.

USB Copy

The USB Copy function enables you to copy files stored on USB devices such as USB disks and digital cameras to the 1U4600 by press button. To use USB copy, follow the steps below:

1. Plug your USB device into an available USB port on the Front end.
2. In **Display Mode**, press the **Down Button (▼)**.
3. The LCD will display “**USB Copy?**”
4. Press **Enter (→)** and the 1U4600 will start copying USB disks connected to the front USB port.
5. All of data will be copied into system folder named “**USB copy**”.

Management Mode

During setup and configuration, the LCD will be in **Management Mode**.

To enter into Management Mode, press **Enter (→)** and an “*Enter Password*” prompt will show on the LCD.

At this time, the administrator has to enter the correct LCD password. System will check whether the correct LCD password has been entered. The default LCD password is “**0000**”. If correct password is entered, you will enter into the **Management Mode** menu.

| Management Mode | |
|---------------------|---|
| Item | Description |
| WAN Setting | IP address and netmask of your WAN ports. |
| LAN Setting | IP address and netmask of your LAN ports. |
| Link Agg. Setting | Select Load Balance, 802.3ad or Failover . |
| Change Admin Passwd | Change administrator’s password for LCD operation. |
| Reset to Default | Reset system to factory defaults. |
| Exit | Exit Management Mode and return to Display Mode . |

NOTE

You can also change your LCD password using the Web Administration Interface by navigating to **System Management >Utility> Administrator Password**. For more on the Web Administration Interface, see **Chapter 4: System Management**.

Typical Setup Procedure

From the Web Administration Interface, you can begin to setup your 1U4600 for use on your network. Setting up the 1U4600 typically follows the five steps outlined below.

For more on how to use the Web Administration Interface, see **Chapter 4: Web Administration Interface**.

Step 1: Network Setup

From the Web Administration Interface, you can configure the network settings of the 1U4600 for your network. You can access the **Network** menu from the menu bar.

For details on how to configure your network settings, refer to [**Chapter 4: System Network**](#).

Step 2: RAID Creation

Next, administrators can configure their preferred RAID setting and build their RAID volume. You can access RAID settings from the menu bar of the Web Administration Interface by navigating to **Storage Management > RAID Configuration**.

For more information on configuring RAID, see

[**Chapter 4: System Management > RAID Configuration**](#).

Don't know which RAID level to use? Find out more about the different RAID levels from [**Appendix C: RAID Basics**](#).

Step 3: Create Local Users or Setup Authentication

Once the RAID is ready, you can begin to create local users for the 1U4600, or choose to setup authentication protocols such as Active Directory (AD).

For more on managing users, go to [**Chapter 4:User and Group Authentication**](#).

For more information on configuring Active Directory, see

[**Chapter 4: User and Group Authentication > ADS/NT Support**](#).

For information about the benefits of Active Directory, see [**Appendix D: Active Directory Basics**](#).

Step 4: Create Folders and Set Up ACLs

Once users are introduced into your network, you can begin to create various folders on the 1U4600 and control user access to each using Folder Access Control Lists.

More information on managing folders, see

[**Chapter 4: Storage Management > Share Folder**](#).

To find out about configuring Folder Access Control Lists, see [**Chapter 4: Storage Management > Share Folder> Folder Access Control List \(ACL\)**](#).

Step 5: Start Services

Finally, you can start to setup the different services of the 1U4600 for the users on your network. You can find out more about each of these services by clicking below:

[**SMB/CIFS**](#)

[**Apple File Protocol \(AFP\)**](#)

[**Network File System \(NFS\)**](#)

[**File Transfer Protocol \(FTP\)**](#)

[**iTunes Server**](#)

Media Server

Printer Server

Photo Server

Chapter 4: System Administration

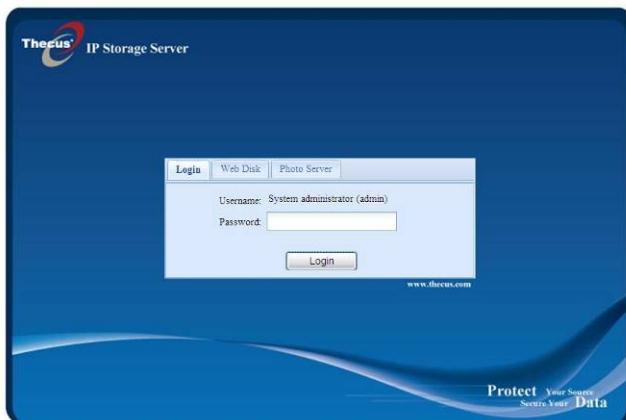
Overview

The 1U4600 provides an easily accessible **Web Administration Interface**. With it, you can configure and monitor the 1U4600 anywhere on the network.

Web Administration Interface

Make sure your network is connected to the Internet. To access the 1U4600 **Web Administration Interface**:

1. Type the 1U4600's IP address into your browser. (Default IP address is <http://192.168.1.100>)



NOTE

Your computer's network IP address must be on the same subnet as the 1U4600. If the 1U4600 has default IP address of 192.168.1.100, your managing PC IP address must be 192.168.1.x, where x is a number between 1 and 254, but not 100.

2. Login to the system using the administrator user name and password. The factory defaults are:

User Name: admin
Password: admin

※ If you changed your password in the setup wizard, use the new password.

Once you are logged in as an administrator, you will see the **Web Administration Interface**. From here, you can configure and monitor virtually every aspect of the 1U4600 from anywhere on the network.

Menu Bar

The **Menu Bar** is where you will find all of the information screens and system settings of the 1U4600. The various settings are placed in the following groups on the menu bar:



| Menu Bar | |
|-------------------------------|--|
| Item | Description |
| System Information | Current system status of the 1U4600. |
| System Management | Various 1U4600 system settings and information. |
| System Network | Information and settings for network connections, as well as various services of the 1U4600. |
| Storage | Information and settings for storage devices installed into the 1U4600. |
| User and Group Authentication | Allows configuration of users and groups. |
| Application Server | Printer Server and iTunes Server to set up of the 1U4600. |
| Module Management | System and user Module to install of the 1U4600. |
| Backup | Category of Backup Features set up of the 1U4600. |

Moving your cursor over any of these items will display the dropdown menu selections for each group.

In the following sections, you will find detailed explanations of each function, and how to configure your 1U4600.

Message Bar

You can get information about system status quickly by moving mouse over.



| Message Bar | | |
|-------------|--------------------|---|
| Item | Status | Description |
| | RAID Information. | Display the status of created RAID volume. Click to go to RAID information page as short cut. |
| | Disks Information. | Display the status of disks installed in the system. Click to go to Disk information page as short cut. |
| | FAN. | Display system FAN Status. Click to go to System Status page as short cut. |
| | UPS. | Display UPS device status. Click to go to UPS Setting page as short cut. |

| | | |
|---|--------------|--|
|  | Temperature. | Green: Systematic temperature is normal. Red: Systematic temperature is unusual. Click to go to System Status page as short cut. |
|  | Network. | Green: Connection to network is normal. Red: abnormal connection to the network |

Logout



Click to logout Web Administration Interface.

Language Selection

The 1U4600 supports multiple languages, including:

- English
- Japanese
- Traditional Chinese
- Simplified Chinese
- French
- German
- Italian
- Korean
- Spanish
- Russia
- Polish

On the menu bar, click **Language** and the **selection** list appears. This user interface will switch to selected language for the 1U4600.



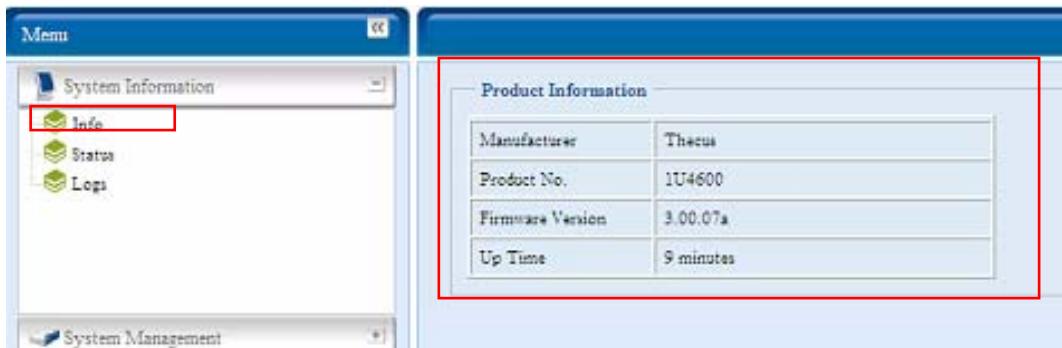
System Information

Information provides viewing on current Product info, System Status, Service Status and Logs.

The menu bar allows you to see various aspects of the 1U4600. From here, you can discover the status of the 1U4600, and also other details.

Product Information

Once you login, you will first see the basic **Product Information** screen providing **Manufacturer**, **Product No.**, **Firmware Version**, and **System Up Time** information.



Product Information

| Item | Description |
|------------------|---|
| Manufacturer | Displays the name of the system manufacturer. |
| Product No. | Shows the model number of the system. |
| Firmware version | Shows the current firmware version. |
| Up time | Displays the total run time of the system. |

System/Service Status

From the **Status** menu, choose the **System** item, **System Status** and **Service Status** screens appear. These screens provide basic system and service status information.

System Status

| Item | Description |
|------------------|--|
| CPU Loading (%) | Displays current CPU workload of the 1U4600. |
| CPU Fan Speed | Displays current CPU fan status. |
| System Fan Speed | Displays the current status of the system fan. |
| Up Time | Shows how long the system has been up and running. |

Service Status

| Item | Description |
|------|-------------|
| | |

| | |
|-----------------|---|
| AFP Status | The status of the Apple Filing Protocol server. |
| NFS Status | The status of the Network File Service Server. |
| SMB/CIFS Status | The status of the SMB/CIFS server. |
| FTP Status | The status of the FTP server. |
| Media Server | The status of the Media Server |
| Nsync Status | The status of the Nsync server. |
| UPnP Status | The status of the UPnP service. |
| SNMP | The status of the SNMP service. |

Logs

From the **System Information** menu, choose the **Logs** item and the **System Logs** screen appears. This screen shows a history of system usage and important events such as disk status, network information, and system booting. See the following table for a detailed description of each item:

| Time | Logs Information |
|---------------------|---|
| 2009/05/13 16:28:50 | 7700 : The system N7700 is recovering the RAID and rebuilding is in progress. |
| 2009/05/13 15:55:16 | 7700 : Disk 4 on N7700 has been added. |
| 2009/05/13 15:39:49 | 7700 : Disk 3 on N7700 has been added. |
| 2009/05/13 15:39:43 | 7700 : Disk 2 on N7700 has been added. |
| 2009/05/13 14:08:36 | 7700 : User admin logged in from 172.16.65.133 |
| 2009/05/13 13:45:03 | 7700 : User admin logged in from 172.16.65.156 |
| 2009/05/13 11:11:45 | 7700 : User admin logged in from 172.16.65.172 |
| 2009/05/13 09:59:19 | 7700 : User admin logged in from 172.16.65.138 |
| 2009/05/13 09:41:26 | 7700 : User admin logged in from 172.16.65.138 |
| 2009/05/13 09:32:40 | 7700 : User admin logged in from 172.16.65.138 |
| 2007/01/02 02:35:01 | 7700 : User admin logged in from 172.16.66.38 |
| 2007/01/02 02:34:26 | 7700 : User admin logged in from 172.16.66.38 |
| 2007/01/02 02:33:06 | 7700 : N7700 boot |

See the following table for a detailed description of each item:

| System Logs | |
|-------------|--|
| Item | Description |
| All | Provides all log information including system messages, warning messages and error messages. |
| INFO | Records information about system messages. |
| WARN | Shows only warning messages. |
| ERROR | Shows only error messages. |

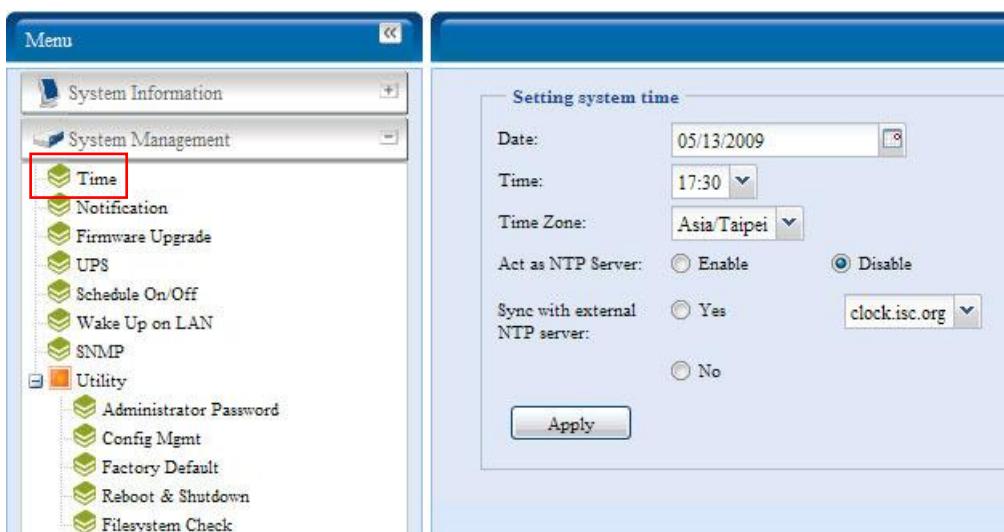
| | |
|---|--|
| Download All Log File | Export all logs to an external file. |
| Truncate All Log File | Clear all log files. |
| The number of lines per page <input type="checkbox"/> | Specify desired number of lines to display per page. |
| Sort Ascending | Shows logs by date in ascending order. |
| Sort Descending | Shows logs by date in descending order. |
| << < > >> | Use the forward (> >>) and backward (<< <) buttons to browse the log pages. |
|  | Re-loading logs. |

System Management

The **System Management** menu gives you a wealth of settings that you can use to configure your 1U4600's system administration functions. You can set up system time, system notifications, and even upgrade firmware from this menu.

Time: Setting system time

From the **time** menu, choose the **Time** item and the **Time** screen appears. Set the desired **Date**, **Time**, and **Time Zone**. You can also elect to synchronize the system time on the 1U4600 with an **NTP (Network Time Protocol) Server**.



See the following table for a detailed description of each item:

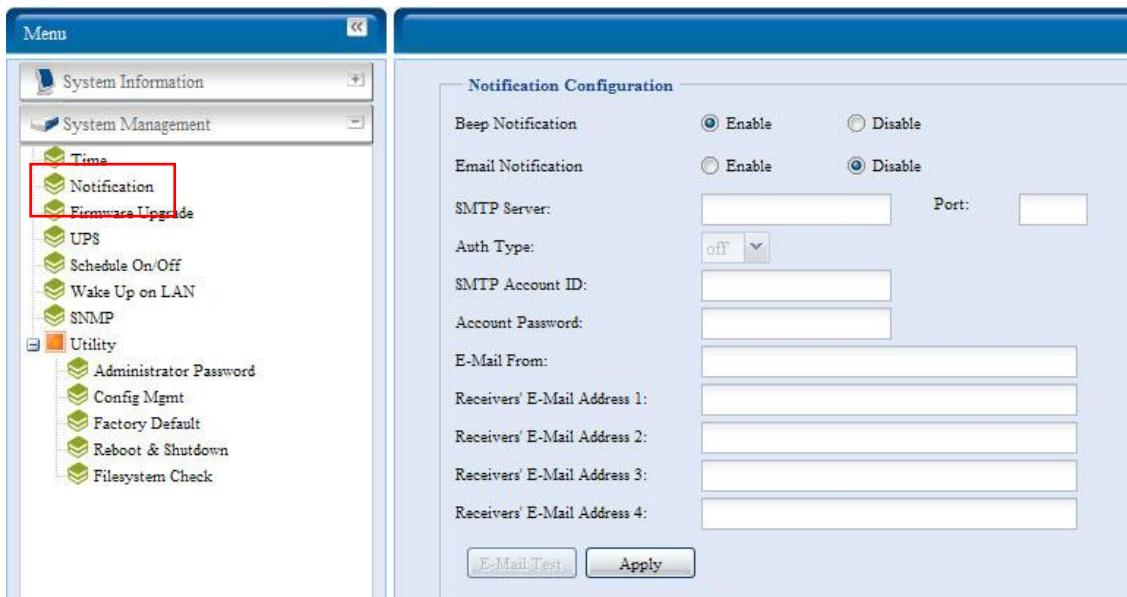
| Time | |
|-------------------------------|--|
| Item | Description |
| Date | Sets the system date. |
| Time | Sets the system time. |
| Time Zone | Sets the system time zone. |
| Act as NTP Server | Select Enable to synchronize with the NTP server. Select Disable to close the NTP server synchronization. |
| Sync with external NTP Server | Select YES to allow the 1U4600 to synchronize with an NTP server of your choice. Press Apply to change. |

WARNING

If an NTP server is selected, please make sure your 1U4600's network has been setup to access the NTP server.

Notification configuration

From the menu, choose the **Notification** item, and the **Notification Configuration** screen appears. This screen lets you have the 1U4600 notify you in case of any system malfunction. Press **Apply** to confirm all settings. See following table for a detailed description of each item.



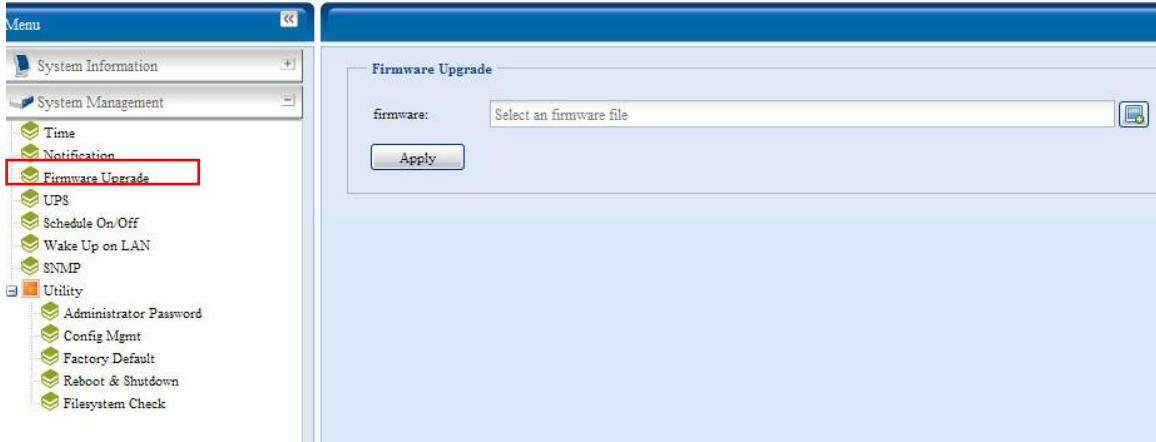
| Notification Configuration | |
|-------------------------------------|---|
| Item | Description |
| Beep Notification | Enable or disable the system beeper that beeps when a problem occurs. |
| Email Notification | Enable or disable email notifications of system problems. |
| SMTP Server | Specifies the hostname/IP address of the SMTP server. |
| Port | Specifies the port to send outgoing notification emails. |
| Auth Type | Select the SMTP Server account authentication type. |
| SMTP Account ID | Set the SMTP Server Email account ID. |
| Account Password | Enter a new password. |
| E-mail From | Set email address to send email. |
| Receiver's E-mail Address (1,2,3,4) | Add one or more recipient's email addresses to receive email notifications. |

NOTE

Consult with your mail server administrator for email server information.

Firmware Upgrade

From the menu, choose the **Firmware Upgrade** item and the **Firmware Upgrade** screen appears.



Follow the steps below to upgrade your firmware:

1. Use the **Browse** button to find the firmware file.
2. Press **Apply**.
3. The beeper beeps and the Busy LED blinks until the upgrade is complete.

NOTE

- The beeper only beeps if it is enabled in the System Notification menu.
- Check Thecus website for the latest firmware release and release notes.
- Downgrading firmware is not permitted.

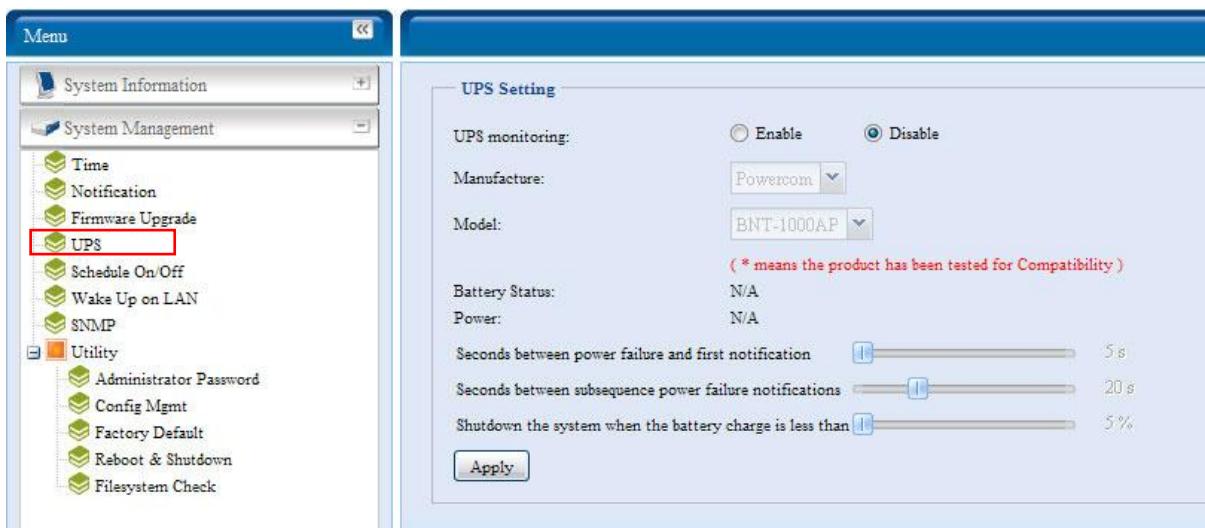
WARNING

Do not turn off the system during the firmware upgrade process.
This will lead to a catastrophic result that may render the system inoperable.

UPS Setting

The 1U4600 can also support various uninterruptible power supply units via either "Serial" or "USB" interface, providing extra data security and accessibility in the case of a power failure.

From the **Status** menu, choose the **UPS** item and the **UPS Setting** screen appears. Make any changes you wish, and press **Apply** to confirm changes.



See the following table for a detailed description of each item.

| UPS Setting | |
|--|---|
| Item | Description |
| UPS Monitoring | Enable or disable UPS monitoring. |
| Manufacturer | Choose the UPS manufacturer from the dropdowns. |
| Model | Choose the UPS model number from the dropdowns. |
| Battery Status | Current status of the UPS battery |
| Power | Current status of the power being supplied to the UPS |
| Seconds between power failure and first notification | Delay between power failure and first notification in seconds. |
| Seconds between subsequent power failure notifications | Delay between subsequent notifications in seconds. |
| Shutdown the system when the battery charge is less than | Amount of UPS battery remaining before system should auto-shutdown. |
| Apply | Press Apply to save your changes. |

For a list of supported UPS units, see [Appendix E: UPS Compatibility List](#).

Schedule Power On/Off

Using the 1U4600's System Management, you can save energy and money by scheduling the 1U4600 to turn itself on and off during certain times of the day.

From the menu, choose the **Schedule Power On/Off** item and the **Schedule Power On/Off** screen appears.

To designate a schedule for the 1U4600 to turn on and off, first enable the feature by checking the **Enable Schedule Power On/Off** checkbox.

Then, simply choose an on and off time for each day of the week that you would like to designate a schedule by using the various dropdowns.

Finally, click **Apply** to save your changes.

| | Action | Time | Action | Time |
|------------|--------|-------|--------|-------|
| Sunday: | None | 00:00 | None | 00:00 |
| Monday: | None | 00:00 | None | 00:00 |
| Tuesday: | None | 00:00 | None | 00:00 |
| Wednesday: | None | 00:00 | None | 00:00 |
| Thursday: | None | 00:00 | None | 00:00 |
| Friday: | None | 00:00 | None | 00:00 |
| Saturday: | None | 00:00 | None | 00:00 |

Example - Monday: On: 8:00; Off: 16:00

System will turn on at 8:00 AM on Monday, and off at 16:00 on Monday. System will turn on for the rest of the week.

If you choose an on time, but do not assign an off time, the system will turn on and remain on until a scheduled off time is reached, or if the unit is shutdown manually.

Example - Monday: On: 8:00

System will turn on at 8:00 AM on Monday, and will not shut down unless powered down manually.

You may also choose two on times or two off times on a particular day, and the system will act accordingly.

Example - Monday: Off: 8:00; On: 16:00

System will turn off at 8:00 AM on Monday. System will turn on at 16:00 PM on Monday, if it was on. If the system was already off at 16:00 PM on Monday, system will stay off.

Wake-Up On LAN (WOL)

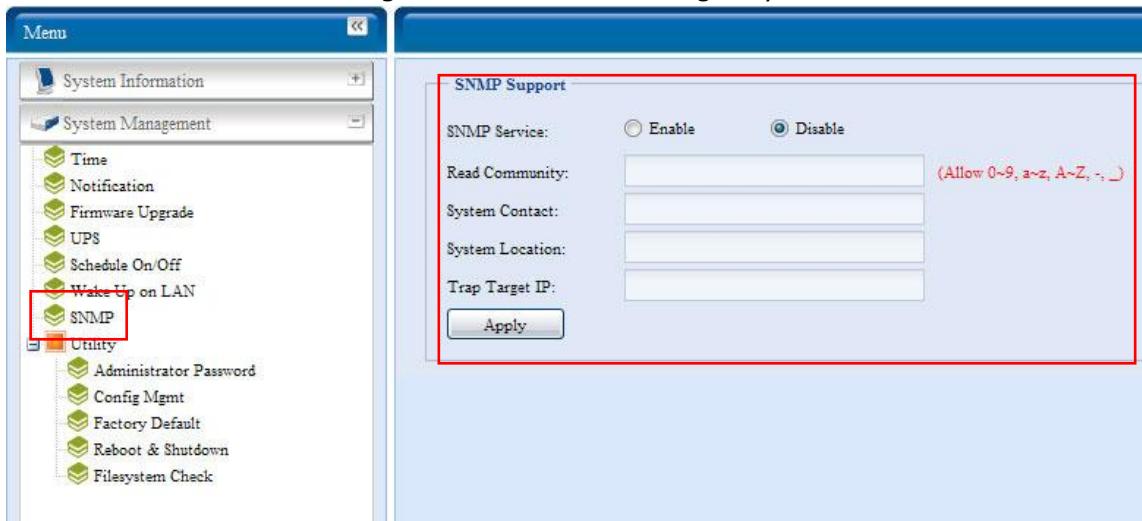
The 1U4600 has the ability to be awoken from sleep mode via WAN port.

From the menu, choose the **WOL** item, and the **Wake-up On LAN** screen appears. From here, you can **Enable** or **Disable**.

| Wake-up On LAN Configuration | |
|------------------------------|---|
| Item | Description |
| WOL Service | Enable or Disable WOL service |
| Apply | Click Apply to save changes. |

SNMP Support

From the menu, choose the **SNMP** item and the **SNMP Support** screen appears. You could enable the SNMP function and filled in the related information in each fields. With the SNMP management software could get system basic information.



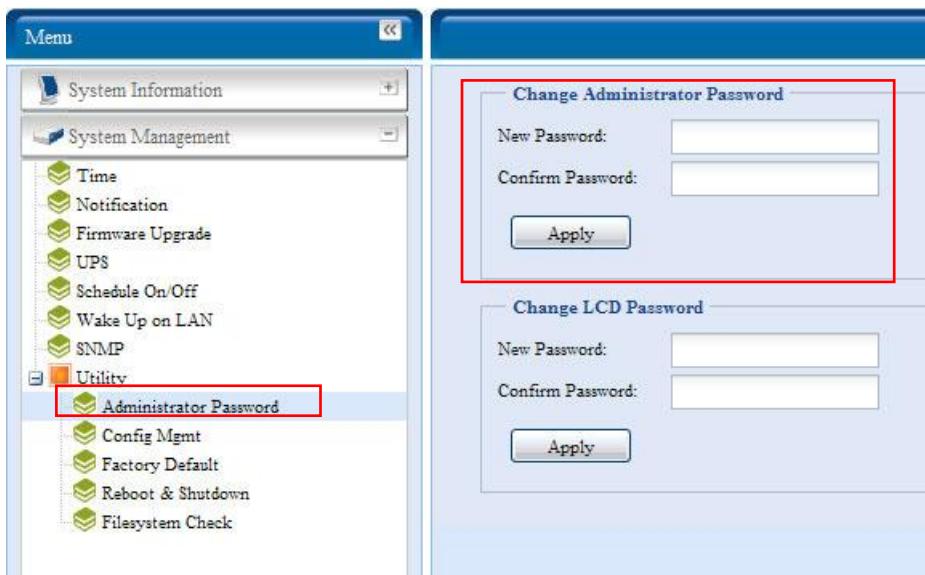
From the menu, choose the **SNMP** item, and the **SNMP Support** screen appears. From here, you can **Enable** or **Disable**.

Utility

Administrator password

From the menu, choose the **Administrator Password** item and the **Change Administrator Password** screen appears. Enter a new password in the **New Password** box and confirm your new password in the **Confirm Password** box. Press **Apply** to confirm password changes.

There is also **password** for enter **LCD** setting you could setup here. Enter a new password in the **New Password** box and confirm your new password in the **Confirm Password** box. Press **Apply** to confirm password changes.



See the following table for a detailed description of each item.

| Change Administrator and LCD Entry Password | |
|---|---|
| Item | Description |
| New Password | Type in a new administrator password. |
| Confirm Password | Type the new password again to confirm. |
| Apply | Press this to save your changes. |

Config Mgmt

From the menu, choose the **Config Mgmt** item and the **System Configuration Download/Upload** screen appears. From here, you can download or upload stored system configurations.



See the following table for a detailed description of each item.

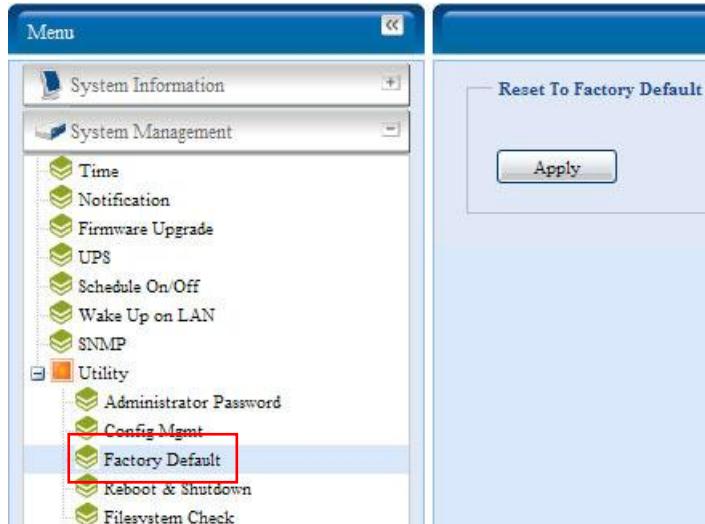
| System Configuration Download/Upload | |
|--------------------------------------|--|
| Item | Description |
| Download | Save and export the current system configuration. |
| Upload | Import a saved configuration file to overwrite current system configuration. |

NOTE

Backing up your system configuration is a great way to ensure that you can revert to a working configuration when you are experimenting with new system settings. The system configuration you have backup can be only restore in same firmware version. And the backup details have excluded user/group accounts.

Factory default

From the menu, choose the **Factory Default** item and the **Reset to Factory Default** screen appears. Press **Apply** to reset the 1U4600 to factory default settings.

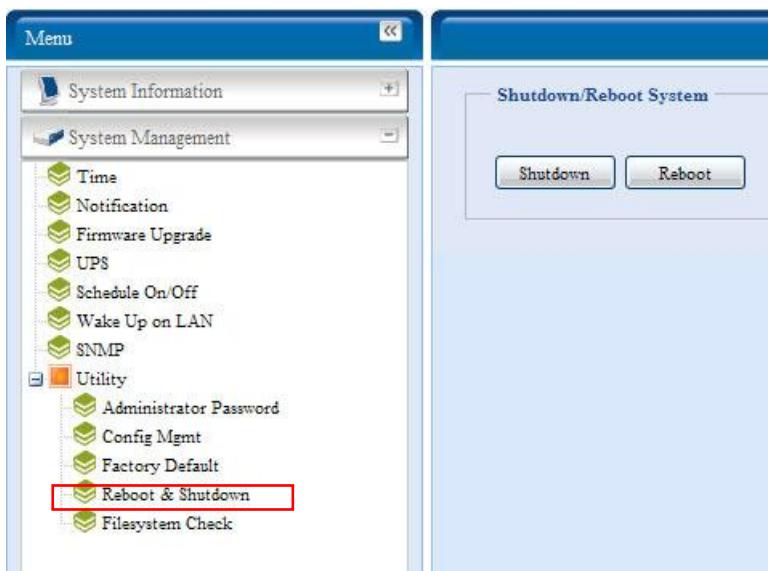


WARNING

Resetting to factory defaults will not erase the data stored in the hard disks, but WILL revert all the settings to the factory default values.

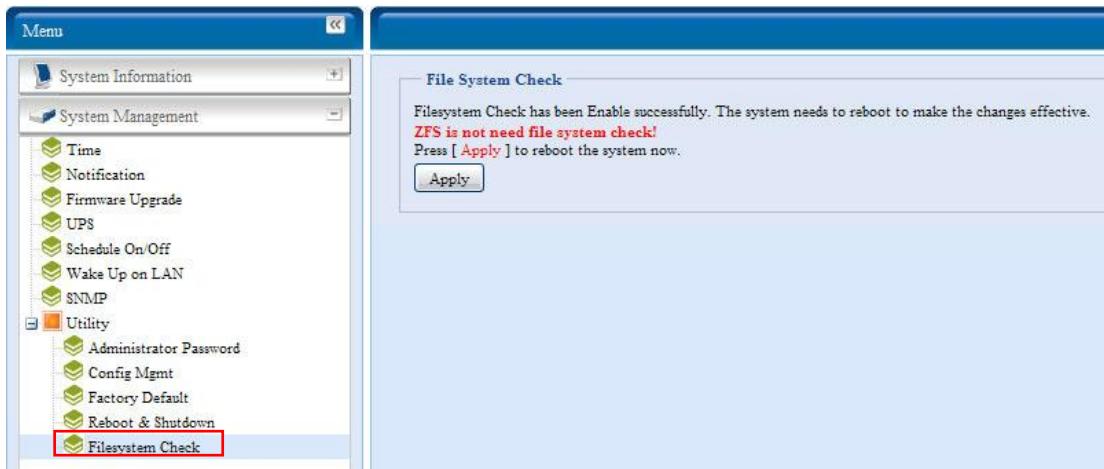
Reboot & Shutdown

From the menu, choose **Reboot & Shutdown** item, and the **Shutdown/Reboot System** screen appears. Press **Reboot** to restart the system or **Shutdown** to turn the system off.



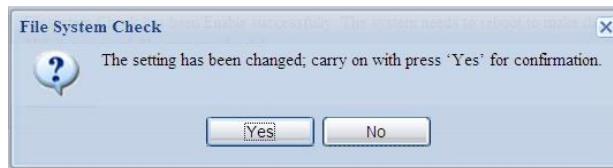
File System check

The File System Check allows you to perform a check on the integrity of your disks' file system. Under the menu, click **File system Check** and the **File System Check** prompt appears.

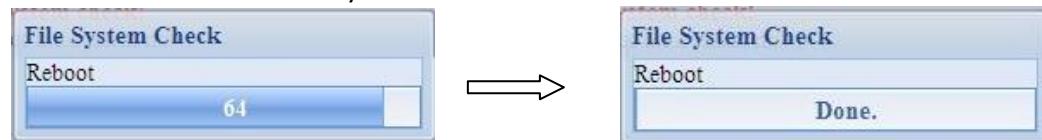


To perform a file system check, click **Apply**.

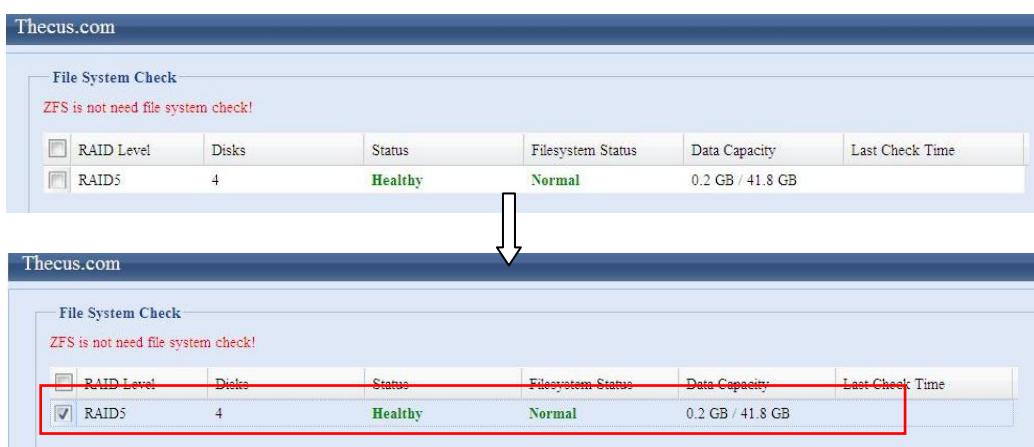
Once clicked, the following prompt will appear:



Click **Yes** to reboot the system.

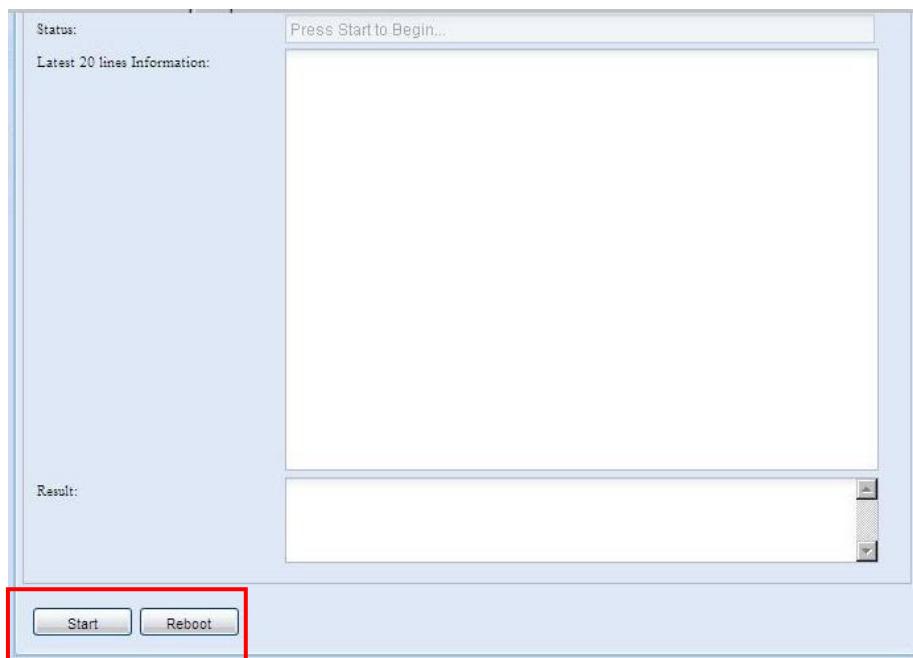


Once the system has rebooted, you will be returned to the **File System Check** prompt. There you will see the available RAID volumes to run the file system check on except ZFS volume, ZFS has no need to perform file system check. Check the desired RAID volumes and click **Next** to proceed with the file system check. Click **Reboot** to reboot without running the check.

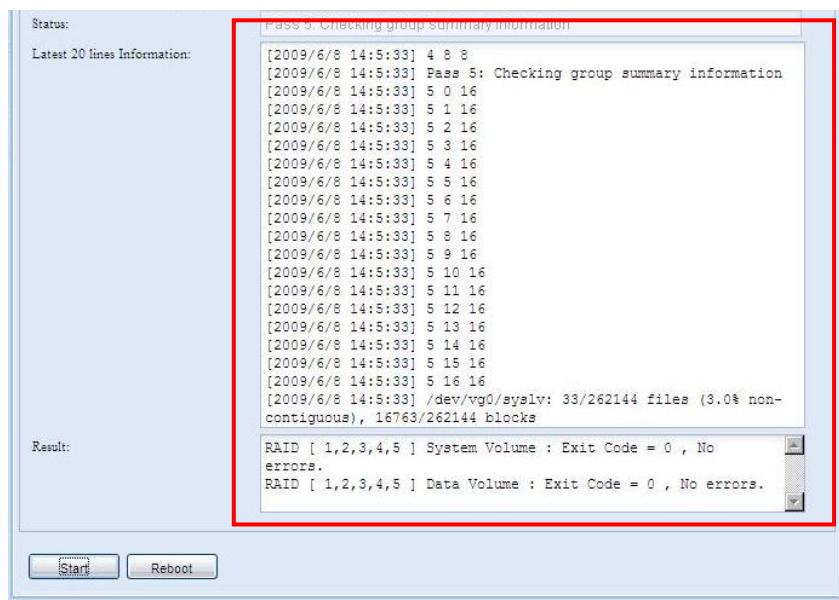


Once you click **Next**, you will see the following screen:





Click **Start** to begin the file system check. Click **Reboot** to reboot the system. When the file system check is run, the system will show 20 lines of information until it is complete. Once complete, the results will be shown at the bottom.



NOTE

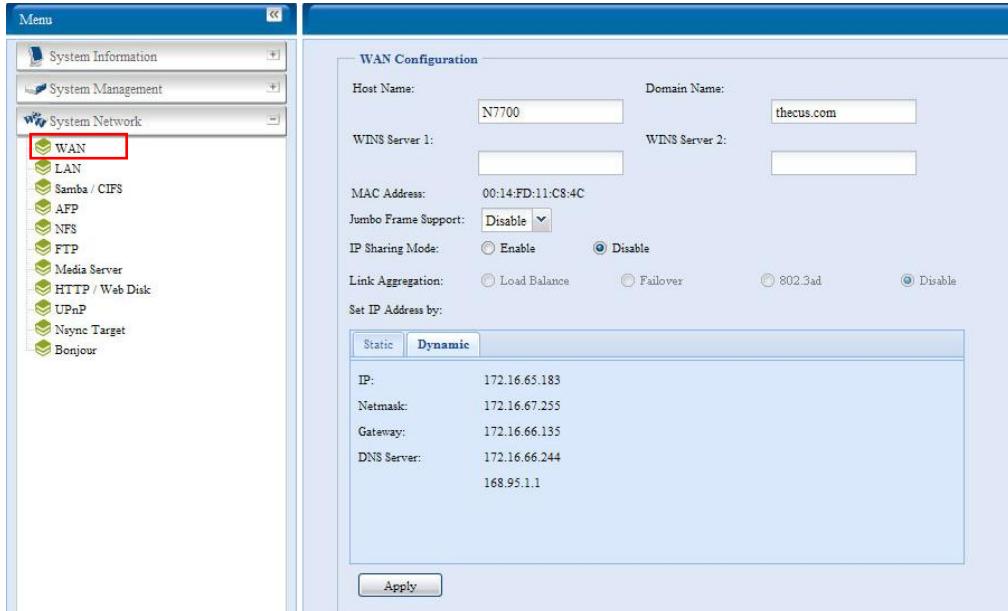
The system must be rebooted before the 1U4600 can function normally after file system check complete.

System Network

Use the **System Network** menu to make network configuration settings as well as service support settings.

WAN Configuration

From the **System Network** menu, choose **WAN**, and the **WAN Configuration** screen appears. This screen displays the network parameters of the WAN connection. You may change any of these items and press **Apply** to confirm your settings. See a description of each item in the following table:



| WAN Configuration | |
|--|---|
| Item | Description |
| Host name | Host name that identifies the 1U4600 on the network. |
| Domain name | Specifies the domain name of the 1U4600. |
| WINS Server | To set a server name for NetBIOS computer. |
| MAC Address | MAC address of the network interface. |
| Jumbo Frame Support | Enable or disable Jumbo Frame Support of the WAN interface on your 1U4600. |
| IP Sharing Mode | When enabled, PCs connected to the LAN port will be able to access the WAN. |
| Link Aggregation | Specifies whether WAN and LAN ports will be aggregated and act as one port. Load Balance: Ethernet traffic will flow alternative between two Ethernet ports. Failover: When one port fails, the other one will take over. 802.3ad: Linkage two Ethernet ports in parallel to increase throughput. |
| Set IP Address by: Static / Dynamic | You can choose a static IP or Dynamic IP, and input your network configuration. |
| IP | IP address of the WAN interface. |
| Netmask | Network mask, which is generally: 255.255.255.0 |
| Gateway | Default Gateway IP address. |
| DNS Server | Domain Name Service (DNS) server IP address. |

NOTE

- Only use Jumbo Frame settings when operating in a Gigabit environment where all other clients have Jumbo Frame Setting enabled.
- Enabling DHCP automatically turns on UPnP— see the Service Support Screen.
- If you are only using the WAN port, we suggest that you disable IP Sharing Mode. This will result in higher throughput.
- A correct DNS setting is vital to networks services, such as SMTP and NTP.
- To use the Link Aggregation with “802.3ad selected” feature, please make sure the networking equipment on the other end of Ethernet cable also supports 802.3ad protocol.

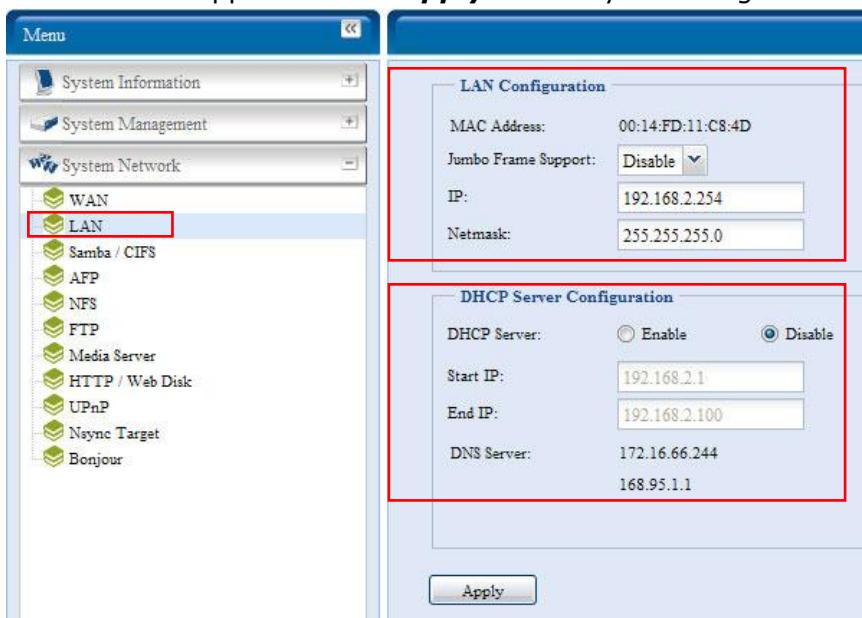
WARNING

Most Fast Ethernet (10/100) Switches/Routers do not support Jumbo Frame and you will not be able to connect to your 1U4600 after Jumbo Frame is turned on. If this happens, turn off the 1U4600. Then, press the reset button on the front panel right below power button. System will bring your network settings back to factory default.

LAN

LAN Configuration

The 1U4600 supports two Gigabit Ethernet ports for higher service availability. To configure these ports, choose **LAN** from the **System Network** menu, and the **LAN Configuration** screen appears. Press **Apply** to save your changes.



LAN Configuration

| Item | Description |
|---------------------|---|
| MAC Address | Displays the MAC address of the LAN interface. |
| Jumbo Frame Support | Enable or disable Jumbo Frame Support on the LAN interface. |
| IP | Specifies the IP address of the LAN interface. |
| Netmask | Specifies the Network Mask of the LAN interface. |

NOTE

Before enabling Jumbo Frame Support, please make sure your network equipment supports Jumbo Frame. If your equipment is incompatible, you might not be able to connect to your 1U4600.

DHCP Server Configuration

A DHCP server can be configured to assign IP addresses to devices connected to the LAN port. To configure these ports, choose **LAN** from the **System Network** menu.

| DHCP Configuration | |
|--------------------|---|
| Item | Description |
| DHCP Server | Enable or disable the DHCP server to automatically assign IP address to PCs connected to the LAN interface. |
| Start IP | Specifies the starting IP address of the DHCP range. |
| End IP | Specifies the ending IP address of the DHCP range. |
| DNS Server | Displayed the DNS server IP address. |

NOTE

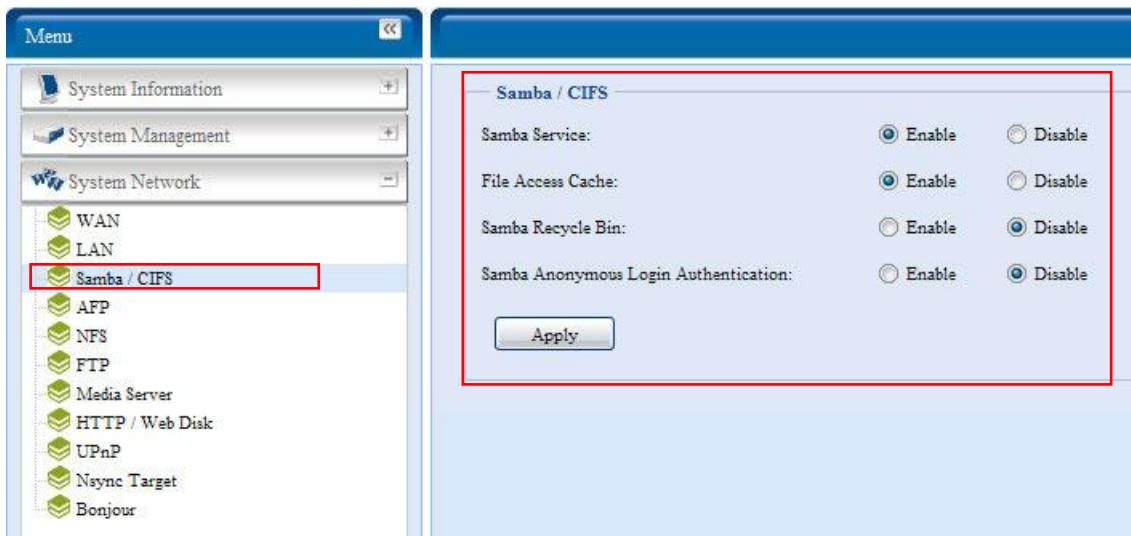
The IP Segment of WAN and LAN should not overlap.

WARNING

The IP address of the LAN interface should not be in the range of the Start IP address and End IP address.

Samba / CIFS

There are 4 options currently allow Admin to Enable/Disable to operate 1U4600 associated with Samba / CIFS protocol. With the option changed, it will need to reboot system to activate.



Samba Service

Used for letting the operating system of UNIX series and SMB/CIFS of Microsoft Windows operating system (Server Message Block / Common Internet File System). Do the link in network protocol. Enable or Disable SMB/CIFS protocol for Windows, Apple, Unix drive mapping.

File Access Cache

File Access Cache is default **Enable**. This option will help to increase the performance while single client access share folder in writing under SMB/CIFS protocol.

Samba Recycle Bin

The 1U4600 is supported recycle bin via SMB/CIFS protocol. Simply enable it then all of deleted files/folders will reside in the ".recycle" folder with hidden attribution in each share.



In general, Windows has default to invisible all of hidden folders/files. So please enable this option to view ".recycle" folder.

Samba Anonymous Login Authentication

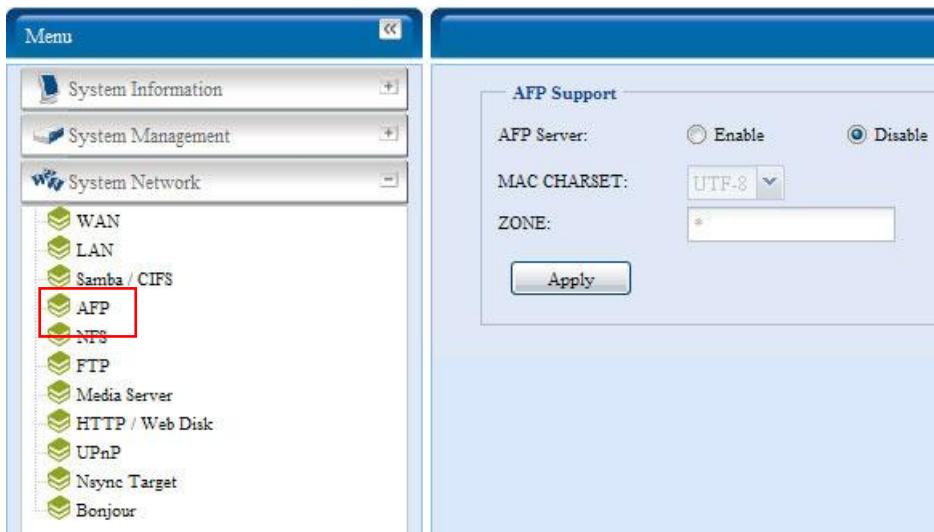
To enable this option, no matter there is share folder has been created in public access. The user account and password is needed from system to access under SMB/CIFS protocol. On the other hand, no more anonymous login is allowed.

NOTE

- In some environments, due to security concerns, you may wish to disable SMB/CIFS as a precaution against computer viruses.

AFP (Apple Network Setup)

From the **System Network** menu, choose the **AFP** item, and the **AFP Support** screen appears. This screen displays the configuration items for the Apple Filing Protocol. You can change any of these items and press **Apply** to confirm your settings.

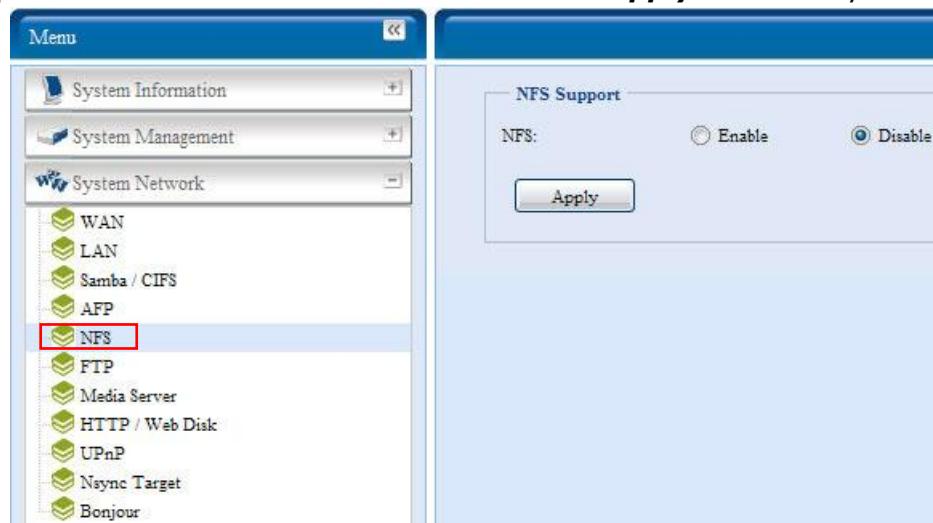


A description of each item follows:

| Apple Network Configuration | |
|------------------------------------|---|
| Item | Description |
| AFP Server | Enable or disable Apple File Service to use the 1U4600 with MAC OS-based systems. |
| Zone | Specifies Zone for Appletalk service. If your Appletalk network uses extended networks and is assigned with multiple zones, assign a zone name to the 1U4600. If you do not want to assign a network zone, enter an asterisk (*) to use the default setting. |

NFS Setup

From the **System Network** menu, choose the **NFS** item, and the **NFS Support** screen appears. The 1U4600 can act as an NFS server, enabling users to download and upload files with the favorite NFS clients. Press **Apply** to confirm your settings.

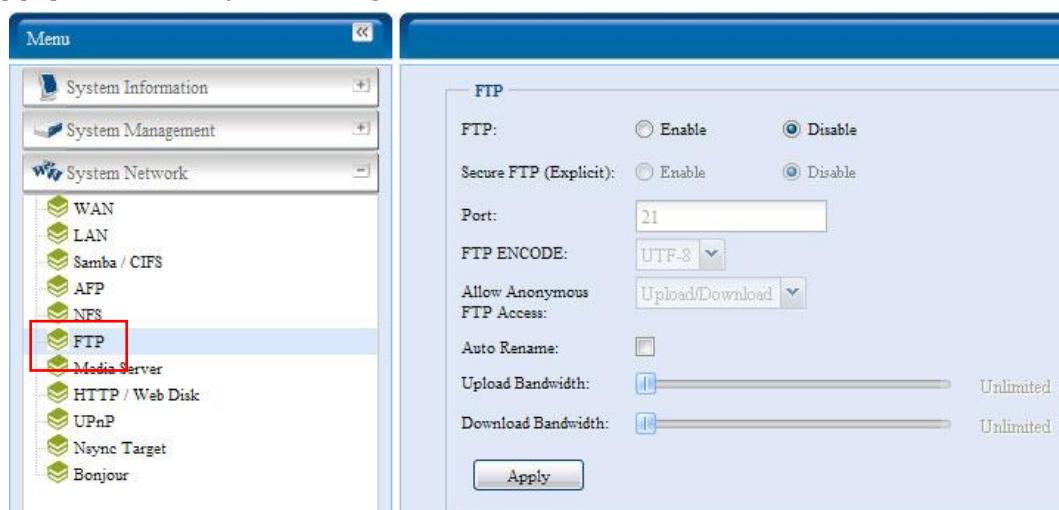


A description of each item follows:

| NFS Server Setting | |
|--------------------|--|
| Item | Description |
| NFS | Enable or Disable NFS support. |
| Apply | Click Apply to save your changes. |

FTP

1U4600 can act as a FTP server, enabling users to download and upload files with their favorite FTP programs. From the **System Network** menu, choose the **FTP** item, and the **FTP** screen appears. You can change any of these items and press **Apply** to confirm your settings.



A description of each item follows:

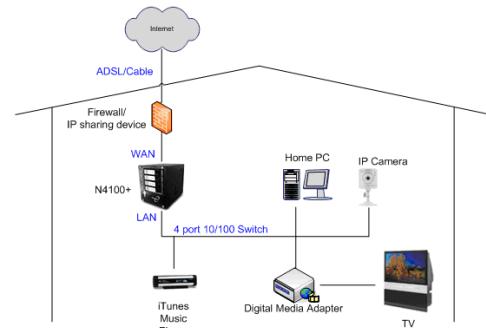
| FTP | |
|----------------------------|---|
| Item | Description |
| FTP | Enable FTP Service on the 1U4600. |
| Security FTP | Enable or disable Security FTP, be sure the client FTP software has also security FTP setting enabled. |
| Port | Specifies the port number of an incoming connection on a non-standard port. |
| FTP ENCODE | If your FTP client or operating system does not support Unicode (e.g. Windows® 95/98/ME or MAC OS9/8), select the same encoding as your OS here in order to properly view the files and directories on the server. Available options are BIG5, HZ, GB2312, GB18030, ISO, EUC-JP, SHIFT-JIS and UTF-8. |
| Allow Anonymous FTP Access | Upload/Download: Allow anonymous FTP users to upload or download files to/from public folders. Download: Allow anonymous FTP users to download files from public folders. No access: Block anonymous FTP user access. |
| Auto Rename | If checked, the system will automatically rename files that are uploaded with a duplicate file name. The renaming scheme is [filename].#, where # represents an integer. |
| Upload Bandwidth | You may set the maximum bandwidth allocated to file uploads. Selections include Unlimited, 1, 2, 4, 8, 16 and 32 MB/s . |
| Download Bandwidth | You may set the maximum bandwidth allocated to file downloads. Selections include Unlimited, 1, 2, 4, 8, 16 and 32 MB/s . |

To access the share folder on the 1U4600, use the appropriate user login and password set up on the **Users** page. Access control to each share folder is set up on the **ACL** page (**Storage Management > Share Folder > ACL**).

Media Server

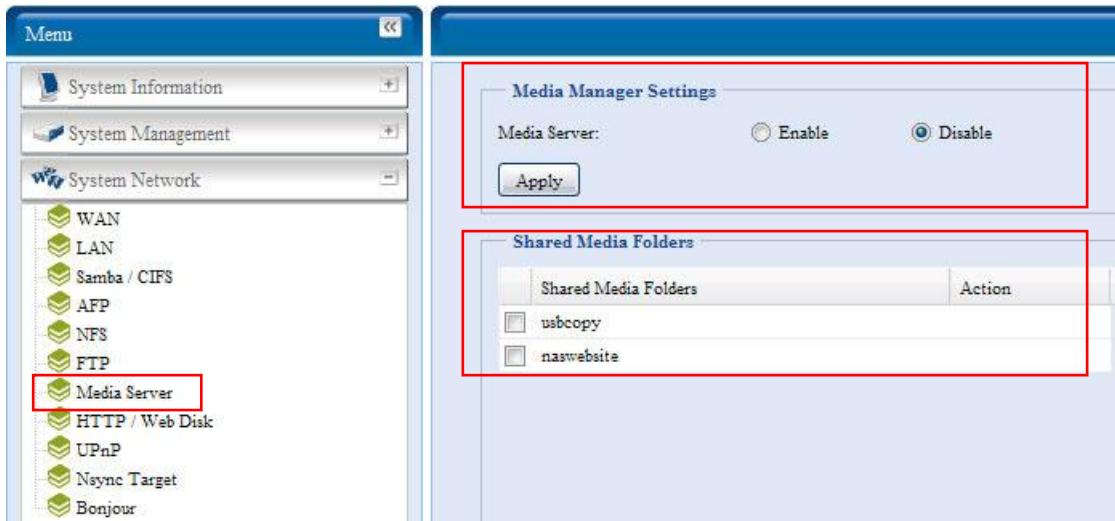
With the built-in Media Server capability, the 1U4600 provides media streaming service to stand-alone networked home media adapters that support the UPnP AV protocol or are Digital Living Network Alliance (DLNA) standard compliant.

With the 1U4600's built-in media server capability, you can share digital media such as music, pictures, and movies with any compatible device throughout your entire home.



Media Manager Settings

To configure the media server, under the **System Network** menu, click Media Server and the Media Manager Settings window will appear.



A description of each field follows:

| Media Manager Settings | |
|------------------------|---|
| Item | Description |
| Media Server | Enable or disable the Media Server service. |
| Shared Media Folders | Select the folder(s) that contains media files to be shared. |
| Rescan | Click the Rescan button to have the 1U4600 scan for new contents in the selected media folder. |

Share Media Folders

Once the Media Server software is installed, you can start adding folders that contain the media that you would like to share. To create a media share folder, follow the steps below:

1. Click on **System Network > Media Server** in the menu bar.
2. From the **Shared Media Folders** window, select the folder that contains your media files, and click its checkbox.
3. The contents in the folder will be scanned for the Media Server. The time required for scanning depends on the size of the folder.

Connecting DMAs to the Media Server

Next, it's time to connect your Digital Media Adapter (DMA) to the media server:

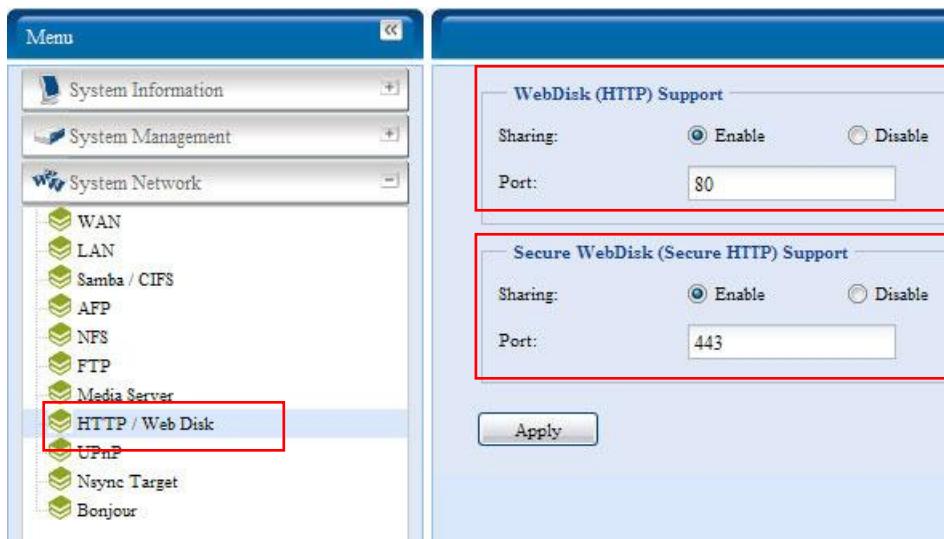
1. Connect your DMA to your Media Server
 - a. Configure your DMA to use a Dynamic IP address. The IP address will be assigned by the router.
 - b. Some DMAs are wireless enabled. You can connect the DMA to a wireless router. For instructions on how to connect your DMA to a wireless router, please refer to your DMA's user manual.
2. Connect your DMA's video output to video input of your TV set.
3. Turn on the TV and change the video signal input to DMA.

4. Setup the DMA (These steps will be different if you use a different DMA)

- a. From the Server List screen, select “**1U4600: Media Server**” as the server.
- b. Go to **My Media**
- c. Click on the **Up/Down Arrow** buttons to select **Music Jukebox, Photo Albums, or Video Clips**
- d. Start enjoying the contents stored in your 1U4600.

HTTP/ Web Disk

From the **System Network** menu, choose the **HTTP/ Web Disk** item, and the **Web Disk (HTTP) Support** screen appears. This screen displays the service support parameters of the system. You can change any of these items and press **Apply** to confirm your settings.



A description of each item follows:

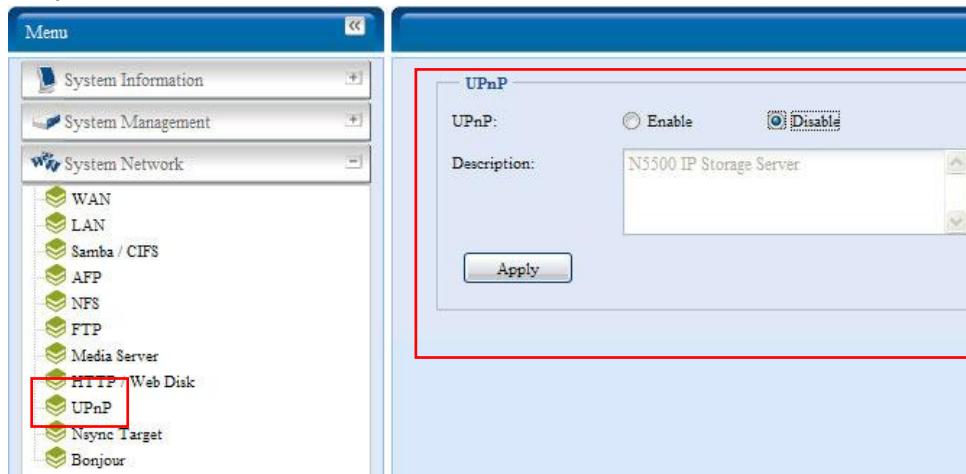
| Web Service | |
|--------------------------------|--|
| Item | Description |
| HTTP (WebDisk) Support | Enable or disable WebDisk support. Enter the port number if this option is enabled. The port number is default 80. |
| HTTPs (Secure WebDisk) Support | Enable or disable secure WebDisk support. Enter the port if this option is enabled. |

NOTE

- Disable HTTP support and Enable Secure HTTP support to guarantee secure access.

UPnP

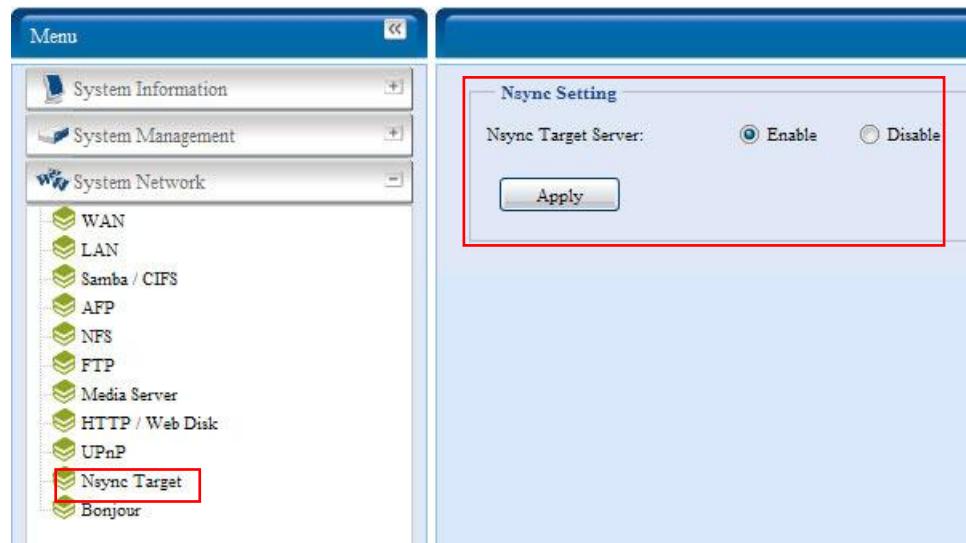
This device supports UPnP Media server, which allows users to play media files with UPnP client (ex. DMA devices). Enable or disable Universal Plug and Play protocol. UPnP helps to find the IP address of the 1U4600.



Nsync Target

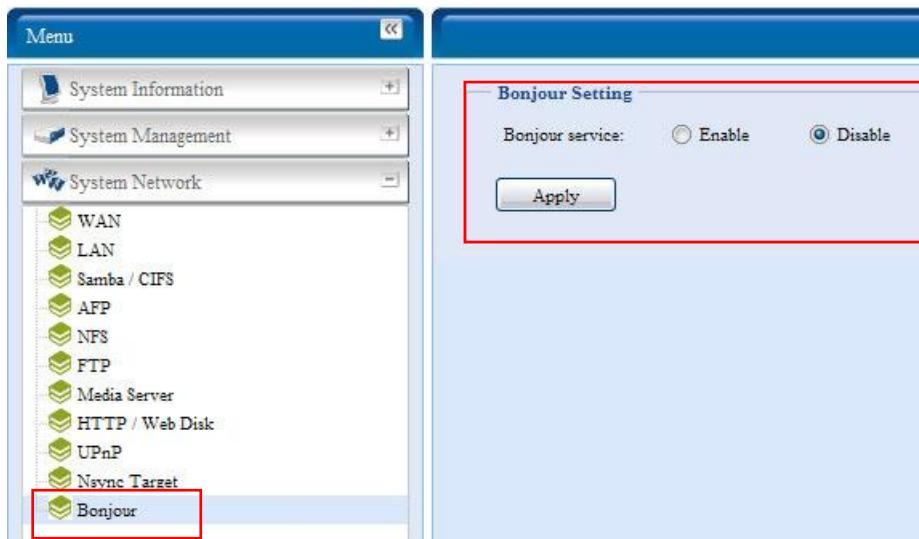
From the **System Network** menu, choose the **Nsync Target** item, and the **Nsync Setting** screen appears. Enable or Disable your Nsync Target Server. Press **Apply** to confirm your settings.

Once **Nsync Target** has been enabled, the other Thecus NAS product is able to operate remote replication to this NAS system.



Bonjour Setting

Bonjour, is Apple Inc.'s trade name for its implementation of Zeroconf, a service discovery protocol. Bonjour locates devices such as printers, as well as other computers, and the services that those devices offer on a local network using multicast Domain Name System service records. This definitive guide walks you through Bonjour zero-configuration networking with a complete description of the protocols and technologies used to create Bonjour enabled applications and devices.



Storage Management

The **Storage** menu displays the status of storage devices installed in the 1U4600, and includes storage configuration options such as RAID and disk settings, folder configuration, space allocation and ISO Mount.

Disks Information

From the **Storage** menu, choose the **Disks** item and the **Disks Information** screen appears. From here, you can see various items about installed SATA hard disks. Blank lines indicate that a SATA hard disk is not currently installed in that particular disk slot.

| Disk No. | Capacity (MB) | Model | Firmware | Status | Bad Block Scan |
|----------|---------------|------------------|----------|--------|----------------|
| 1 | 553,870 | Hitachi HDE71101 | ST60 | OK | Yet to start |
| 2 | 553,870 | Hitachi HDE71101 | ST60 | OK | Yet to start |
| 3 | 553,870 | Hitachi HDE71101 | ST60 | OK | Yet to start |
| 4 | 553,870 | Hitachi HDE71101 | ST60 | OK | Yet to start |

| Disks Information | |
|-----------------------|--|
| Item | Description |
| Disk No. | Indicates disk location. |
| Capacity | Shows the SATA hard disk capacity. |
| Model | Displays the SATA hard disk model name. |
| Firmware | Shows the SATA hard disk firmware version. |
| Status | Indicates the status of the disk. Can read OK , Warning , or Failed . |
| Bad Block scan | Yes to start scan Bad Block. |
| Total Capacity | Shows the total SATA hard disk capacity. |
| Disk Power Management | The administrator can set the disk to power down after a period of inactivity. |

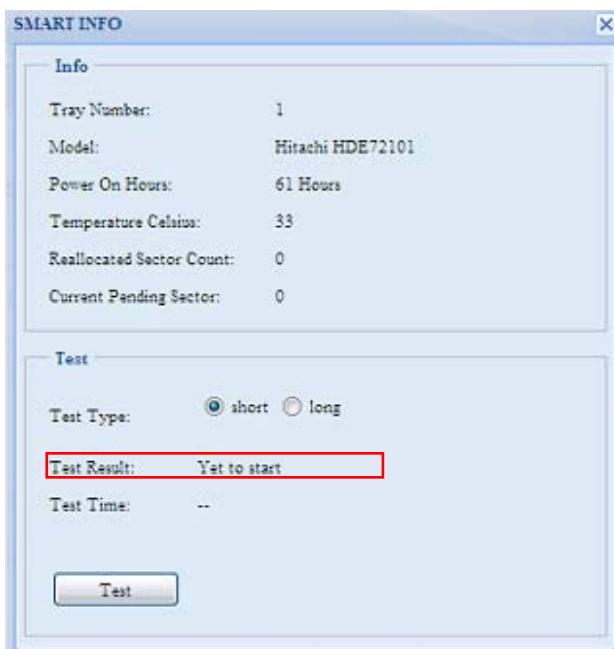
NOTE

When the Status shows Warning, it usually means there are bad sectors on the hard disk. It is shown only as a precaution and you should consider changing the drives.

S.M.A.R.T. Information

On the **Disks Information** screen, the status of each disk will be displayed in the **Status** column. Clicking on an **OK** or **Warning** link will display the **S.M.A.R.T. Information** window for that particular disk.

You may also perform disk SMART test, simply to click "Test" to start with. The result is only for reference and system will not take any action from its result.



| S.M.A.R.T. Information | |
|--------------------------|---|
| Item | Description |
| Tray Number | Tray the hard disk is installed in. |
| Model | Model name of the installed hard disk. |
| Power ON Hours | Count of hours in power-on state. The raw value of this attribute shows total count of hours (or minutes, or seconds, depending on manufacturer) in power-on state. |
| Temperature Celsius | The current temperature of the hard disk in degrees Celsius |
| Reallocated Sector Count | Count of reallocated sectors. When the hard drive finds a read/write/verification error, it marks this sector as "reallocated" and transfers data to a special reserved area (spare area). This process is also known as remapping and "reallocated" sectors are called remaps. This is why, on a modern hard disks, you can not see "bad blocks" while testing the surface - all bad blocks are hidden in reallocated sectors. However, the more sectors that are reallocated, the more a decrease (up to 10% or more) can be noticed in disk read/write speeds. |
| Current Pending Sector | Current count of unstable sectors (waiting for remapping). The raw value of this attribute indicates the total number of sectors waiting for remapping. Later, when some of these sectors are read successfully, the value is decreased. If errors still occur when |

| | |
|-------------|--|
| | reading sectors, the hard drive will try to restore the data, transfer it to the reserved disk area (spare area), and mark this sector as remapped. If this attribute value remains at zero, it indicates that the quality of the corresponding surface area is low. |
| Test Type | Set short or long time to test. |
| Test Result | Result of the test. |
| Test Time | Total time of the test. |

NOTE

If the Reallocated Sector Count > 32 or Current Pending Sector of a hard disk drive > 0 , the status of the disk will show "Warning". This warning is only used to alert the system administrator that there are bad sectors on the disk, and they should replace those disks as soon as possible.

Bad Block Scan

On the **Disks Information** screen, you may also perform disk bad block scan, simply to click "Yet to start" to start with. The result is only for reference and system will not take any action from its result.

| Disks Information | | | | | | |
|------------------------------|---------------|------------------|----------|--------|----------------|--|
| Disk No. | Capacity (MB) | Model | Firmware | Status | Bad Block Scan | |
| 1 | 953,870 | Hitachi HDE71101 | ST60 | OK | ▶ Yet to start | |
| 2 | 953,870 | Hitachi HDE71101 | ST60 | OK | Scanning (6%) | |
| 3 | 953,870 | Hitachi HDE71101 | ST60 | OK | ▶ Yet to start | |
| 4 | 953,870 | Hitachi HDE71101 | ST60 | OK | ▶ Yet to start | |
| Total Capacity: 3815480 (MB) | | | | | | |

The testing result will be stay till system reboot with "Yet to start" displayed as default.

RAID Information

From the **Storage** menu, choose the **RAID** item and the **RAID Information** screen appears.

This screen lists the RAID volumes currently residing on the 1U4600. From this screen, you can get information about the status of your RAID volumes, as well as the capacities allocated for data, target USB and iSCSI. There is also a graph which represents how the RAID volume is currently allocated.

The screenshot shows two windows side-by-side. The left window is a sidebar menu titled 'Menu' with the following items: System Information, System Management, System Network, Storage, DISKS (highlighted with a red box), RAID (highlighted with a red box), Space Allocation, Share Folder, Stackable, and ISO Mount. The right window is titled 'RAID Information' and contains a table with the following columns: Master RAID, ID, RAID Level, Status, Disks Used, Total Capacity, Data Capacity, USB Capacity, and iSCSI Capacity. At the top of this window, there are 'Create' and 'Edit' buttons, both highlighted with a red box.

| Master RAID | ID | RAID Level | Status | Disks Used | Total Capacity | Data Capacity | USB Capacity | iSCSI Capacity |
|-------------|----|------------|--------|------------|----------------|---------------|--------------|----------------|
| | | | | | | | | |

| RAID Information | |
|------------------|--|
| Item | Description |
| Master RAID | The RAID volume currently designated as the Master RAID volume. |
| ID | ID of the current RAID volume. NOTE: All RAID IDs must be unique. |
| RAID Level | Shows the current RAID configuration. |
| Status | Indicates status of the RAID. Can read either Healthy , Degraded , or Damaged . |
| Disks Used | Hard disks used to form the current RAID volume. |
| Total Capacity | Total capacity of the current RAID. |
| Data Capacity | Indicates the used capacity and total capacity used by user data. |
| USB Capacity | Total capacity of the target USB Device. |
| iSCSI Capacity | Indicates the capacity allocated to iSCSI. |

Create a RAID

On the **RAID Information** screen, press the **create** button to go to the **CREATE RAID** screen. In addition to RAID disk information and status, this screen lets you make RAID configuration settings.

Using **Create RAID**, you can select stripe size, choose which disks are RAID disks or the Spare Disk. .

| RAID Configurations | |
|---------------------|---|
| Item | Description |
| Disk No. | Number assigned to the installed hard disks. |
| Capacity (MB) | Capacity of the installed hard disks. |
| Model | Model number of the installed hard disks. |
| Status | Status of the installed hard disks. |
| Used | If this is checked, current hard disk is a part of a RAID volume. |
| Spare | If this is checked, current hard disk is designated as a spare for a RAID volume. |
| Master RAID | Check a box to designate this as the Master RAID volume. See the NOTE below for more information. |
| Stripe Size | This sets the stripe size to maximize performance of sequential files in a storage volume. Keep the 64K setting unless you require a special file storage layout in the storage volume. A larger stripe size is better for large files. |
| Data Percentage | The percentage of the RAID volume that will be used to store data. |
| Create | Press this button to configure a file system and create the RAID storage volume. |

To create a RAID volume, follow the steps below:

1. On the **RAID Information** screen, click **create**.
2. On the **RAID Configuration** screen, set the RAID storage space as **JBOD**, **RAID 0**, **RAID 1**, **RAID 5**, **RAID 6**, or **RAID 10** — see [Appendix C: RAID Basics](#) for a detailed description of each.
3. Specify a RAID ID.
4. If this RAID volume is meant to be the Master RAID volume, tick the **Master RAID** checkbox.

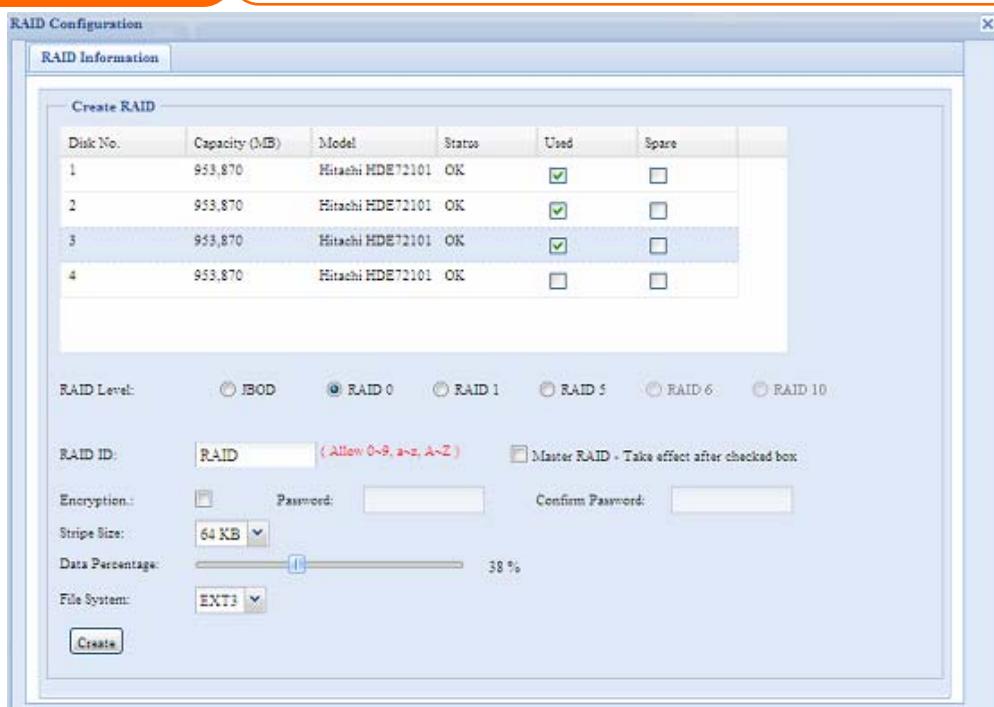
NOTE

In a multiple RAID configuration, one RAID volume must be designated as the Master RAID volume. The Master RAID volume will store all installed modules. If the Master RAID is changed to another location (i.e. assigning volume 2 to be the Master RAID volume after volume 1 had been previously assigned), then all modules must be reinstalled. In addition, all system folders that were contained on the Master RAID volume will be invisible. Reassigning this volume to be the Master RAID will make these folders visible again.

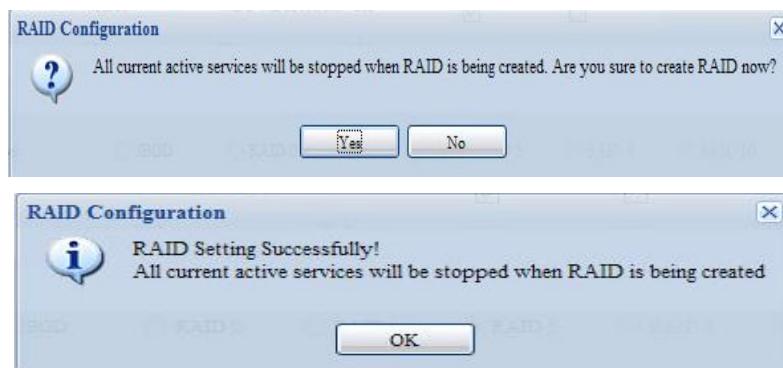
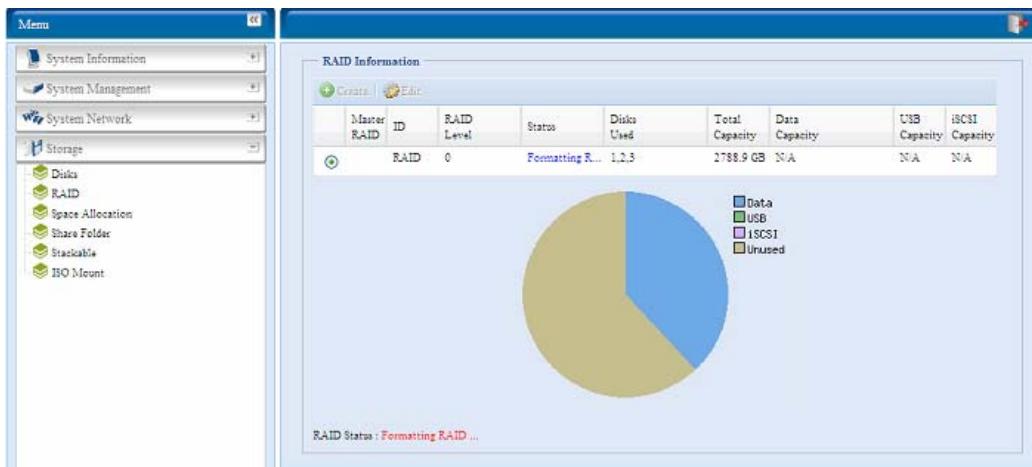
5. Specify a stripe size — 64K is the default setting.
6. Specify the percentage allocated for user data by drag the horizontal bar. The remaining space will be made available for target USB or iSCSI.
7. Selected the file system you like to have for this RAID volume. The selection is available from ext3, XFS and ZFS.

NOTE

- Select ZFS file system while snapshot is needed. It is only one ZFS file system allowed to be created per system.
- ZFS file system is only accessible by CIFS/SMB, not for AFP and NFS users.
- XFS file system is not support folder quota feature



8. Press **Create** to build the RAID storage volume.



NOTE

Building a RAID volume may take time, depending on the size of hard drives and RAID mode. In general, while the RAID volume building process is up to "RAID Building" then the data volume is capable to be accessed.

WARNING

Creating RAID destroys all data in the current RAID volume. The data is unrecoverable.

With a RAID 1, RAID 5, RAID 6, or RAID 10 volume, you can also add a spare disk after the RAID is created.

See **Chapter 6: Tips and Tricks > Adding a Spare Disk** for details.

For more information on RAID, see **Appendix C: RAID Basics**.

RAID Level

You can set the storage volume as **JBOD, RAID 0, RAID 1, RAID 5, RAID 6 or RAID 10**. RAID configuration is usually required only when you first set up the device. A brief description of each RAID setting follows:

| RAID Levels | |
|-------------|---|
| Level | Description |
| JBOD | The storage volume is a single HDD with no RAID support. JBOD requires a minimum of 1 disk. |
| RAID 0 | Provides data striping but no redundancy. Improves performance but not data safety. RAID 0 requires a minimum of 2 disks. |
| RAID 1 | Offers disk mirroring. Provides twice the read rate of single disks, but same write rate. RAID 1 requires a minimum of 2 disks. |
| RAID 5 | Data striping and stripe error correction information provided. |

| | |
|---------|--|
| | RAID 5 requires a minimum of 3 disks. RAID 5 can sustain one failed disk. |
| RAID 6 | Two independent parity computations must be used in order to provide protection against double disk failure. Two different algorithms are employed to achieve this purpose. RAID 6 requires a minimum of 4 disks. RAID 6 can sustain two failed disks. |
| RAID 10 | RAID 10 has high reliability and high performance. RAID 10 is implemented as a striped array whose segments are RAID 1 arrays. It has the fault tolerance of RAID 1 and the performance of RAID 0. RAID 10 requires 4 disks. RAID 10 can sustain two failed disks. |

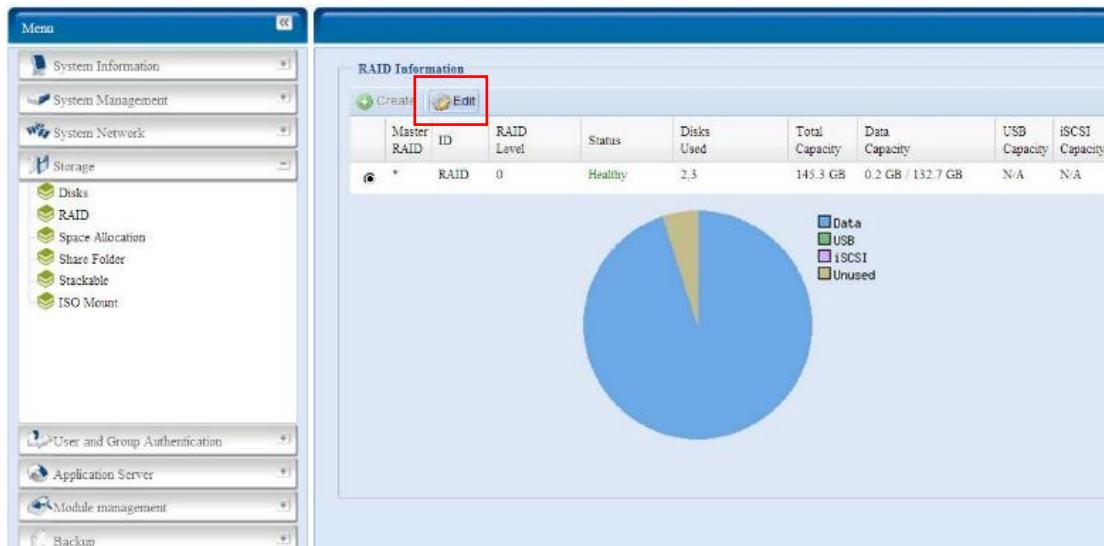
WARNING

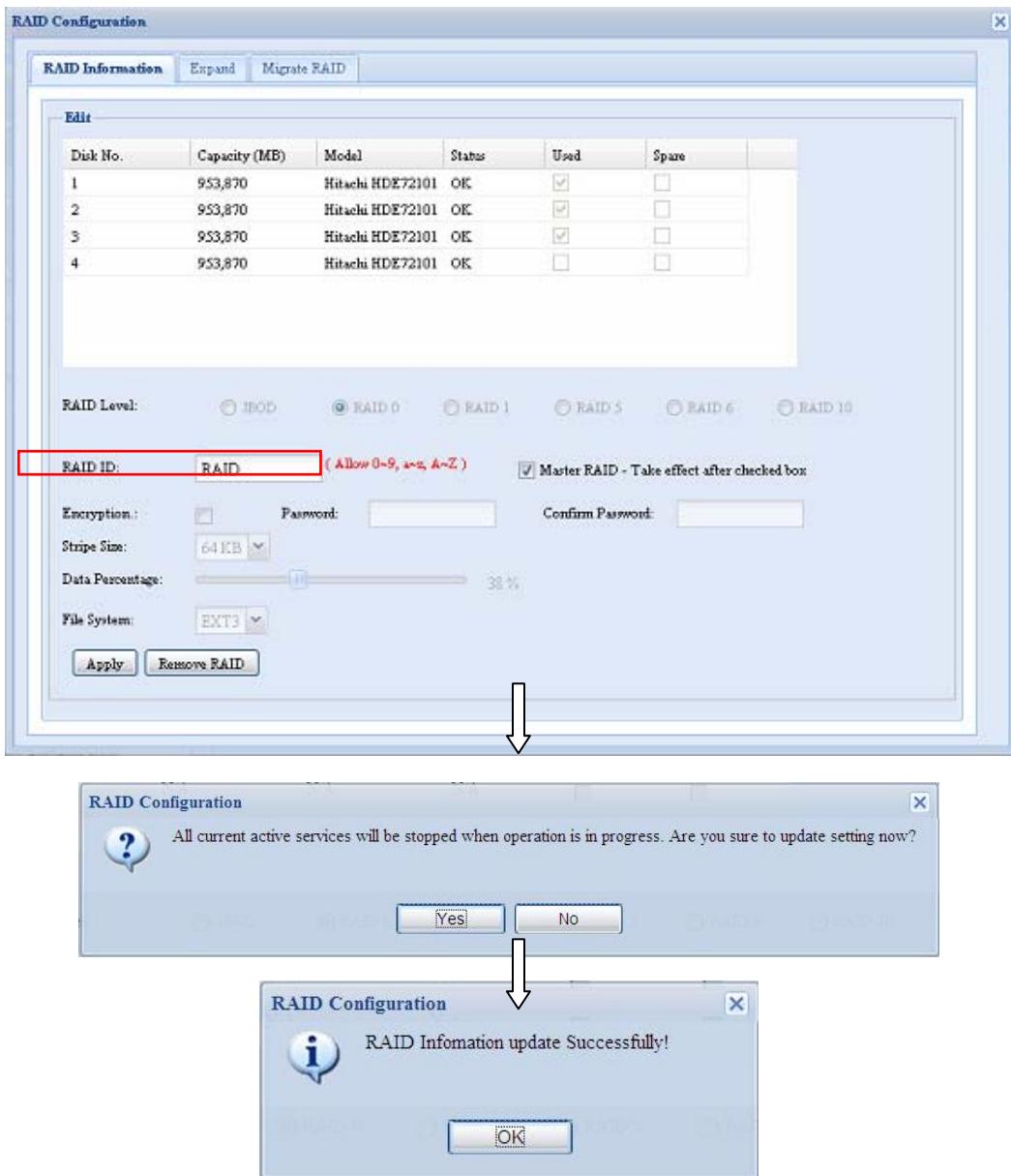
If the administrator improperly removes a hard disk that should not be removed when RAID status is degraded, all data will be lost.

Edit RAID

On the **RAID Information** screen, press the **Edit** button to go to the **RAID Information** screen.

Using **Edit RAID**, you can select RAID ID and the Spare Disk..



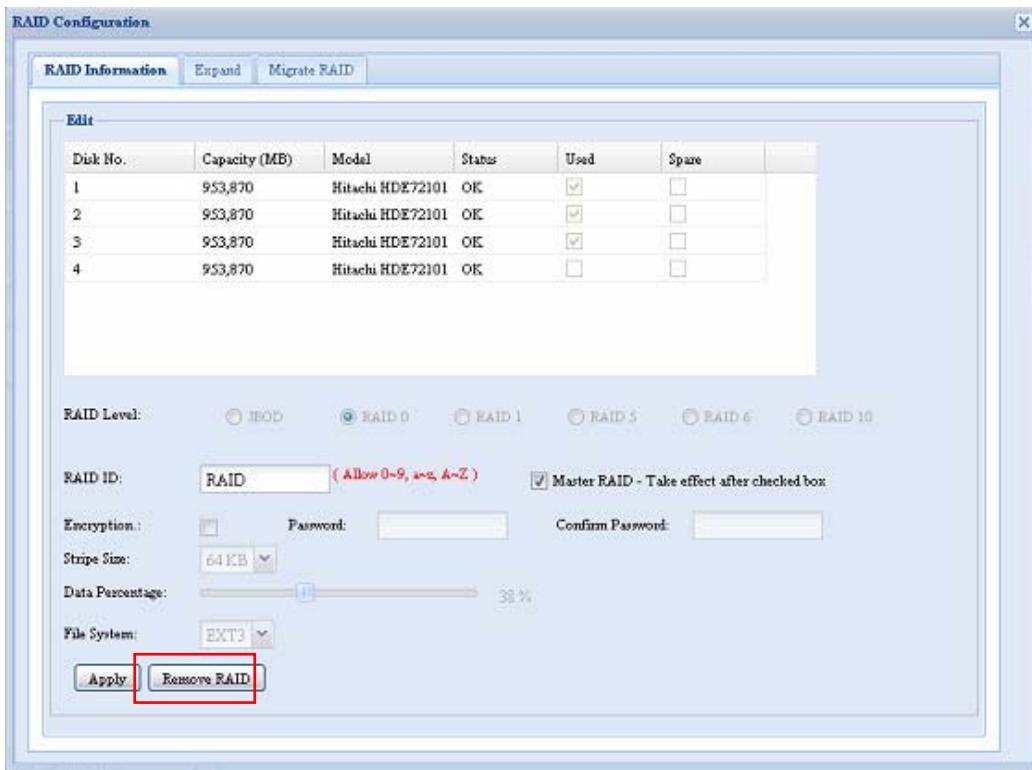


Remove RAID

Click to remove the RAID volume. All user data, iSCSI and target USB data been created in selected RAID volume will be removed.

To remove a RAID volume, follow the steps below:

1. On the RAID List screen, select the RAID volume by clicking on its radio button, and click **RAID Information** to open the **RAID Configuration** screen.
2. On the **RAID Configuration** screen, click **Remove RAID**.
3. The confirmation screen appear, you will have to input "Yes" with exactly wording case to complete "**Remove RAID**" operation



WARNING

Remove RAID destroys all data in the current RAID volume. The data is unrecoverable.

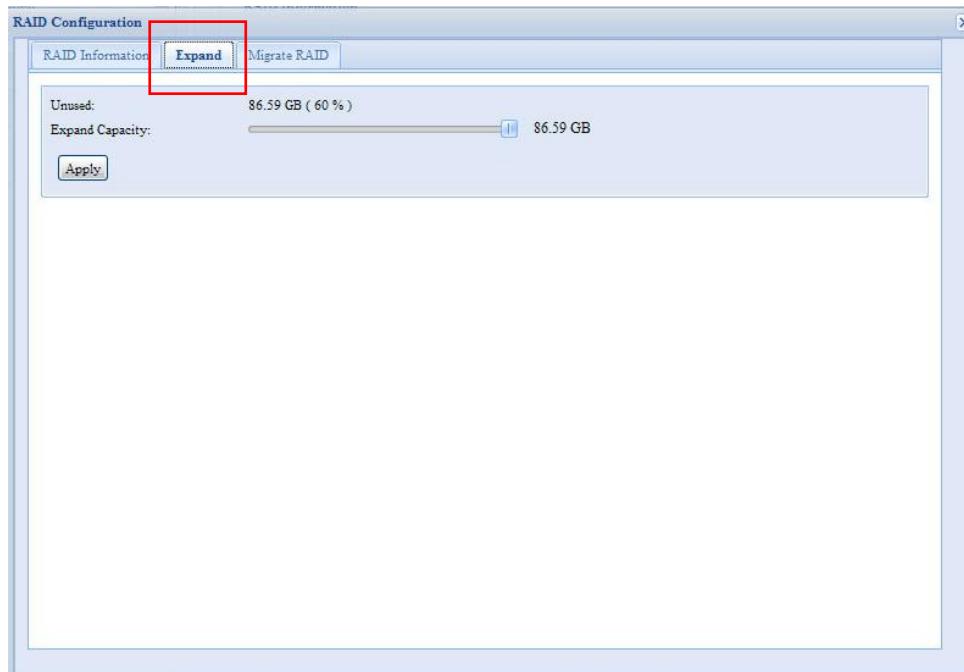
Expanding a RAID

To expand a RAID 1, RAID 5, RAID 6, or RAID 10 volume, follow the steps below:

1. Replace one of the hard drives in the RAID volume and allow it to automatically rebuild.
2. Once rebuilt, you can continue to replace any remaining disks in the RAID array.
3. When you are done replacing hard drives, log on to Web Management. Navigate to **Storage > RAID** to open the **RAID Configuration** screen.
4. On the **RAID Information** screen, and click **Edit** to open the **RAID Configuration** screen.
5. On the **RAID Configuration** screen, click **Expand**.

NOTE

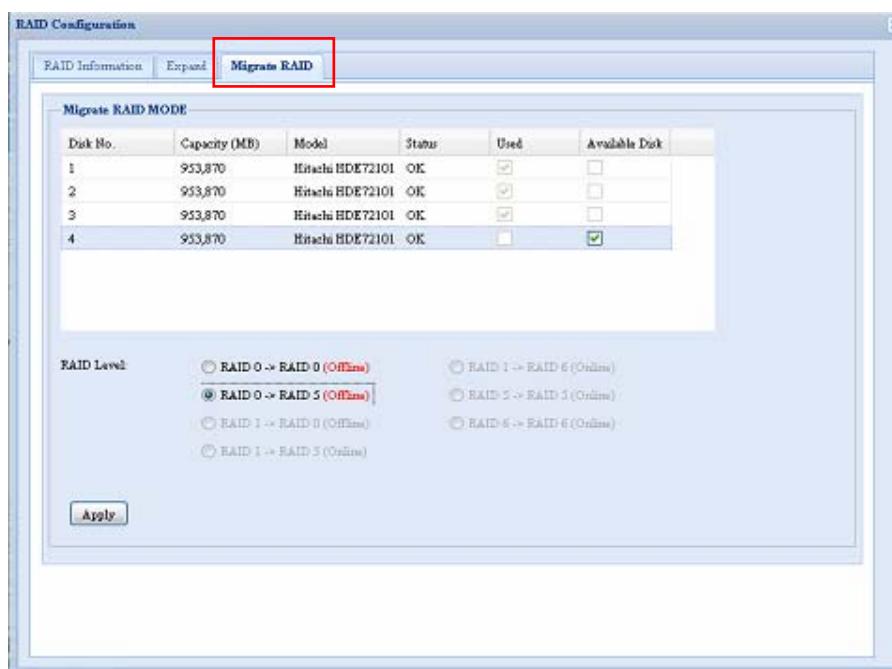
RAID expansion did not support file system created by ZFS.

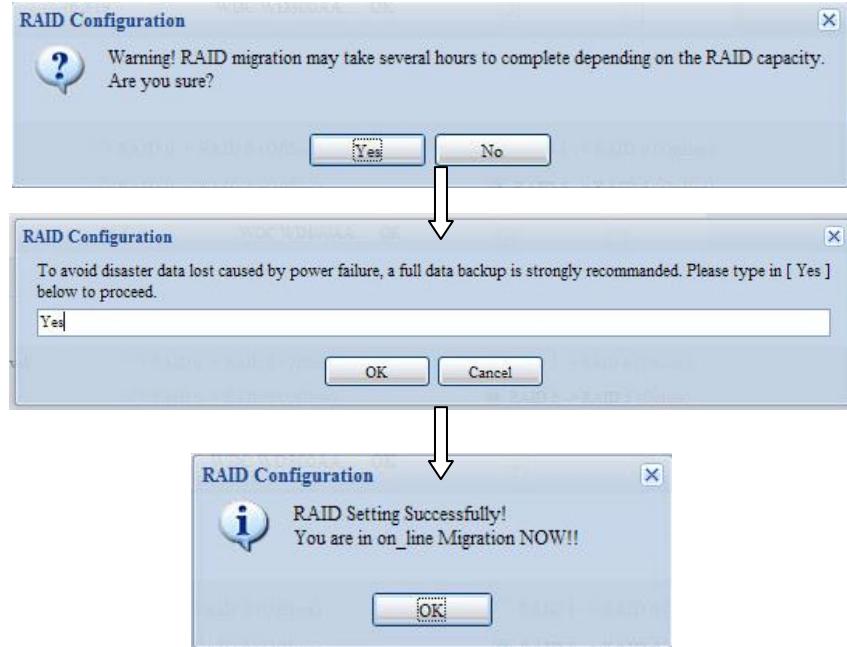


Migrating a RAID

Once a RAID volume has been created, you may want to move it to other physical drives or change the RAID array all together. To migrate a RAID 0, RAID 1, RAID 5 or RAID 6 volume, follow the steps below:

1. From the RAID Configuration screen, click **Migrate RAID**.
2. A list of possible RAID migration configurations will be listed. Select the desired migration scheme and click **Apply**.
3. The system will begin migrating the RAID volume.





NOTE

Migrating a RAID volume could take several hours to complete

With RAID level migration function, it has two different type "On line" and "Off line" alone with limitation as listed below.

1. During RAID level migration, it is not allowed reboot or shutdown system.
2. Off line RAID level migration, all services will stop and data is inaccessible.
3. To have ZFS file system created doing on line RAID level migration from **R1 to R5 or R1 to R6**, the all services will restart and volumes "user data", "iSCSI" and "Target USB" are read only during operation.
4. To have ext3 and XFS file system created doing on line RAID level migration from **R1 to R5 or R1 to R6**, the all services will restart and volumes "iSCSI" and "Target USB" are read only but "user data" is capable read / write during operation.
5. The other combination to make as "On line" can have read / write work as normal.

Below is a table listing of possible RAID migration schemes:

| To From | RAID 0 | RAID 5 | RAID 6 |
|---------------|--|--|---|
| RAID 0 | <p>[OFFLINE]</p> <p>[RAID 0] HDDx2 to [RAID 0] HDDx3</p> <p>[RAID 0] HDDx2 to [RAID 0] HDDx4</p> <p>[RAID 0] HDDx3 to [RAID 0] HDDx4</p> | <p>[OFFLINE]</p> <p>[RAID 0] HDDx2 to [RAID 5] HDDx3</p> <p>[RAID 0] HDDx2 to [RAID 5] HDDx4</p> <p>[RAID 0] HDDx3 to [RAID 5] HDDx4</p> | X |
| RAID 1 | <p>[OFFLINE]</p> <p>[RAID 1] HDDx2 to [RAID 0] HDDx2</p> <p>[RAID 1] HDDx2 to [RAID 0] HDDx3</p> <p>[RAID 1] HDDx2 to [RAID 0] HDDx4</p> <p>[RAID 1] HDDx3 to [RAID 0] HDDx4</p> | <p>[ONLINE]</p> <p>[RAID 1] HDDx2 to [RAID 5] HDDx3</p> <p>[RAID 1] HDDx2 to [RAID 5] HDDx4</p> <p>[RAID 1] HDDx3 to [RAID 5] HDDx4</p> | <p>[ONLINE]</p> <p>[RAID 1] HDDx2 to [RAID 6] HDDx4</p> <p>[RAID 1] HDDx3 to [RAID 6] HDDx4</p> |
| RAID 5 | X | <p>[ONLINE]</p> <p>[RAID 5] HDDx3 to [RAID 5] HDDx4</p> | X |

Space Allocation

You may specify the space allocated for both Target USB and iSCSI volumes. The iSCSI volume can be created up to 5 volumes per RAID volume.

To do this, under the **Storage** menu, click **RAID** and the **RAID List** window appears. Select the RAID volume you wish to reallocate by clicking on its radio button, and click **Space Allocation**. The **RAID Information** and **Volume Allocation List** windows will appear.

The Volume Allocation List displays the space allocated for **Target USB** and **iSCSI** volumes on the current RAID volume. The N5200PRO supports up to five iSCSI volumes.

The screenshot shows the Storage interface with the 'Space Allocation' option selected in the left sidebar. The main window displays 'RAID Information' for RAID 5 and a 'Volume Allocation List' table. The table has columns for Type, Name, and Capacity. Buttons for Modify, Delete, iSCSI Target, and Target USB are at the top of the list.

| Type | Name | Capacity |
|------------|------------|----------|
| Target USB | Target USB | 27.4 GB |
| iSCSI | iscsi | 30.3 GB |

| Volume Allocation List | |
|------------------------|---|
| Item | Description |
| Modify | Click this to modify the allocated space. |
| Delete | Click this to delete the allocated space. |
| iSCSI Target | Click to allocate space to iSCSI volume. |
| Target USB | Click to allocate space to USB volume. |
| Type | Type of volume. Can be either USB or iSCSI. |
| Name | Name assigned to the volume. |
| Capacity | Capacity of the allocated space. |

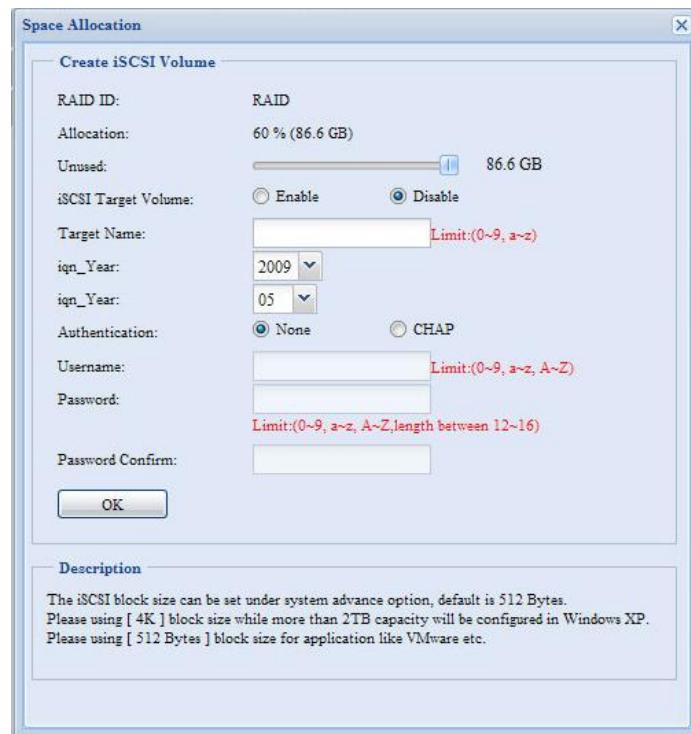
Allocating Space for iSCSI Volume

The screenshot shows the Storage interface with the 'Space Allocation' option selected in the left sidebar. The main window displays 'RAID Information' for RAID 5 and a 'Volume Allocation List' table. The table has columns for Type, Name, and Capacity. The 'iSCSI Target' button is highlighted with a red box. The table shows two entries: 'Target USB' and 'iSCSI'. The 'iSCSI' entry is also highlighted with a red box.

| Type | Name | Capacity |
|------------|------------|----------|
| Target USB | Target USB | 27.4 GB |
| iSCSI | iscsi | 30.3 GB |

To allocate space for an iSCSI volume on the current RAID volume, follow the steps below:

- Under the **Volume Allocation List**, click **iSCSI Target**.
The **Create iSCSI Volume** screen appears.



| Create iSCSI Volume | |
|---------------------|--|
| Item | Description |
| RAID ID | ID of current RAID volume. |
| Allocation | Percentage and amount of space allocated to iSCSI volume. |
| Unused | Percentage and amount of unused space on current RAID volume. |
| iSCSI Target Volume | Enable or Disable the iSCSI Target Volume. |
| Target Name | Name of the iSCSI Target. This name will be used by the Stackable NAS function to identify this export share. |
| Year | Select the current year from the dropdown. |
| Authentication | You may choose CHAP authentication or choose None. |
| Month | Select the current month from the dropdown. |
| Username | Enter a username. |
| Password | Enter a password. |
| Password Confirm | Reenter the chosen password |

- Designate the percentage to be allocated from the **Allocation** drag bar.
- Enable the **iSCSI Target Service** by selecting **Enable**.
- Choose to enable **CHAP** authentication or choose **None**.
- Enter a **Target Name**. This will be used by the **Stackable NAS** function to identify this export share.
- Choose the current year from the **Year** dropdown.
- Choose the current month from the **Month** dropdown.
- If you've enabled CHAP authentication, enter a **username** and a **password**. Confirm your chosen password by reentering it in the **Password Confirm** box.

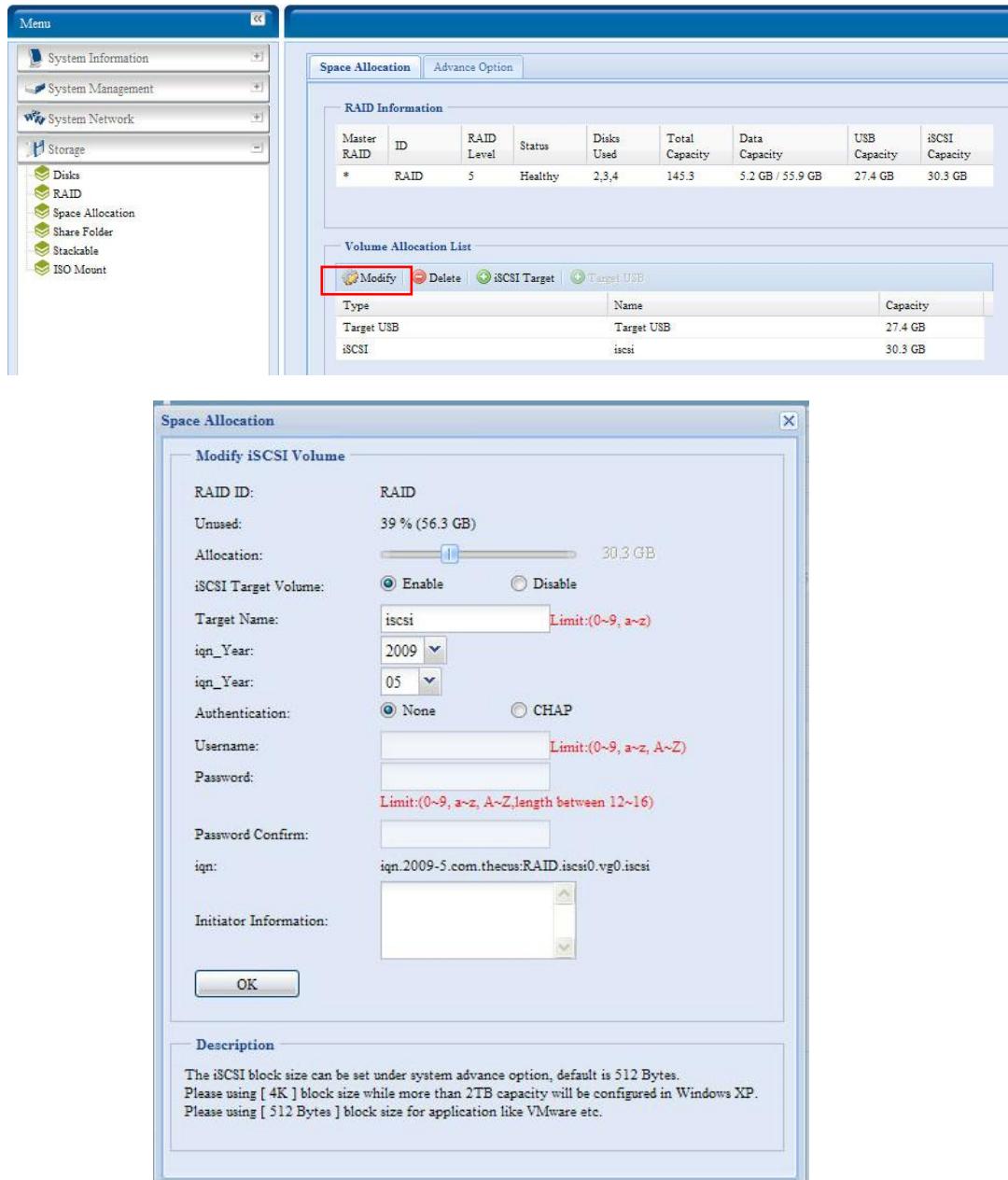
9. Click **OK** to create the iSCSI volume.

Modify iSCSI Volume

To Modify iSCSI volume on the current RAID volume, follow the steps below:

1. Under the **Volume Allocation List**, click **Modify**.

The **Modify iSCSI Volume** screen appears.



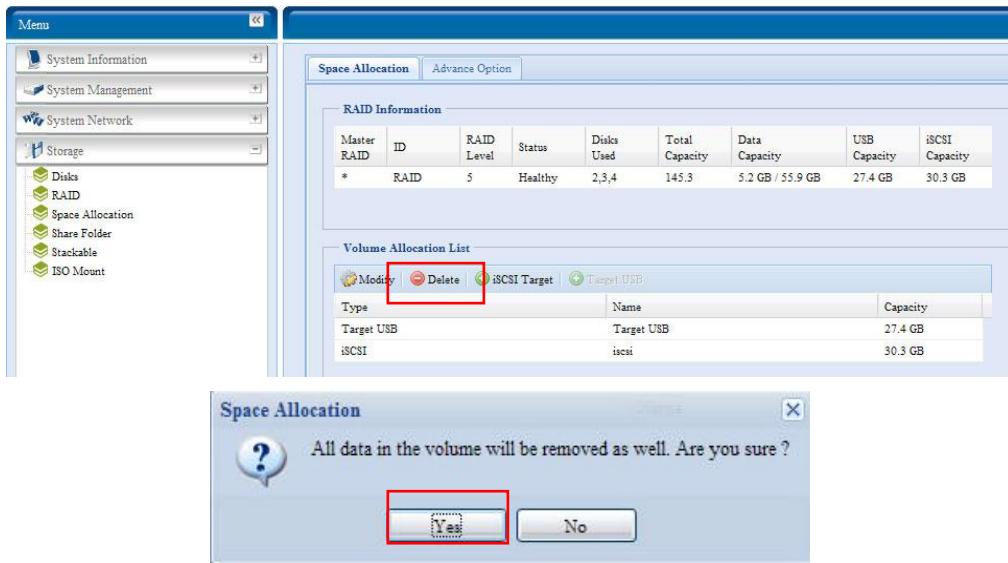
2. Modify your setting. Press **ok** to change.

Delete Volume

To delete volume on the current RAID volume, follow the steps below:

1. Under the **Volume Allocation List**, click **Delete**.

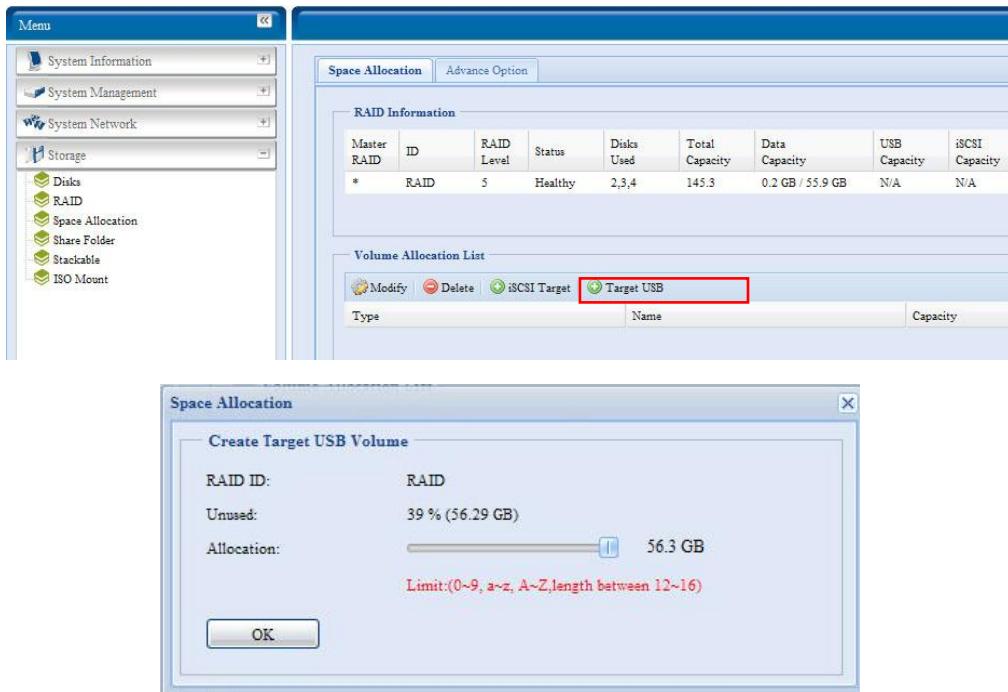
The **Space Allocation** screen appears.



2. Press **YES**. All data in the volume will be removed.

Allocating Space for Target USB Volume

1. Under the **Volume Allocation List**, click **Target USB**.
The **Create Target Volume** screen appears.

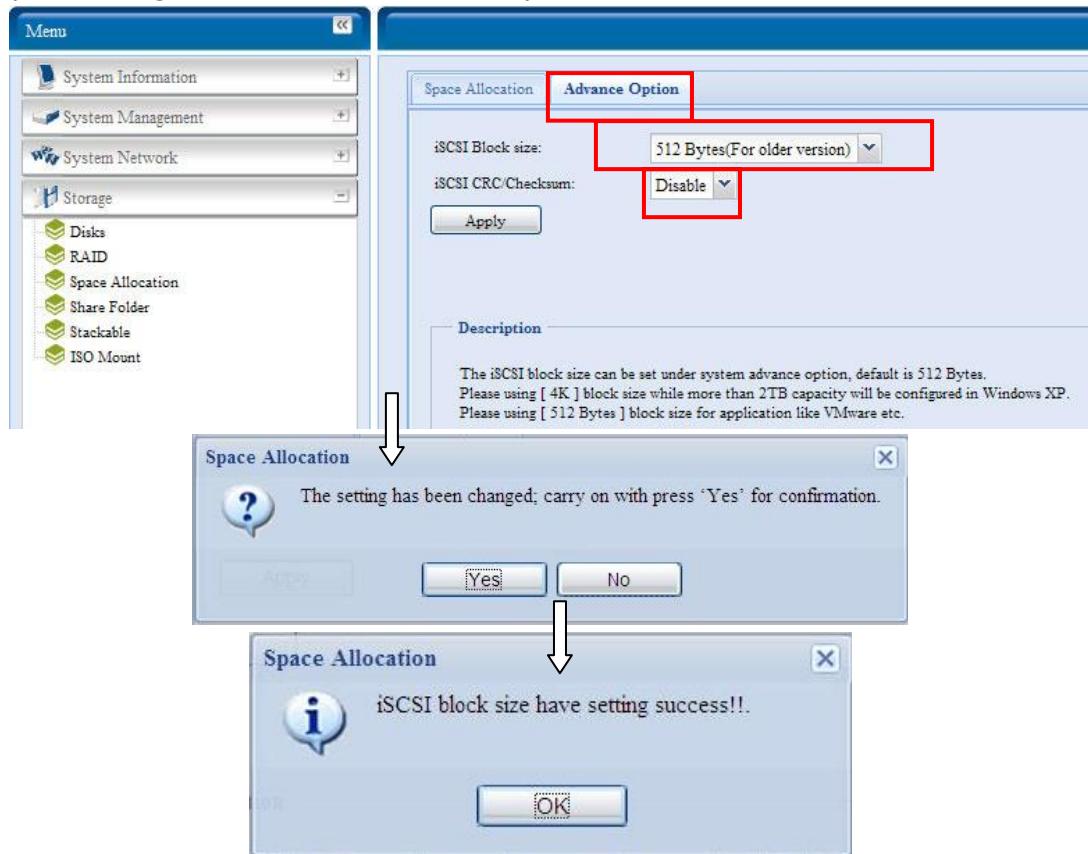


2. Designate the percentage to be allocated from the **Allocation** drag bar.
3. Click **OK** to create the USB volume.

| Create USB Volume | |
|-------------------|---|
| Item | Description |
| RAID ID | ID of current RAID volume. |
| Unused | Percentage and amount of unused space on current RAID volume. |
| Allocation | Percentage and amount of space allocated to USB volume. |

Advance Option

There are 2 options currently allow Admin to Enable/Disable to operate 1U4600 associated with iSCSI setting. The details as listed in following screenshot. With the option changed, it will need to reboot system to activate.



iSCSI Block Size

Select the block size with 4K while the iSCSI volume size is over 2TB.

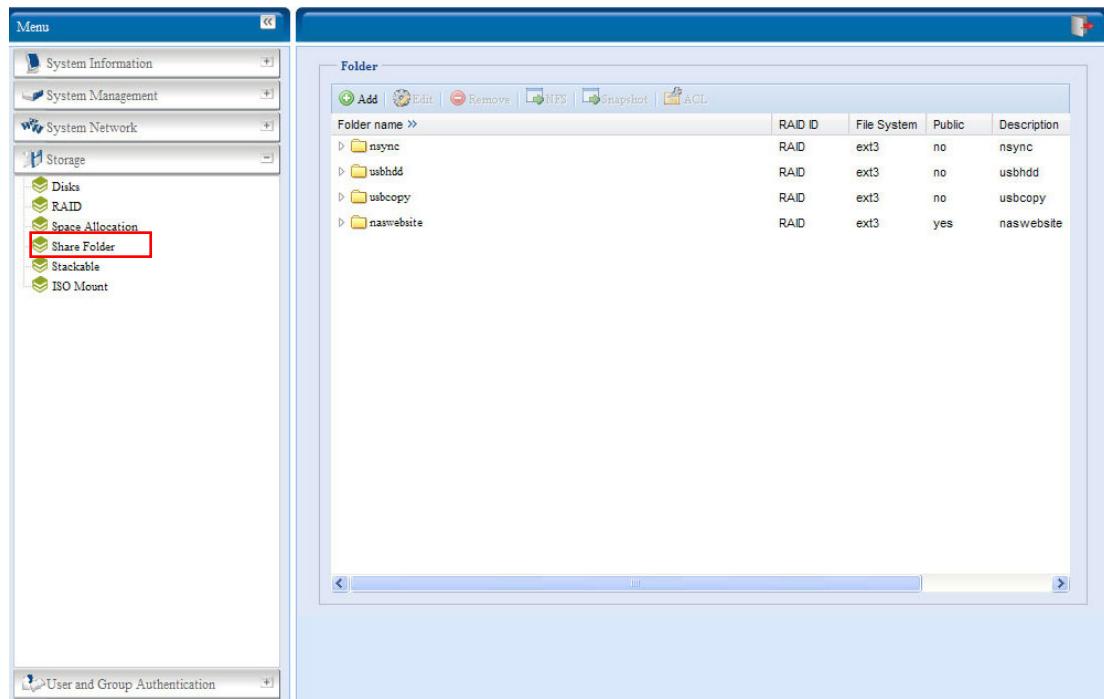
iSCSI CRC/Checksum

To enable this option, the initiator can connect with "Data digest" and "Header digest" enabled.



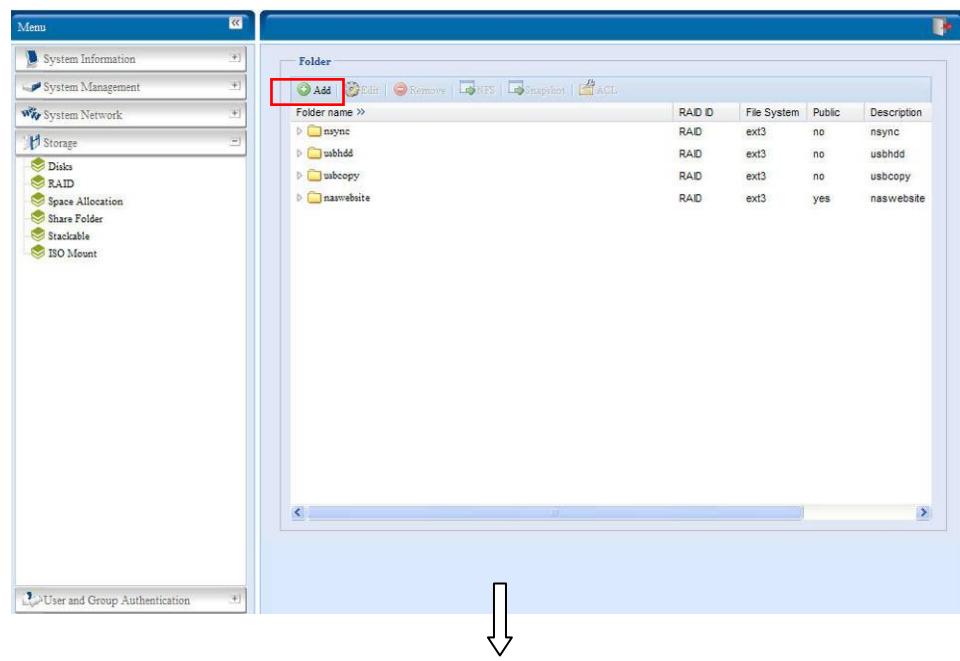
Share Folder

From the **Storage** menu, choose **Share Folder**, and the **Folder** screen appears. This screen allows you to create and configure folders on the 1U4600 volume.



Adding Folders

On the **Folder** screen, press the **Add** button and the **Add Folder** screen appears. This screen allows you to add a folder. After entering the information, press **Apply** to create new folder.



add folder

| | |
|---------------------|---|
| RAID ID: | RAID |
| Folder name: | <input type="text"/> |
| Description: | <input type="text"/> |
| Browseable: | <input checked="" type="radio"/> Yes <input type="radio"/> No |
| Public: | <input type="radio"/> Yes <input checked="" type="radio"/> No |
| Share Folder Limit: | 0 GB |
| Apply | |

| Add Folder | |
|--------------------|---|
| Item | Description |
| RAID ID | RAID volume where the new folder will reside. |
| Folder Name | Enter the name of the folder. |
| Description | Provide a description the folder. |
| Browseable | Enable or disable users from browsing the folder contents. If Yes is selected, then the share folder will be browseable. |
| Public | Admit or deny public access to this folder. If Yes is selected, then users do not need to have access permission to write to this folder. When accessing a public folder via FTP, the behavior is similar to anonymous FTP. Anonymous users can upload/download a file to the folder, but they cannot delete a file from the folder. |
| Share Folder Limit | Enter the maximum size of the folder in Gigabytes (GB). The folder cannot grow beyond this limit. You can enter a 0 to turn off the share folder limit. This option did not apply while XFS file system selected. |
| Apply | Press Apply to create the folder. |

NOTE

Folder names are limited to 60 characters. Systems running Windows 98 or earlier may not support file names longer than 15 characters.

Modify Folders

On the **Folder** screen, press the **Edit** button and the **Modify Folder** screen appears. This screen allows you to change folder information. After entering the information, press **Apply** to save your changes.

Modify Folder

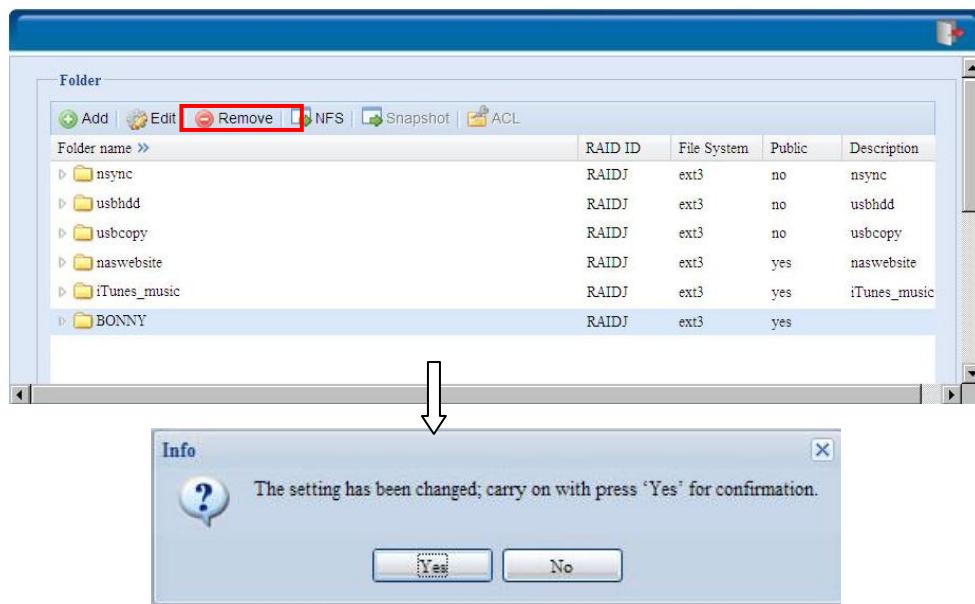
| | |
|---------------------|---|
| RAID ID: | RAID |
| Folder name: | nsync |
| Description: | nsync |
| Browseable: | <input type="radio"/> Yes <input checked="" type="radio"/> No |
| Public: | <input type="radio"/> Yes <input checked="" type="radio"/> No |
| Share Folder Limit: | 0 GB |
| Apply | |

| Modify Folder | |
|----------------------|---|
| Item | Description |
| RAID ID | RAID volume where the folder will reside. |
| Folder Name | Enter the name of the folder. |

| | |
|-------------|---|
| Description | Provide a description the folder. |
| Browseable | Enable or disable users from browsing the folder contents. This setting will only apply while access via SMB/CIFS and web disk. |
| Public | Admit or deny public access to this folder. |
| Share Limit | Enter the maximum size of the folder. The folder will not grow beyond this limit. You can enter a 0 to turn off the share folder limit. |

Remove Folders

To remove a folder, press the **Remove** button from the specified folder row. The system will confirm folder deletion. Press **Yes** to delete the folder permanently or **No** to go back to the folder list.

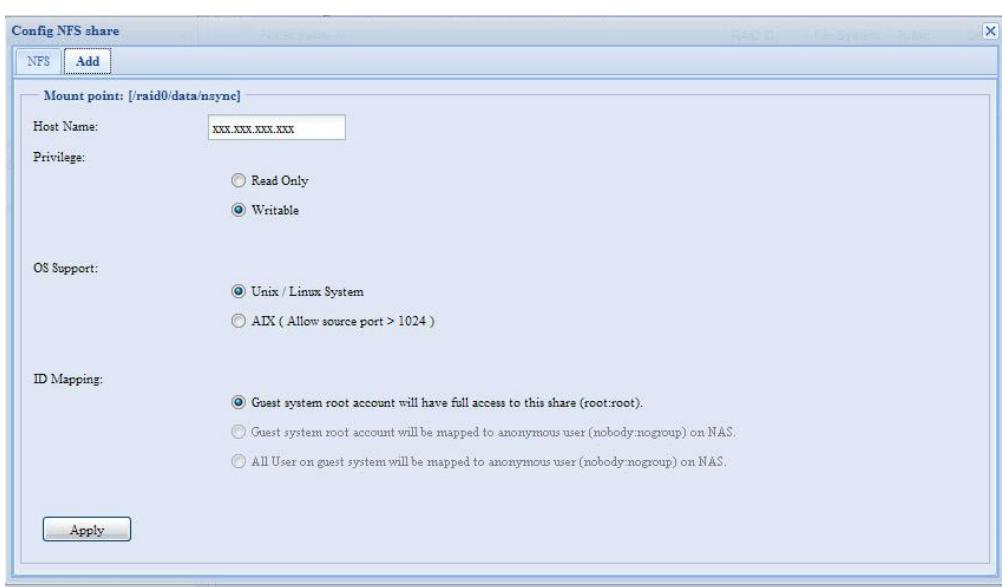
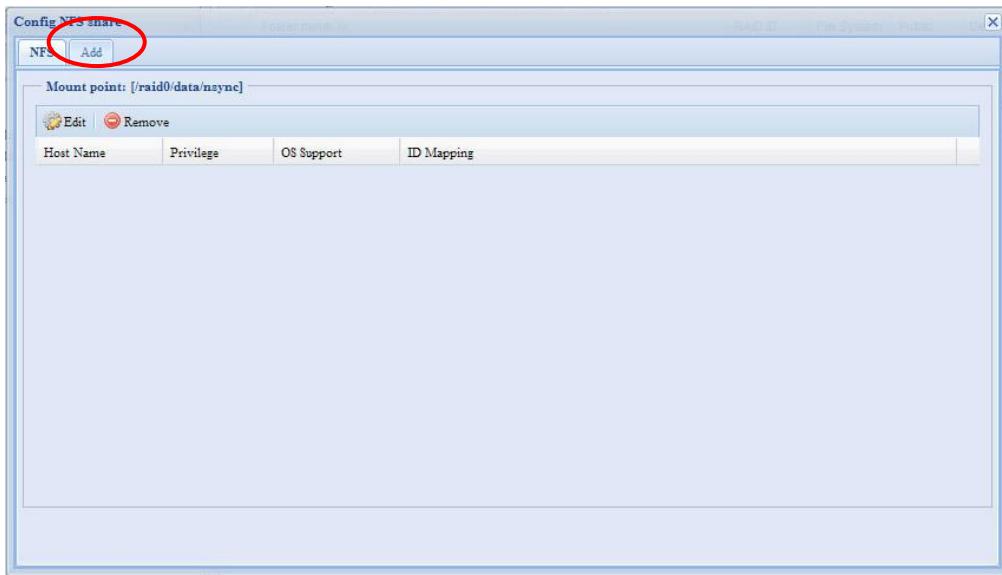


WARNING

All the data stored in the folder will be deleted once the folder is deleted.
The data will not be recoverable.

NFS Share

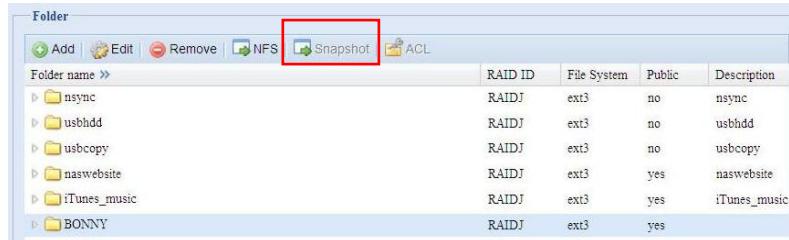
To allow NFS access to the share folder, enable the **NFS Service**, and then set up hosts with access rights by clicking **Add**.



| NFS Share | |
|----------------------|---|
| Item | Description |
| Hostname | Enter the name or IP address of the host |
| Privilege | Host has either read only or writeable access to the folder. |
| Guest System Support | <p>There are two selections available:</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Unix / Linux System <input type="radio"/> AIX (Allow source port > 1024) <p>Choose the one which best fits your needs.</p> |
| IO Mapping | <p>There are three selections available:</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Guest system root account will have full access to this share (root:root). <input type="radio"/> Guest system root account will be mapped to anonymous user (nobody:nogroup) on NAS. <input type="radio"/> All user on guest system will be mapped to anonymous user (nobody:nogroup) on NAS. <p>Choose the one which best fits your needs.</p> |
| Apply | Click to save your changes. |

Snapshot

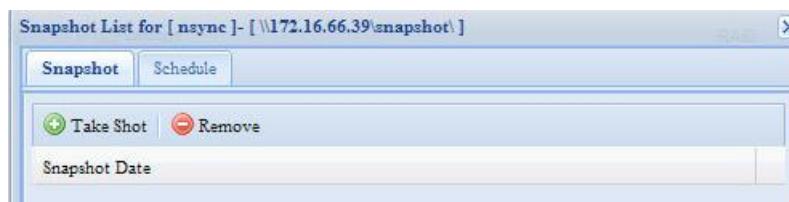
The 1U4600 is capable for 16 snapshot version control. To have snapshot to work on, the file system creation for RAID volume has to be “**ZFS**”.



| Folder name >> | RAID ID | File System | Public | Description |
|----------------|---------|-------------|--------|--------------|
| nsync | RAIDJ | ext3 | no | nsync |
| usbhdd | RAIDJ | ext3 | no | usbhdd |
| usbcopy | RAIDJ | ext3 | no | usbcopy |
| naswebsite | RAIDJ | ext3 | yes | naswebsite |
| iTunes_music | RAIDJ | ext3 | yes | iTunes_music |
| BONNY | RAIDJ | ext3 | yes | |

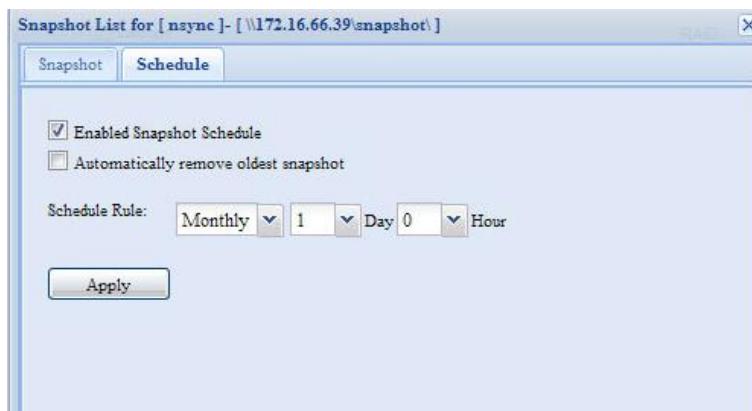
Snap (Snapshot configuration)

If added folder has located in the RAID volume with “ZFS” file system, then the folder management screen with “Snap” button will be configurable.



| Snapshot | |
|-----------|---|
| Item | Description |
| Take Shot | Click to take snapshot right away. |
| Remove | Click to remove snapshot schedule. |
| Schedule | Click to open snapshot schedule setup screen. |

Clicking on schedule button then schedule setup screen appear. Checked the enable check box to activate the snapshot scheduled operation.



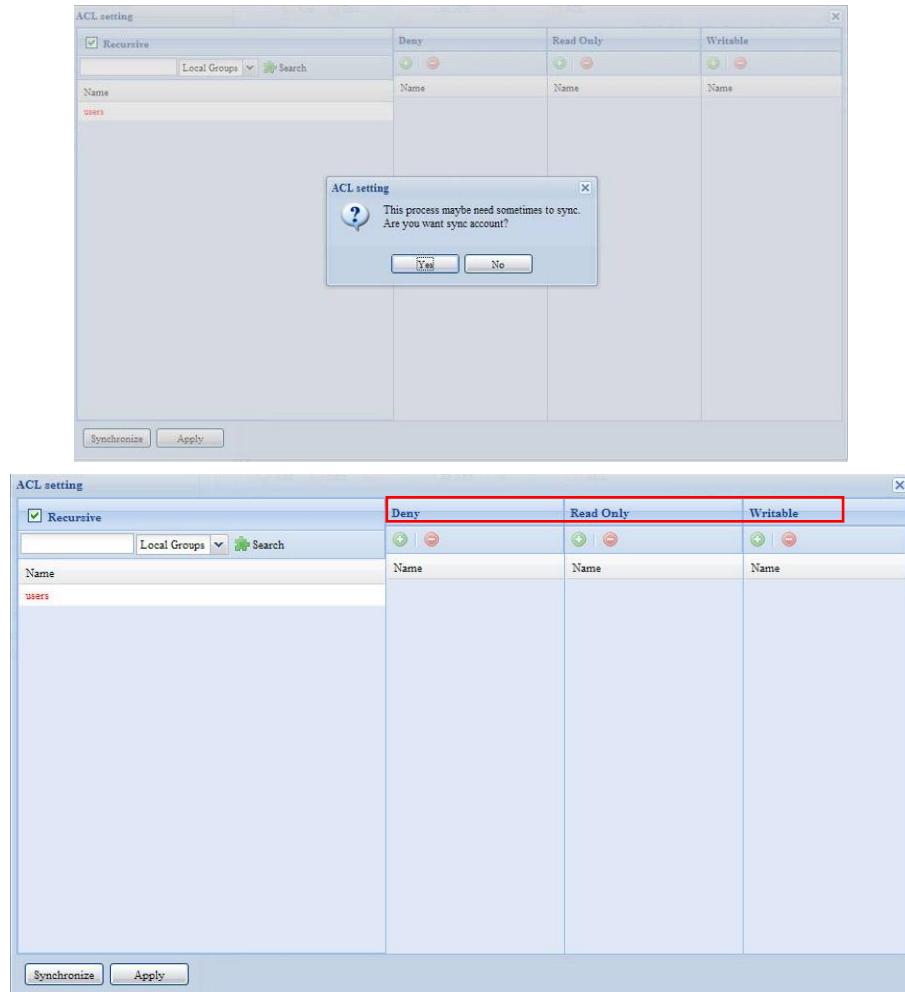
The 1U4600 snapshot is supported total **16 versions**. Once checked “Automatically remove oldest snapshot”, the oldest will be removed to let newest to added on top. Otherwise, if the check box is unchecked and snapshot versions are up to 16 then system will appear warning message and won’t execute the task till available version count.

The snapshot schedule rules can be setup for monthly, weekly or daily hour. Clicking on **Apply** after firmed with desired schedule

These taken snapshot is only accessible through CIFS/SMB by manually type **\IP address\snapshot** and invisible from normal access. Also, the taken snapshot version is read only can not be deleted under CIFS/SMB access but only click the "Del" button showing on the screen shot above.

Folder and sub-folders Access Control List (ACL)

On the Folder screen, press the **ACL** button, and the **ACL setting** screen appears. This screen allows you to configure access to the specific folder and sub-folders for users and groups. Select a user or a group from the left hand column and then choose **Deny**, **Read Only**, or **Writable** to configure their access level. Press the **Apply** button to confirm your settings.



| ACL setting | | | |
|-------------|--|--|--|
| Item | Description | | |
| Deny | Denies access to users or groups who are displayed in this column. | | |
| Read Only | Provides Read Only access to users or groups who are displayed in this column. | | |
| Writable | Provides Write access to users or groups who are displayed in this column. | | |
| Recursive | Enable to inherit the access right for all its sub-folders. | | |

To configure folder access, follow the steps below:

1. On the **ACL** screen, all network groups and users are listed in the left hand column. Select a group or user from this list.

- With the group or user selected, press one of the buttons from the three access level columns at the top. The group or user then appears in that column and has that level of access to the folder.
- Continue selecting groups and users and assigning them access levels using the column buttons.
- To remove a group or user from an access level column, press the **Remove** button in that column.
- When you are finished, press **Apply** to confirm your ACL settings.

NOTE

If one user has belonged to more than one group but different privilege than the priority Deny > Read Only > Writable

To setup sub-folders ACL, click on “▶” symbol to extract sub folders list as screen shot shows below. You may carry on with same steps as share level ACL setting.

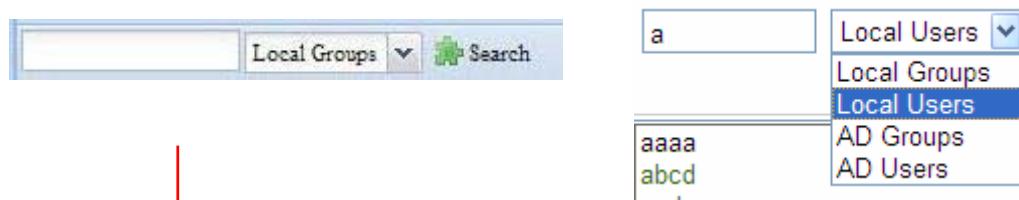
| Folder name | RAID ID | File System | Public | Description |
|----------------|---------|-------------|--------|--------------|
| ▶ nsync | aaaa | ext3 | no | nsync |
| ▶ usbhdd | aaaa | ext3 | yes | usbhdd |
| ▶ usbcopy | aaaa | ext3 | no | usbcopy |
| ▶ naswebsite | aaaa | ext3 | no | naswebsite |
| ▶ iTunes_music | aaaa | ext3 | yes | iTunes_music |
| ▶ test | aaaa | ext3 | yes | |
| ◀ test1 | aaaa | ext3 | no | |
| ▶ ECR | | | no | |
| ▶ NetBench | | | no | |

NOTE

The ACL can be set for share and sub-folders level, not for files.

The ACL screen also allows you to search for a particular user. To do this, follow the steps below:

- In the blank, enter the name of the user you would like to find.
- From the drop down select the group you would like to search for the user in.
- Click **Search**.

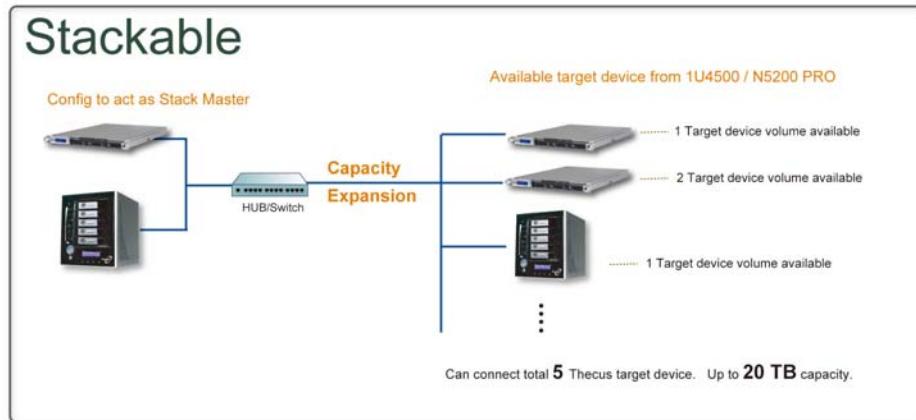


NOTE

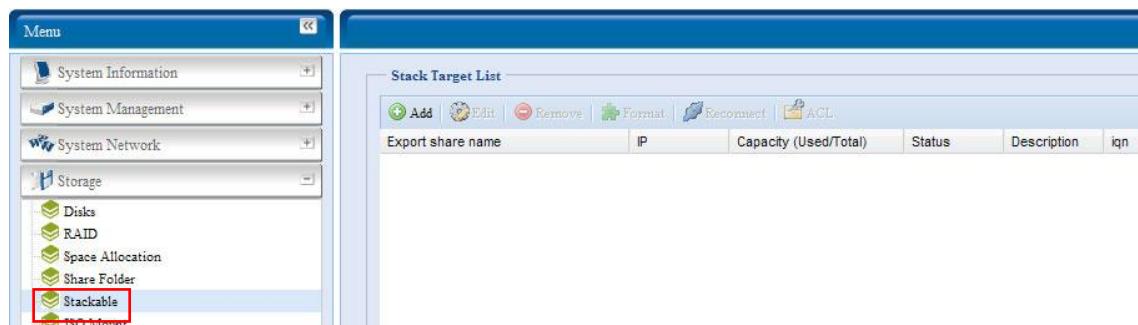
The system will list up to 1,000 users from the chosen category. To narrow your search, enter a search term in the blank provided.

Stackable NAS

The 1U4600's capacity can be expanded even further using the stackable function. With it, users can expand the capacity of their network storage systems up to 5 other stack target volumes which are located in different systems. These can be stacked through single network access like SMB or AFP acting as a share folder type.



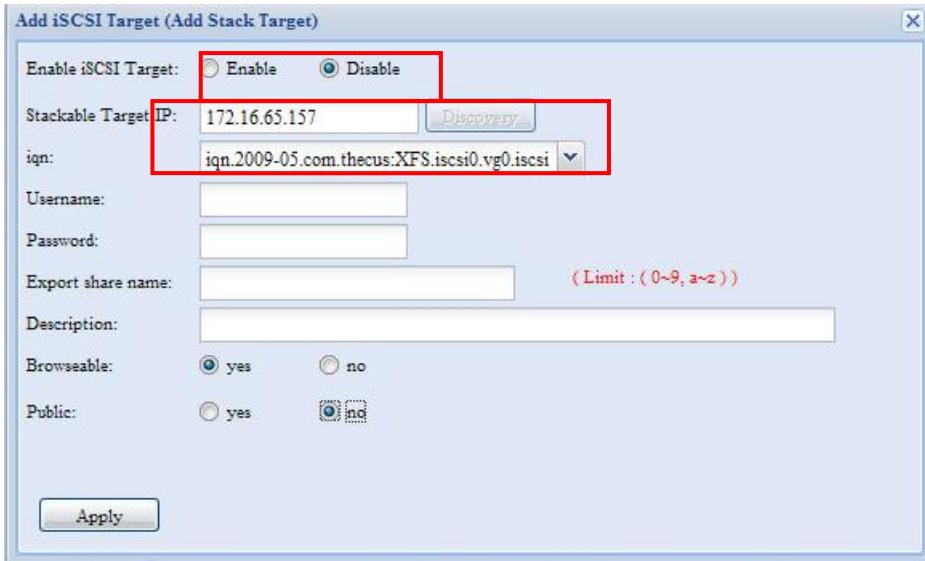
From the main menu, the stackable feature is located under "Storage". Please refer the figure below for reference.



A. Add a Stack Target Volume

From the figure above, click **Add** to access the stackable target device configuration page. Please refer to the figure below:

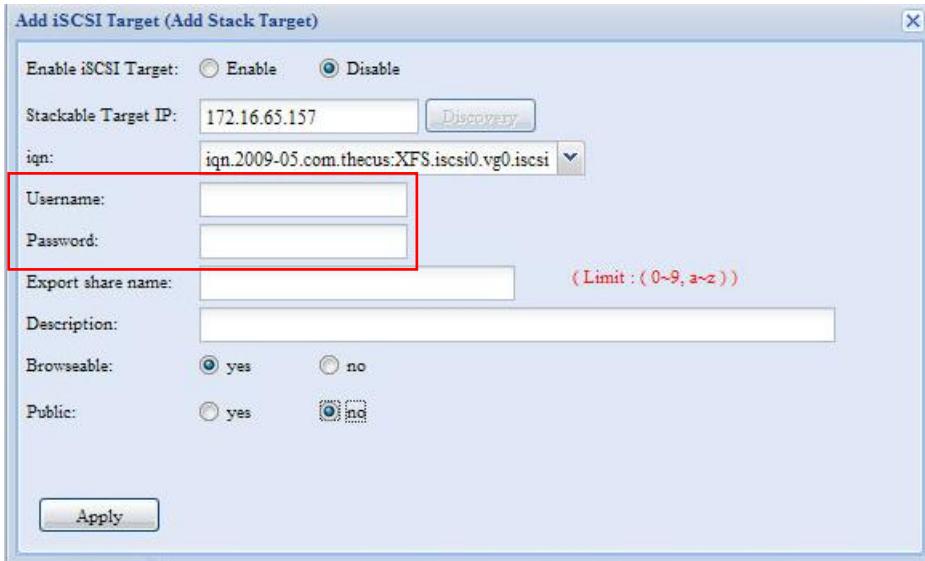
With the added stack target you could "Enable" or "Disable" now or later per usage needed.



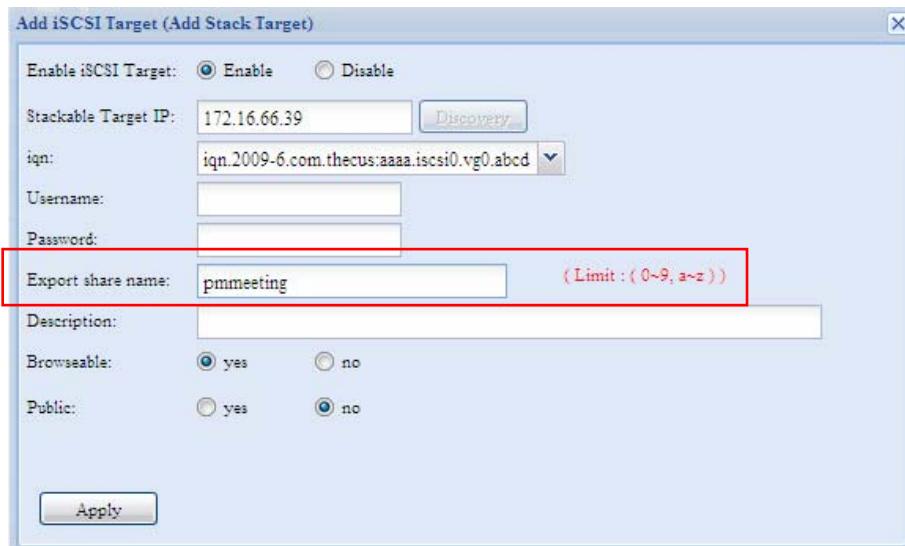
Next, input the target IP address of the stackable device and click the **Discovery** button. The system will list available target volumes from the inputted IP address.

Once IP with volume have been set, you may need to input a valid user name and password to validate your access rights. If there is no user name and password needed to access target volume, then leave it blank.

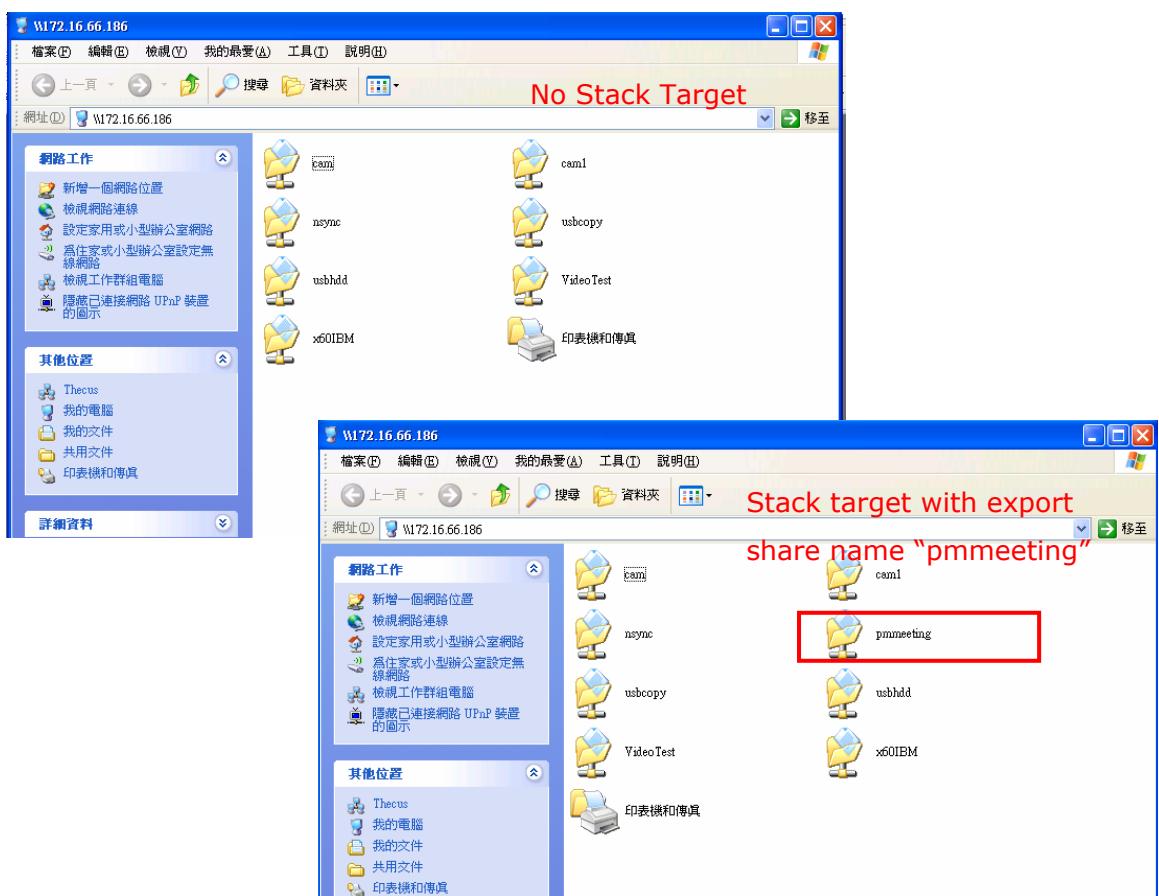
Once IP with volume have been set, you may need to input a valid user name and password to validate your access rights. If there is no user name and password needed to access target volume, then leave it blank.



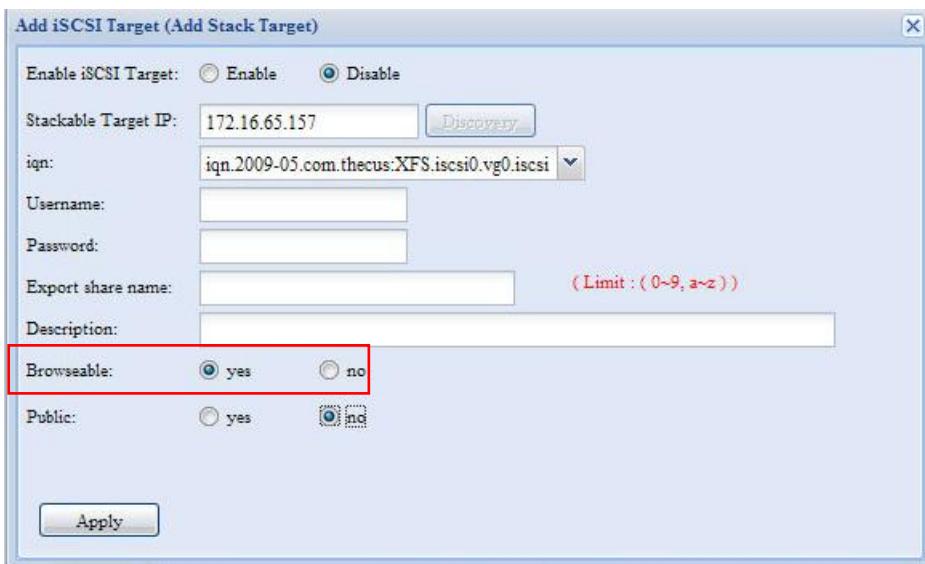
The **Export share name** will become the network share name and displayed through network access such as SMB. You may refer the figures below to see the result. Please note the naming limitation.



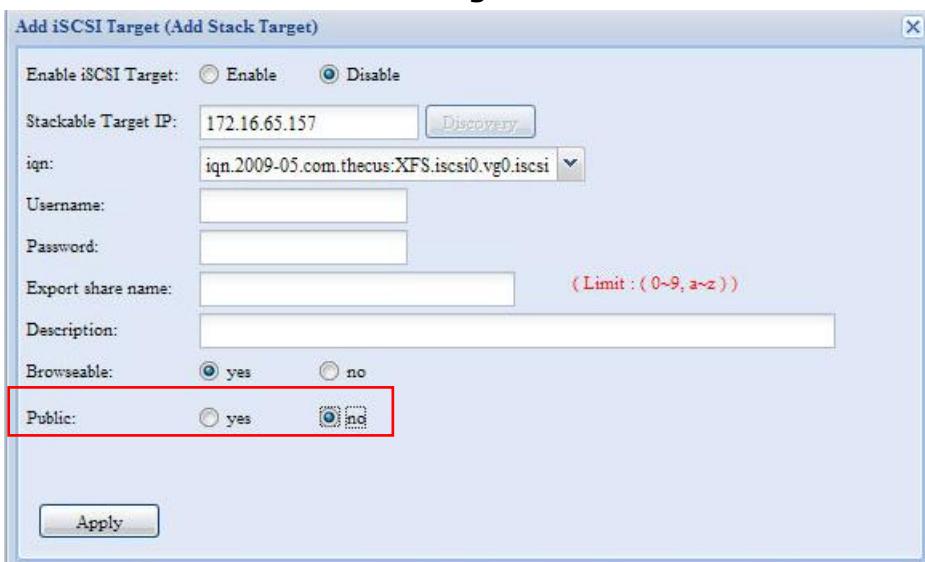
From the figure above, the **Export share name** is "pmmeeting". The figures below show the result before and after via Microsoft Network Access with settings have been completed.



The **Browsable** setting will be same method of setting for system share folder. It designates whether or not this folder will be visible through web disk. You may refer the figures below for reference when **Yes** and **No** are selected.



The **Public** setting will be set same as what the setting for the system share folder associated with the ACL permission setup. If **Public** is set to **Yes**, all users will be able to access it, and **ACL** button will be grayed out. If **Public** is set to **No**, the **ACL** button will be available on the **Stack Target List** window.

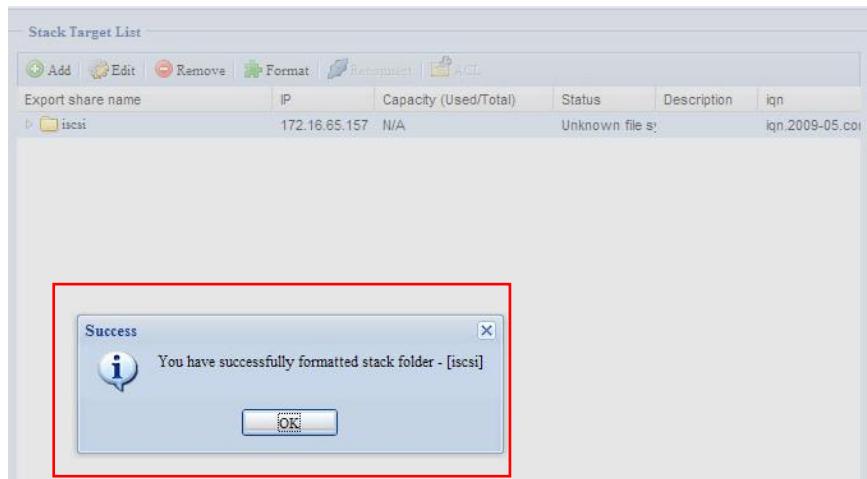


Click **Apply** to save your changes.

B. Activate a Stack Target

After your settings have been applied, the system will bring you back to **Stack Target List** window as shown below. There is one stack target device has been attached into this stack master.

| Stack Target List | | | | | | |
|-------------------|---------------|-----------------------|---------|-------------|---|--|
| Export share name | IP | Capacity (Used/Total) | Status | Description | iqn | |
| > iscsi | 172.16.65.157 | 0 GB / 0.1 GB | Disable | | iqn.2009-05.com.thecus:XFS.iscsi0.vg0.iscsi | |



With this newly attached stack target device, you will see the information displayed and also several options you can choose.

In general, if attached stack target device has been used by another N5200PRO/1U4600/1U4600/N7700/N8800 as stack target volume, then the **Format** item will be display and system will recognize it straight away and display its capacity. Otherwise, the **Format** item will be available and the **Capacity** and **Status** items will show as "N/A" and "Unknown file system" respectively. Next, click **Format** to proceed with formatting. After the format is complete, the stack target volume will be created successfully. You will see the volume's capacity and status in the **Stack Target List** screen.

C. Edit a Stack Target

To make any changes to stack targets, click **Edit** for the corresponding stack target, and system will bring up the following dialogue:

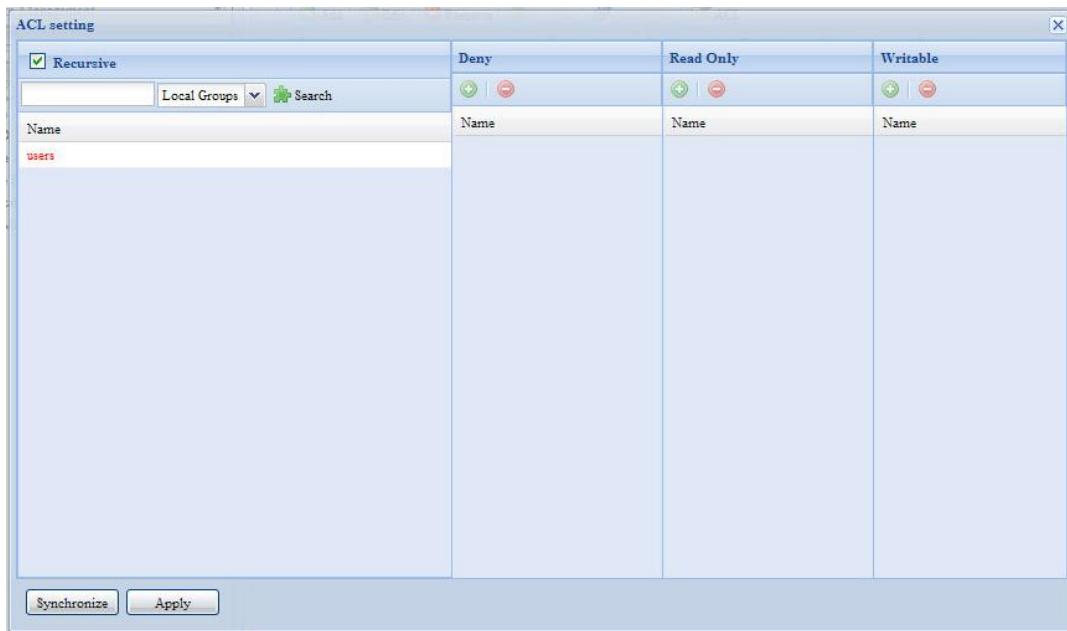


After your changes have been made, click **Apply** to confirm any modifications. Once changes are applied, the associated information will be updated on the **Stack Target List** window.

D. Stack Target ACL

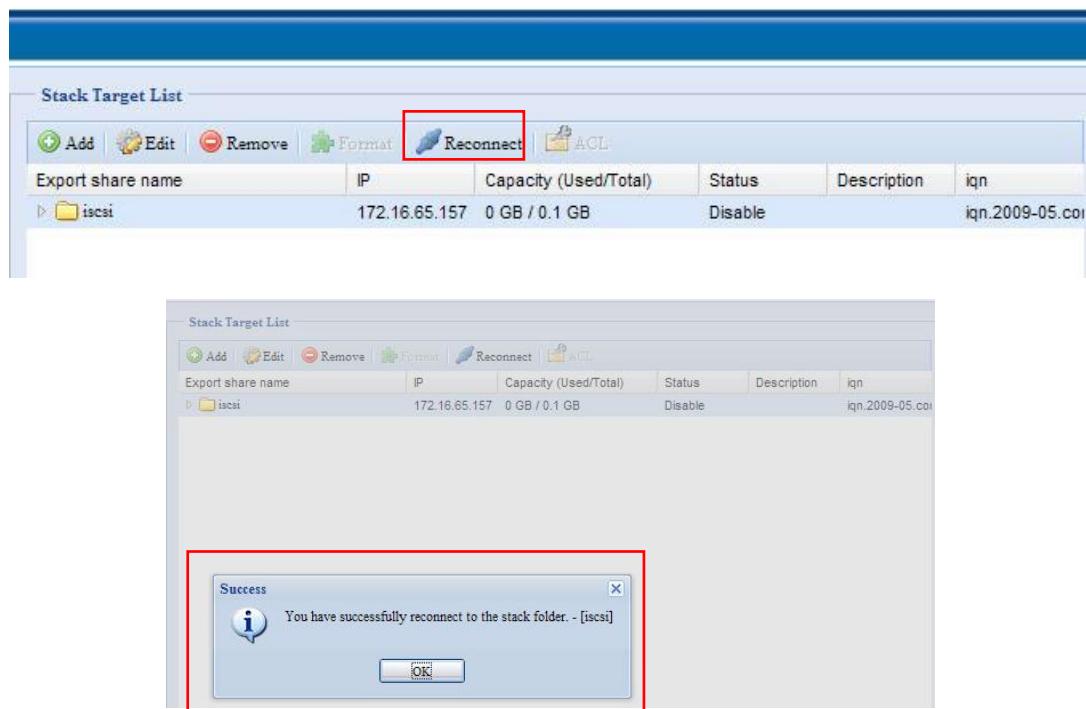
If the stack target **Public** setting set to **Yes**, then the **ACL** button will be grayed out. However, if **Public** setting is set to **No**, then the **ACL** button will be available for you to setup user access permissions for the stack target.

ACL settings will be exactly the same as system folder that you may have setup previously.



E. Reconnect a Stack Target

The enabled stack target devices may be disconnected by situations such as power outages or network disconnects. When this happens, the **Reconnect** button will be available. To attempt to reconnect the stack target, click **Reconnect**.

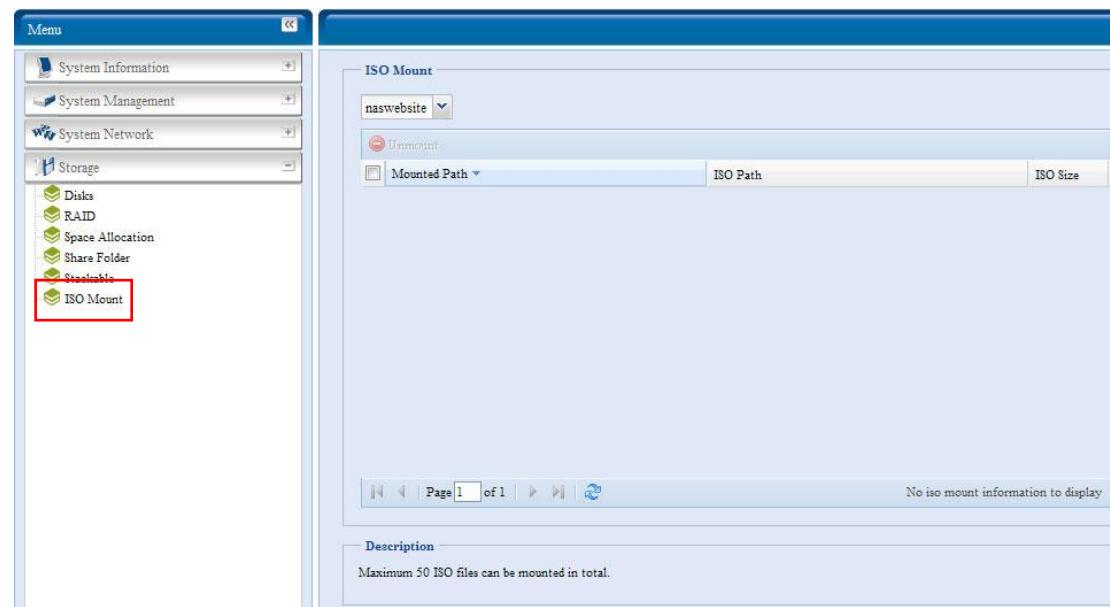


ISO Mount

The ISO Mount feature is very useful tool from Thecus products. With it, users can mount an ISO file and having export name to display all details from mounted ISO file.

From the main menu, the ISO Mount feature is located under "Storage". Please refer the figure below for reference.

Select on the ISO mount function and you will have the screen shot appear as following.

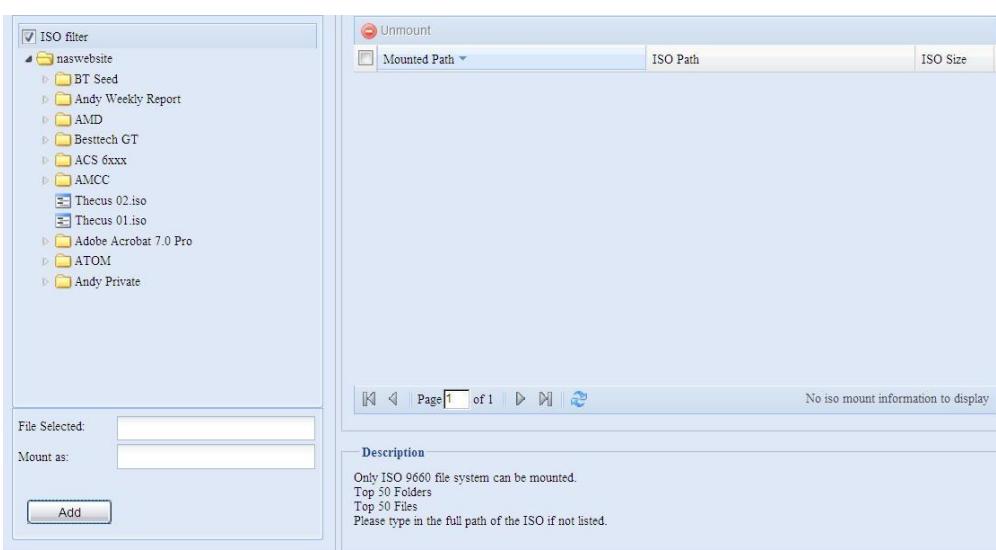


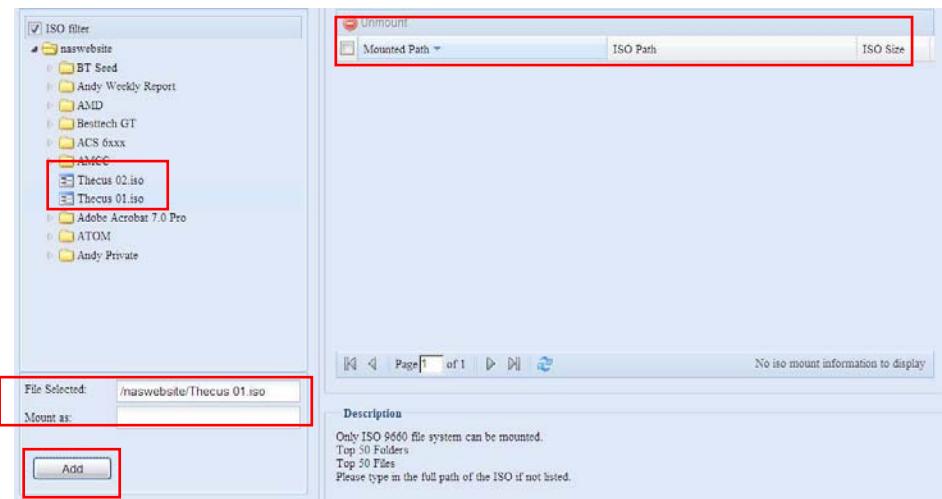
A. Add a ISO file

From the figure above, select ISO file from drop down share list.



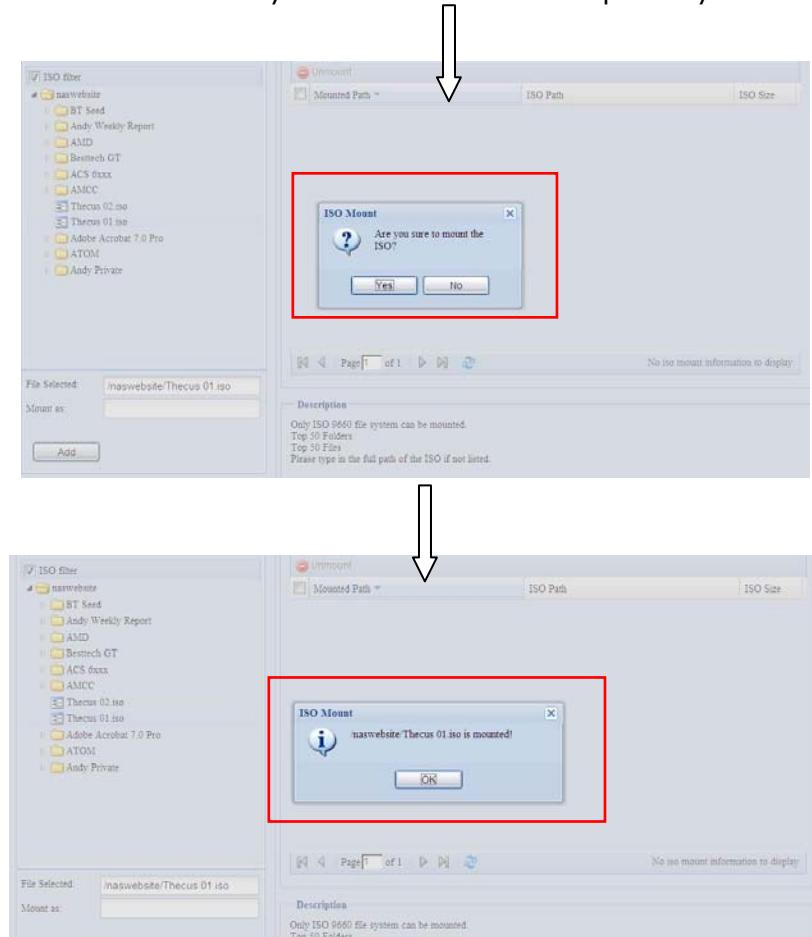
After selection, system will bring up Mount table for further setting screen.



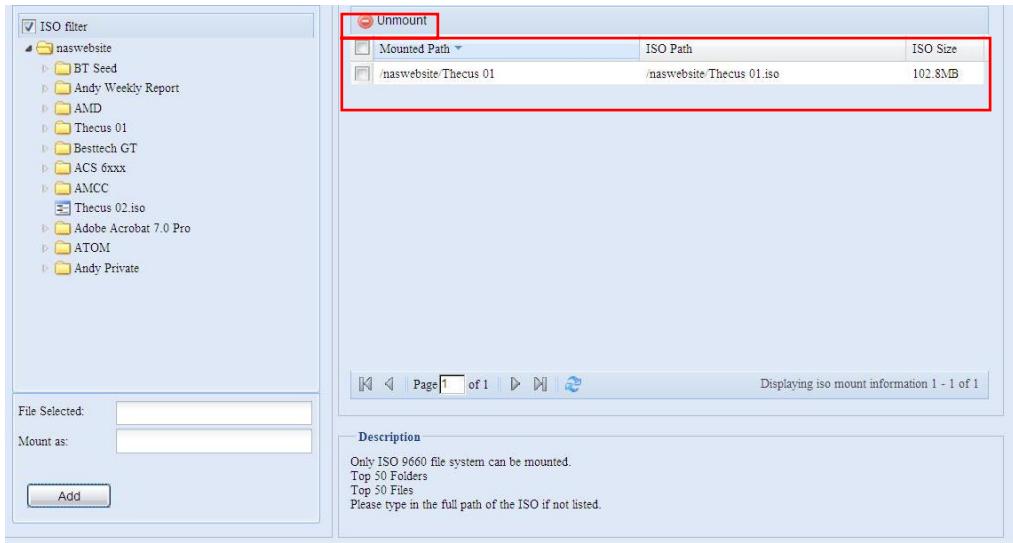


To mount new ISO file, select from listed ISO file and input desired mounting name into "Mount as:" field. Click "ADD" with confirmation to complete mounting ISO file. Or without "Mount as" ISO file export name input, system will automatic to give the export name by ISO file name.

If left "Mount as:" blink then system will create mount point by ISO file name.



After you have completed to add ISO then the page will displayed all mounted ISO files,

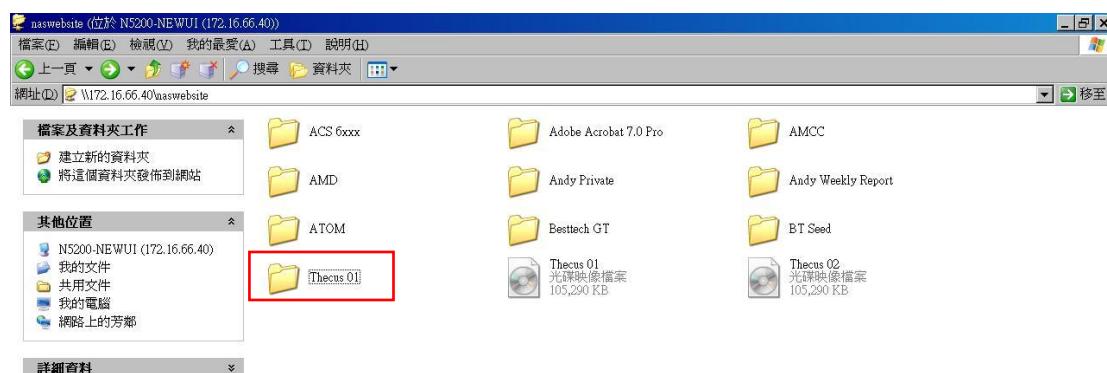


You could click "Unmount" to eliminate mounted ISO file.

B. Using ISO

The mounted ISO file will be located same share folder with name giving. Please refer the screen shot below.

ISO file "image" has mounted as folder "Image" you could see. The ISO file "Thecus 01" without assign mounting name, system automatically has folder "Thecus 01" created.



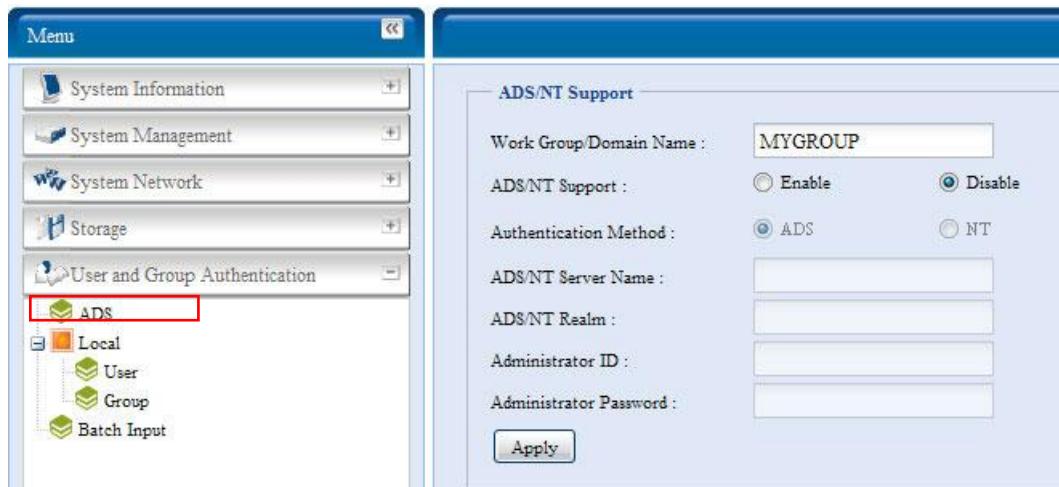
User and Group Authentication

The 1U4600 has built-in user database that allows administrators to manage user access using different group policies. From the **User and Group Authentication** menu, you can create, modify, and delete users, and assign them to groups that you designate.

ADS/NT Support

If you have a Windows Active Directory Server (ADS) or Windows NT server to handle the domain security in your network, you can simply enable the ADS/NT

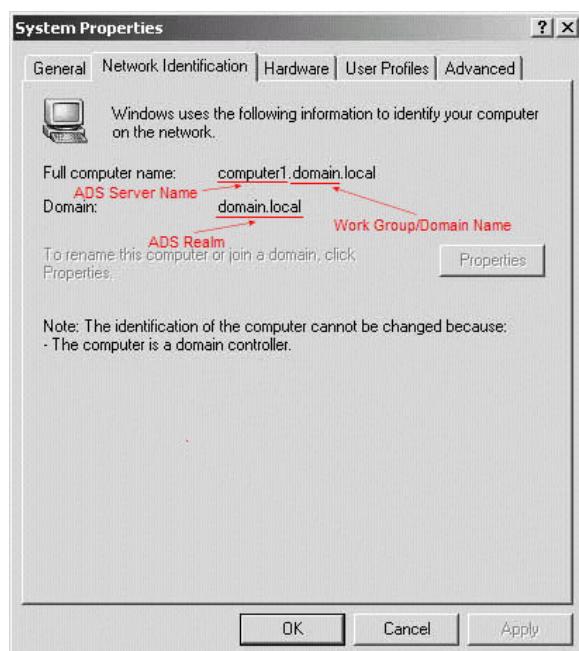
support feature; the 1U4600 will connect with the ADS/NT server and get all the information of the domain users and groups automatically. From the **Accounts** menu, choose **Authentication** item and the **ADS/NT Support** screen appears. You can change any of these items and press **Apply** to confirm your settings.



A description of each item follows:

| ADS/NT Support | |
|--------------------------|---|
| Item | Description |
| Work Group / Domain Name | Specifies the SMB/CIFS Work Group / ADS Domain Name (e.g. 1U4600). |
| ADS/NT Support | Select Disable to disable authentication through Windows Active Directory Server or Windows NT. |
| Authentication Method | Select ADS for Windows Active Directory Server, or select NT for Windows NT |
| ADS/NT Server Name | Specifies the ADS/NT server name (e.g. adservername). |
| ADS/NT Realm | Specifies the ADS/NT realm (e.g. example.com). |
| Administrator ID | Enter the administrators ID of Windows Active Directory or Windows NT, which is required for 1U4600 to join domain. |
| Administrator Password | Enter the ADS/NT Administrator password. |
| Apply | To save your settings. |

To join an AD domain, you can refer the figure and use the example below to configure the 1U4600 for associated filed input:



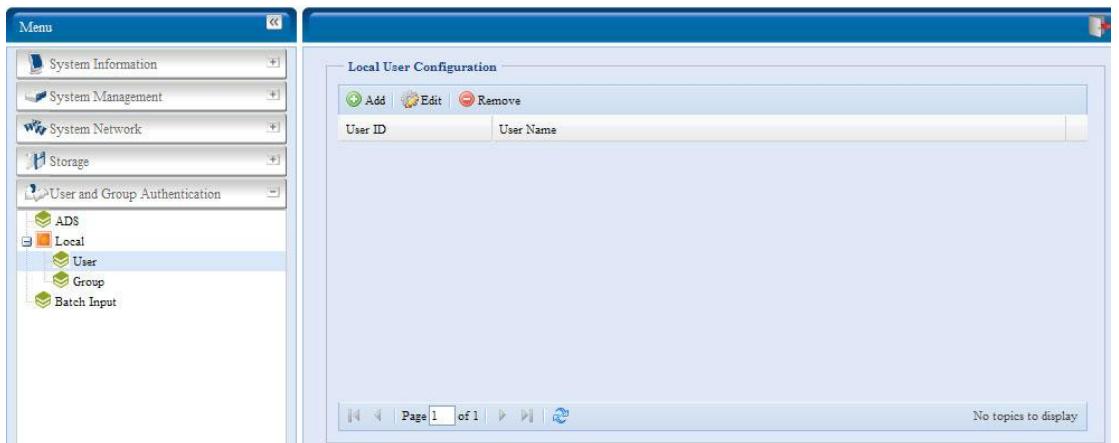
| AD Domain Example | |
|--------------------------|---------------|
| Item | Information |
| Work Group / Domain Name | domain |
| ADS Support | Enable |
| ADS Server Name | Computer1 |
| ADS/NT Realm | Domain.local |
| Administrator ID | Administrator |
| Administrator Password | ***** |

NOTE

- The DNS server specified in the WAN configuration page should be able to correctly resolve the ADS server name.
- The time zone setting between 1U4600 and ADS should be identical.
- The system time difference between 1U4600 and ADS should be less than five minutes.
- The Administrator Password field is for the password of ADS (Active Directory Server) not 1U4600.

Local User Configuration

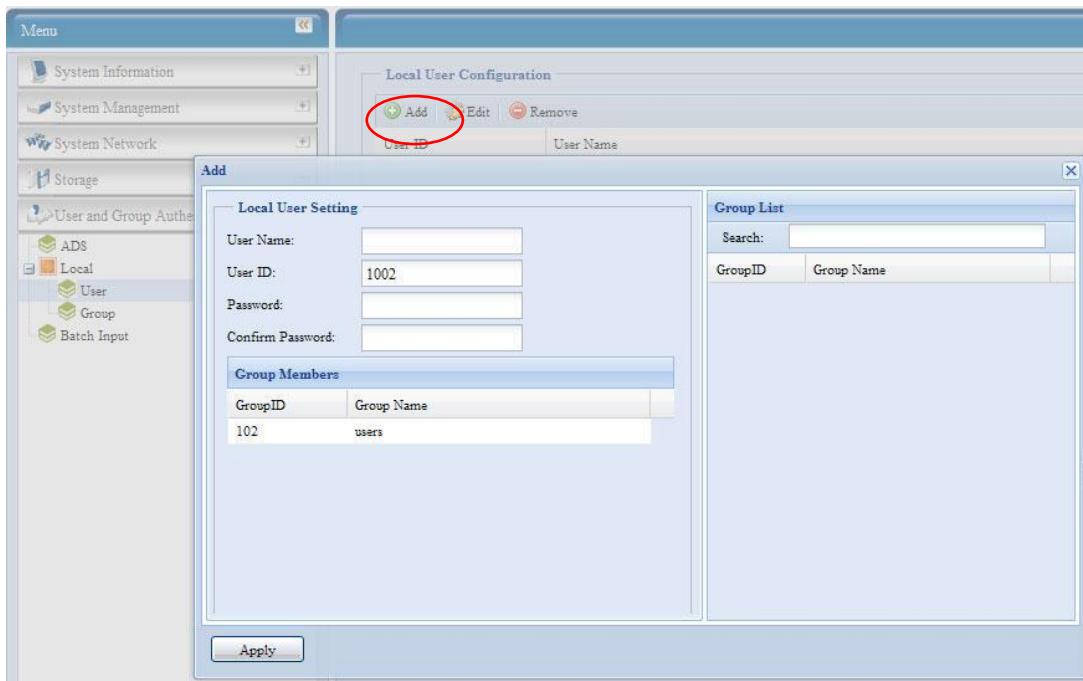
From the **Accounts** menu, choose the **User** item, and the **Local User Configuration** screen appears. This screen allows you to **Add**, **Edit**, and **Remove** local users.



| Local User Configuration | |
|--------------------------|---|
| Item | Description |
| Add | Press the Add button to add a user to the list of local users. |
| Edit | Press the Edit button to modify a local user. |
| Remove | Press the Remove button to delete a selected user from the system. |

Add Users

1. Click on the **Add** button on **Local User Configuration** screen, and **Local User Setting** screen appears.
2. On the **Local User Setting** screen, enter a name in the **User Name** box.
3. Enter a **User ID** number. If left blank, the system will automatically assign one.
4. Enter a password in the **Password** box and re-enter the password in the **Confirm** box.
5. Select which group the user will belong to. **Group Members** is a list of groups this user belongs to. **Group List** is a list of groups this user does not belong to. Use the << or >> buttons to have this user join or leave a group.
6. Press the **Apply** button and the user is created.

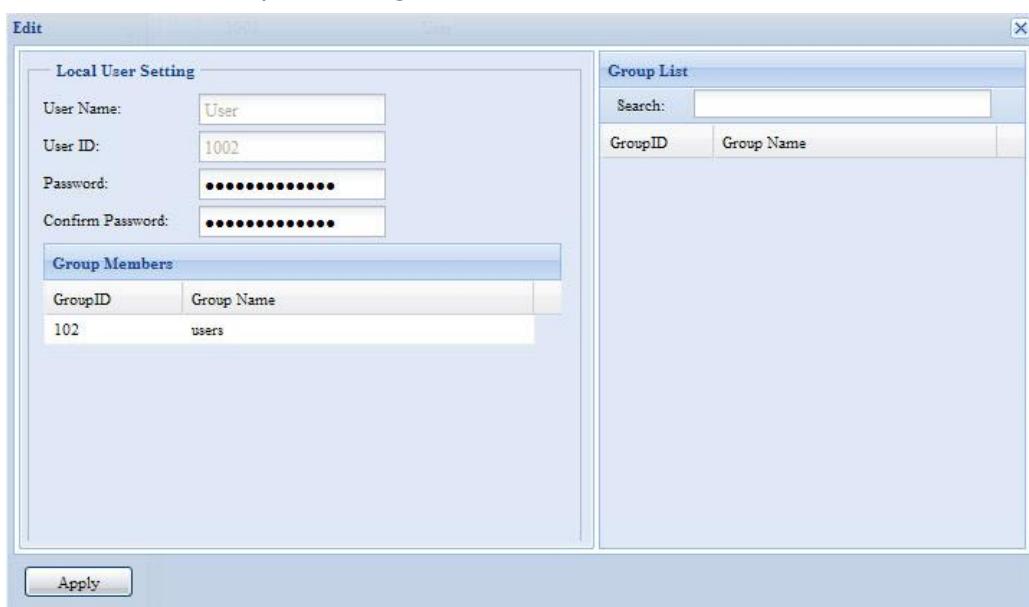


NOTE

All users are automatically assigned to the 'users' group.

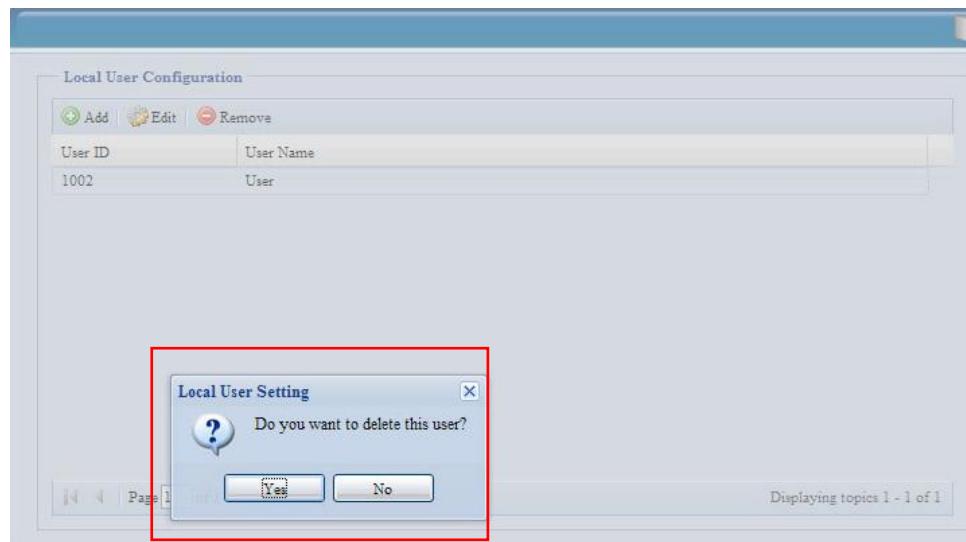
Edit Users

1. Select an existing user from the **Local User Configuration** screen.
2. Click on the **Edit** button, and **Local User Setting** screen appears.
3. From here, you can enter a new password and re-enter to confirm, or use the << or >> buttons to have this user join or leave a group. Click the **Apply** button to save your changes.



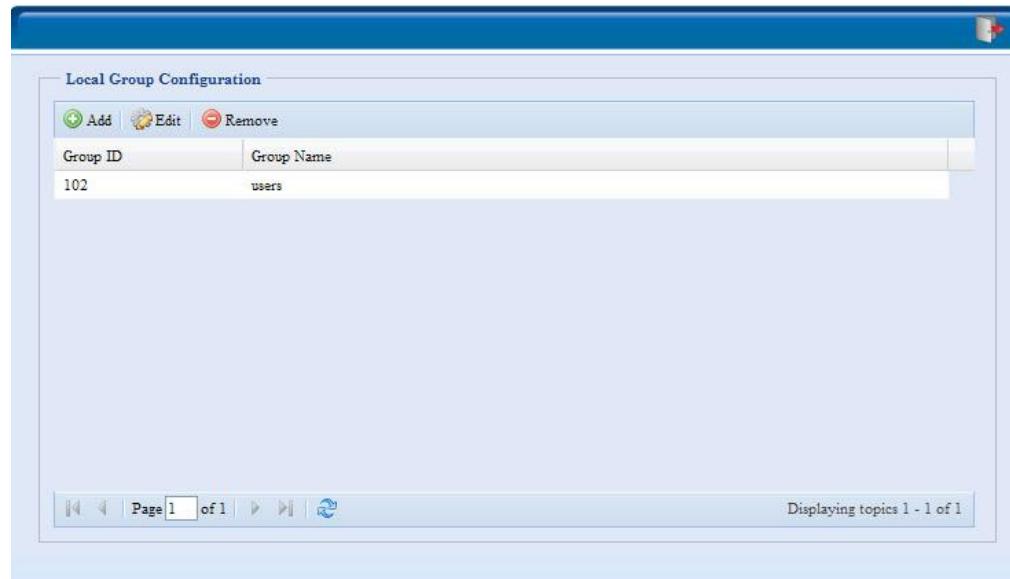
Remove Users

1. Select an existing user from the **Local User Configuration** screen.
2. Click on **Remove** button and the user is deleted from the system.



Local Group Configuration

From the **Accounts** menu, choose the **Group** item, and the **Local Group Configuration** screen appears. This screen allows you to **Add**, **Edit**, and **Remove** local groups.



| Local Group Configuration | |
|---------------------------|--|
| Item | Description |
| Add | Press the Add button to add a user to the list of local groups. |
| Edit | Press the Edit button to modify a selected group from the system. |
| Remove | Press the Remove button to delete a selected group from the system. |

Add Groups

1. On the **Local Group Configuration** screen, click on the **Add** button.
2. The **Local Group Setting** screen appears.
3. Enter a **Group Name**.
4. Enter a **Group ID** number. If left blank, the system will automatically assign one.
5. Select users to be in this group from the **Users List** by adding them to the **Members List** using the << button.
6. Click the **Apply** button to save your changes.

The screenshot shows the 'Add' tab of the 'Local Group Setting' window. It contains fields for 'Group Name' and 'Group ID'. Below these are two lists: 'Members List' and 'Users List'. The 'Members List' is currently empty. The 'Users List' window shows a single entry: UserID 1002 and User Name User.

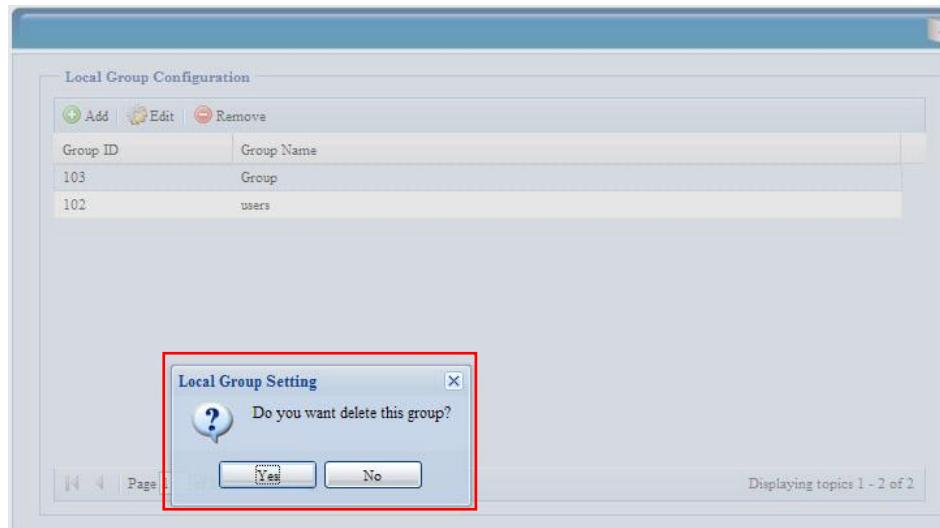
Edit Groups

1. On the **Local Group Configuration** screen, select a group name from the list.
2. Press the **Edit** button to modify the members in a group.
3. To add a user into a group, select the user from the **Users List**, and press the << button to move the user into the **Members List**.
4. To remove a user from a group, select the user from **Members List**, and press the >> button.
5. Click the **Apply** button to save your changes.

The screenshot shows the 'Edit' tab of the 'Local Group Setting' window. It contains fields for 'Group Name' (set to 'Group') and 'Group ID' (set to 103). A 'Members List' section is empty. The 'Users List' window shows a single entry: UserID 1002 and User Name User.

Remove Groups

1. On the **Local Group Configuration** screen, select a group name from the list.
2. Press **Remove** to delete the group from the system.



Batch Create Users and Groups

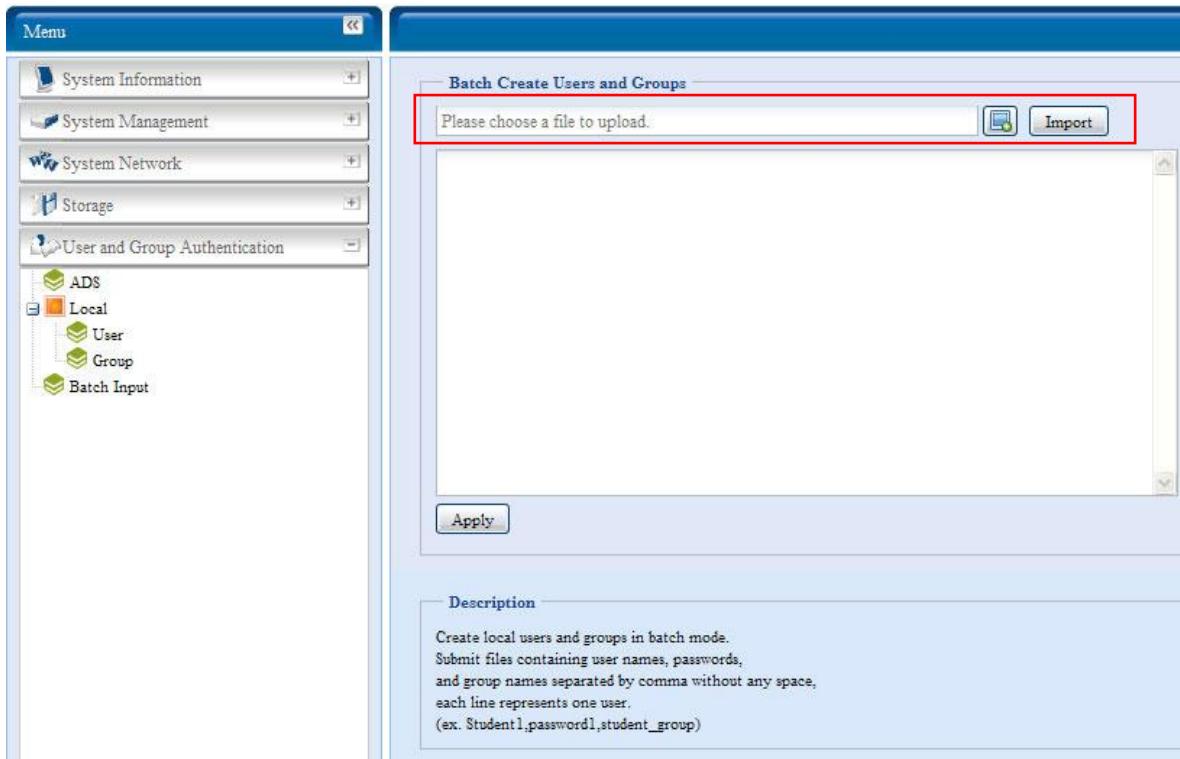
The 1U4600 can also add users and groups in batch mode. This enables you to conveniently add numerous users and groups automatically by importing a simple comma-separated plain text (*.txt) file.

From the **Accounts** menu, click **Batch Mgmt** and the **Batch Create Users and Groups dialogue** will appear. To import your list of users and groups, follow these steps:

6. Click **Browse...** to locate your comma-separated text file.
The information in the text file should follow this format:

[USERNAME], [PASSWORD], [GROUP]

7. Click **Open**.
8. Click **Import** to begin the user list import.

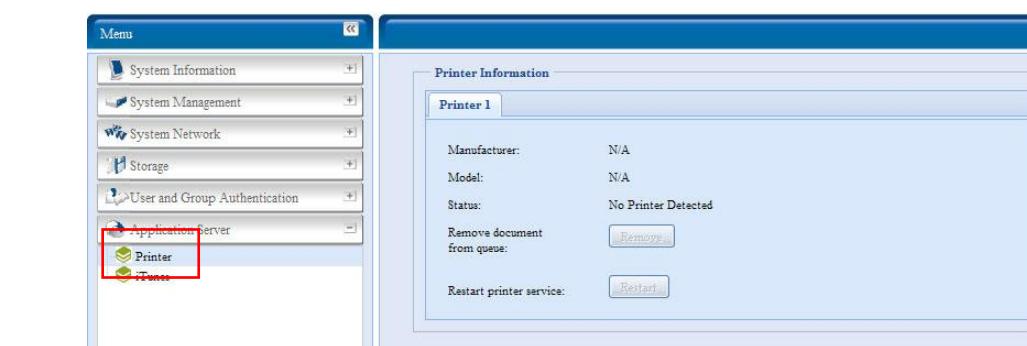


Application Server

The 1U4600 supports printer server, and iTunes server. The integrated Print Server allows you to share a single USB printer will all users on the network. The 1U4600 provides activating the iTunes Server on the device. You will be able to play music files on this device with your iTunes client software directly. The following section shows you how.

Printer Information

From the **Application Server** menu, choose the **Printer** item, and the **Printer Information** screen appears. This screen provides the following information about the USB printer connected to the USB port.



| Printer Information | |
|----------------------------|--|
| Item | Description |
| Manufacturer | Displays the name of the USB printer manufacturer. |
| Model | Displays the model of the USB printer. |
| Status | Displays the status of the USB printer. |
| Remove document from Queue | Click to remove all documents from printer queue |
| Restart Printer service | Click to restart printer service |

If a corrupt print job is sent to a printer, printing may suddenly fail. If your print jobs seem to be locked up, pressing the **Remove All Documents** button to clear the print queue may resolve the issue.

You can configure the 1U4600 to act as a printer server. That way, all PCs connected to the network can utilize the same printer.

Windows XP SP2

To set up the Printer Server in Windows XP SP2, follow the steps below:

1. Connect the USB printer to one of the USB ports (preferably the rear USB ports; front USB ports can be used for external HDD enclosures).
2. Go to **Start > Printers and Faxes**.
3. Click on **File > Add Printer**.
4. The **Add Printer Wizard** appears on your screen. Click **Next**.
5. Select the "**A network printer, or a printer attached to another computer**" option.
6. Select "**Connect to a printer on the Internet or on a home or office network**", and enter "`http://1U4600_IP_ADDRESS:631/printers/usb-printer`" into the URL field.
7. Your Windows system will ask you to install drivers for your printer. Select correct driver for your printer.
8. Your Windows system will ask you if you want to set this printer as "Default Printer". Select **Yes** and all your print jobs will be submitted to this printer by default. Click **Next**.
9. Click **Finish**.

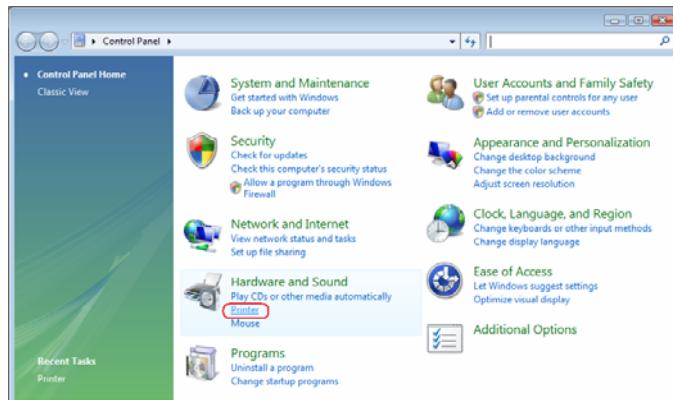
NOTE

- Not all USB printers are supported. Please check Thecus website for a list of supported printers.
- Note that if a multi-function (all-in-one) printer is attached to the 1U4600, usually only the printing and fax functions will work. Other features, such as scanning, will probably not function.

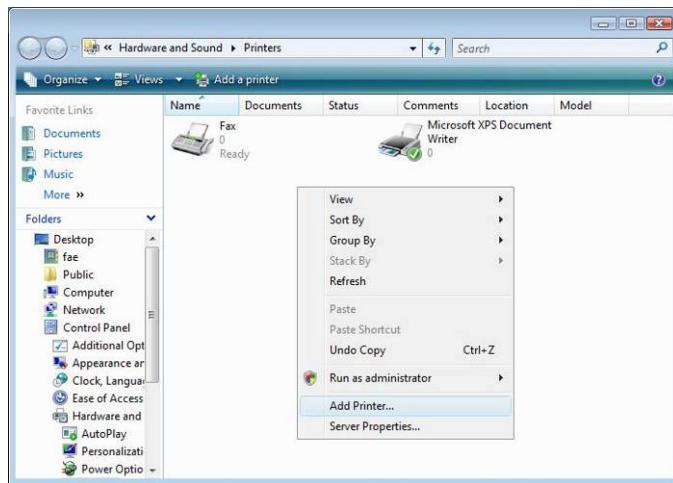
Windows Vista

To set up the Printer Server in Windows Vista, follow the steps below:

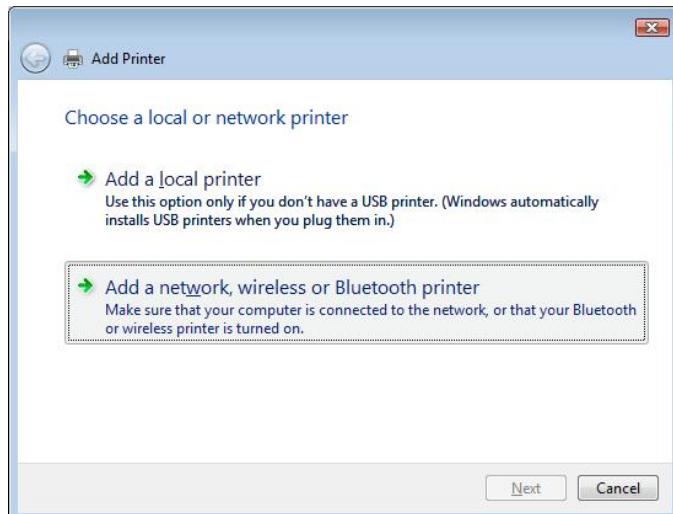
1. Open **Printer Folder** from the **Control Panel**.



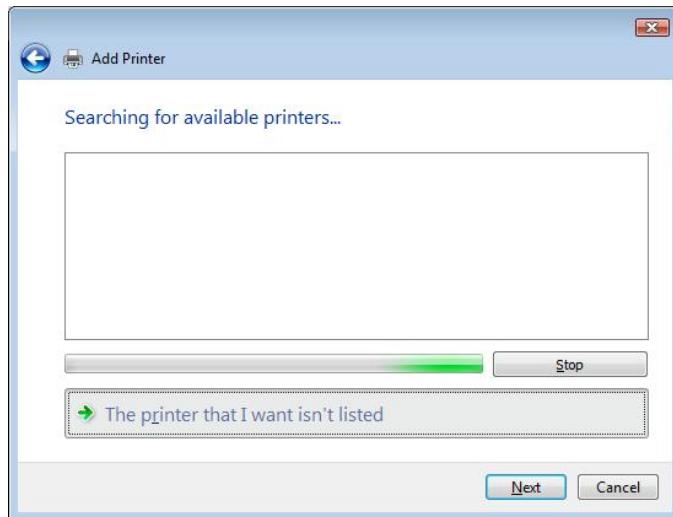
2. Click the right mouse button in anywhere on the **Printers** folder and then select **Add Printer**.



3. Select **Add a network, wireless or Bluetooth printer**.

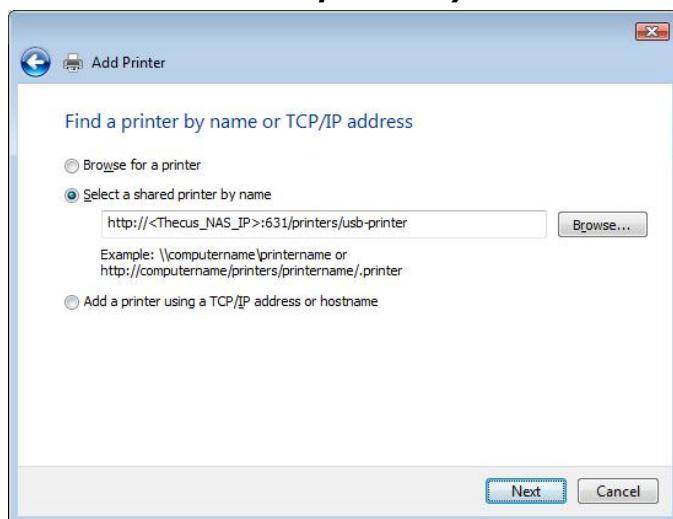


4. Select ***The printer that I want isn't listed***.



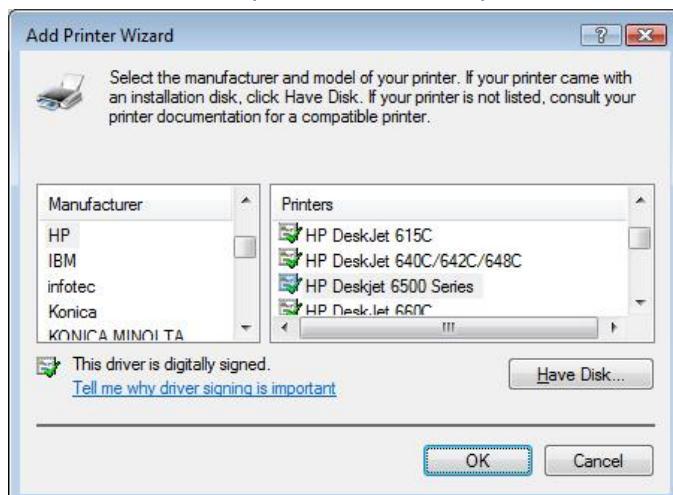
You can press ***The printer that I want isn't listed*** to go into next page without waiting for **Searching for available printers** to finish.

5. Click **Select a shared printer by name**.



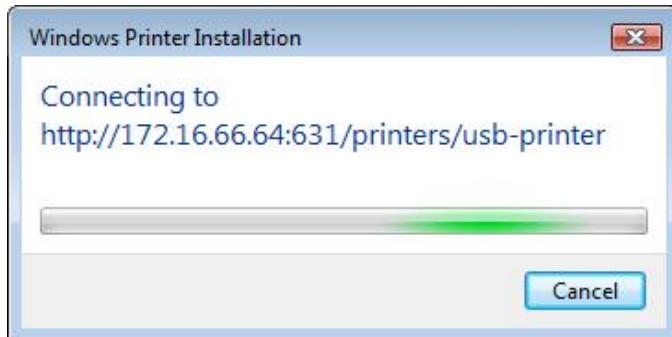
Type `http://<Thecus_NAS>:631/printers/usb-printer` in the box, where `<Thecus_NAS_IP>` is the IP address of the 1U4600. Click **Next**.

6. Select or install a printer and then press **OK**.

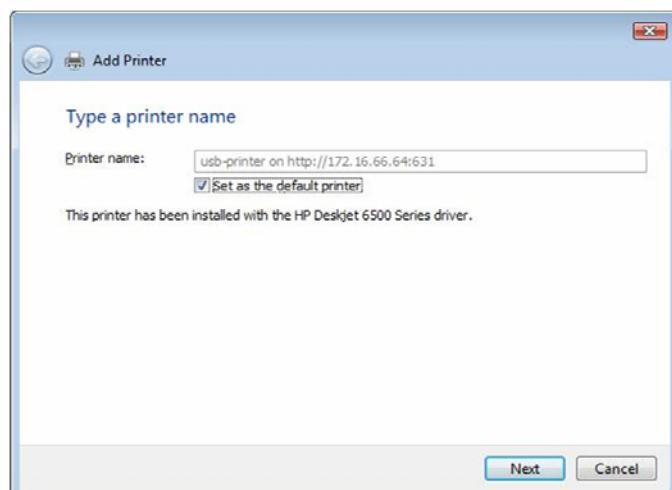


If your printer model is not listed, please contact your printer manufacturer for help.

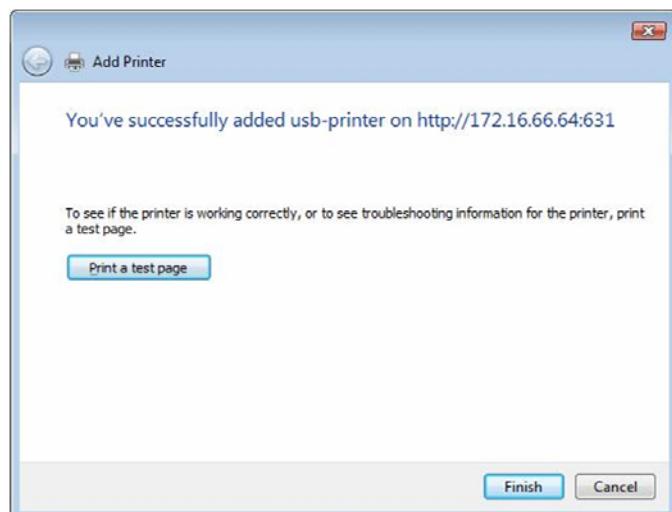
7. Windows will attempt to connect to the printer.



8. You can choose to set this printer as the default printer by checking the **Set as the default printer** box. Click **Next** to continue.



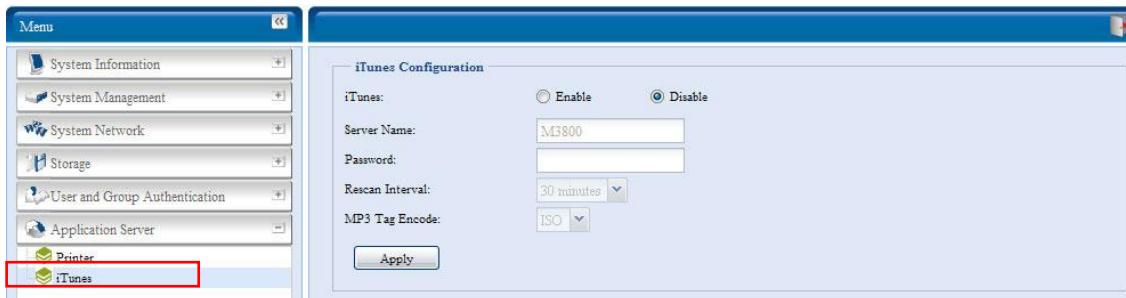
9. Done! Click **Finish**.



iTunes® Server

With the built-in iTunes server capability, the 1U4600 enables digital music to be shared and played anywhere on the network!

From the **Network** menu, choose the **iTunes** item, and the **iTunes Configuration** screen appears. You may enable or disable the iTunes Service from here. Once enabled, enter correct information for each field and press **Apply** to save your changes.



See the following table for detailed descriptions of each field:

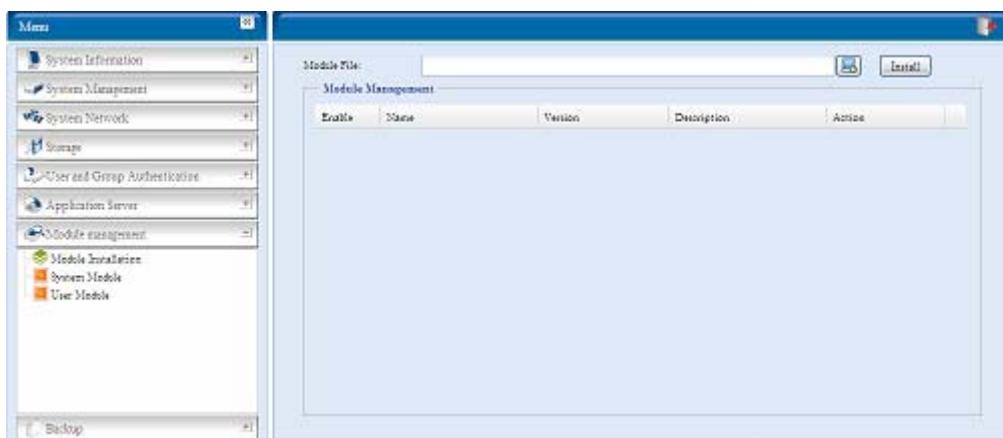
| iTunes Configuration | |
|----------------------|---|
| Item | Description |
| iTunes | Enable or disable the iTunes Service. |
| Server Name | Name used to identify the 1U4600 to iTunes clients. |
| Password | Enter password to control access to your iTunes music. |
| Rescan Interval | Rescan interval in seconds. |
| MP3 Tag Encode | Specify tag encoding for MP3 files stored in 1U4600. All ID3 tags will be sent out in UTF-8 format. |

Once the iTunes service is enabled, the 1U4600 will make all music located in the **Music** folder available for iTunes-equipped computers on the network.

Module Management

Module Installation

From the **Module Management** menu, choose the **Module Installation** item and the **Module Management** screen appears. From here, you can install separate software modules to extend the functionality of your 1U4600.



System Module

The system module is officially provided by Thecus for new features added.

User Module

The user module is reserved for Thecus fans to build up 3rd party functions in the future.

Backup

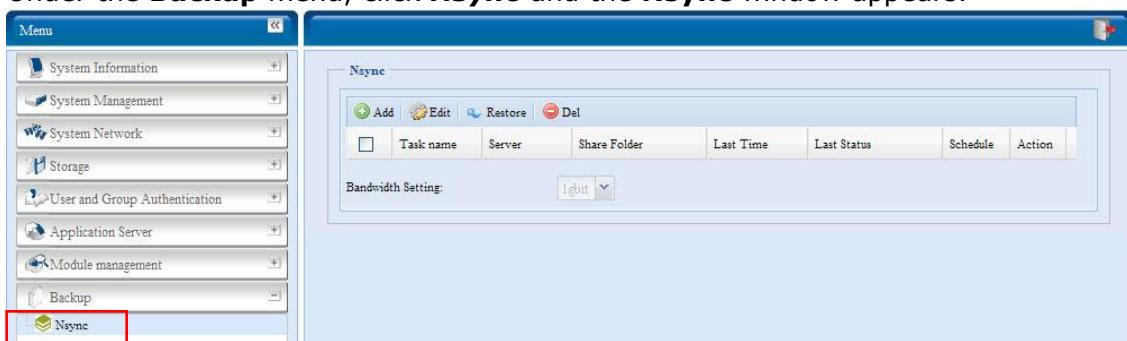
There are a number of ways to back up data with the 1U4600.

Nsync

You can backup a share folder to another 1U4600 (Nsync Target) or any FTP server for safe keeping as long as you have appropriate access right on that target. When using Nsync between two 1U4600s, you have the option to transmit files securely between two 1U4600s.

If the files on your 1U4600 are lost for any reason, you can restore those files from the target 1U4600. To backup files regularly, you can set up a scheduled task to run only once, daily, weekly, or monthly. You can also limit the bandwidth of your Nsync tasks, so other users on the network can share the bandwidth equally.

Under the **Backup** menu, click **Nsync** and the **Nsync** window appears.

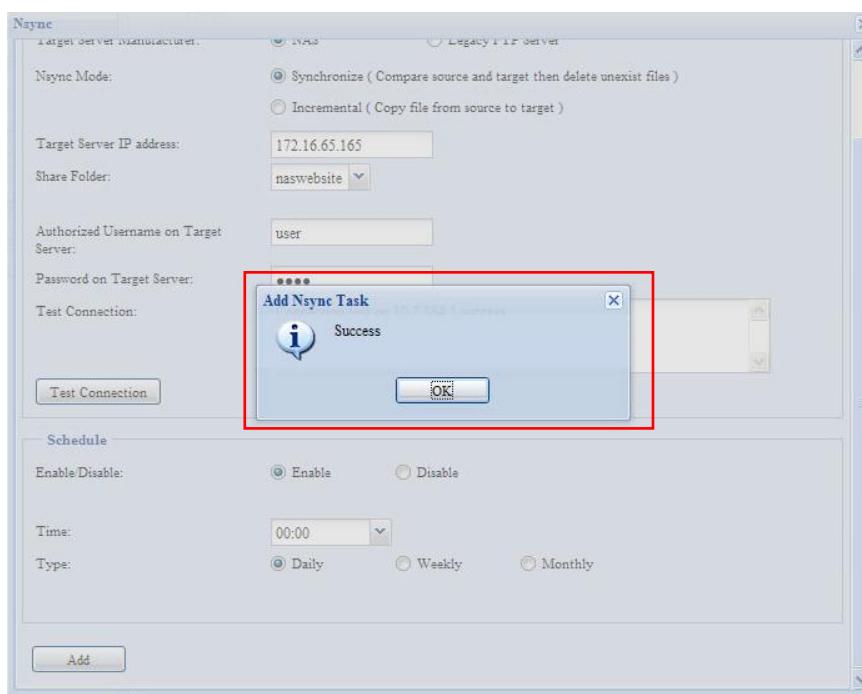
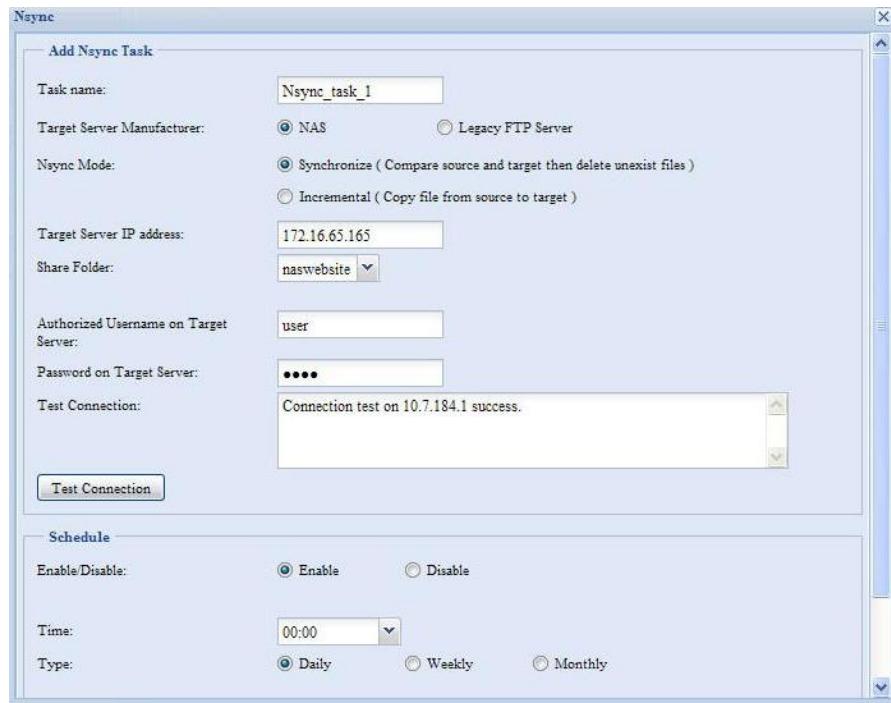


Below is a description of each field:

| Nsync | |
|-------------------|--|
| Item | Description |
| Add | Click to add a Nsync task |
| Edit | Click to Edit an Nsync task. |
| Restore | Restore share folder from an Nsync target. |
| Del | Click to delete an Nsync task. Backup files on Nsync target is also deleted. |
| Task name | The name of your Nsync task. |
| Server | The IP address of your target server |
| Share folder | The share folder you would want to backup. |
| Last Time | The time when the last Nsync task was executed. |
| Last Status | The status of your last Nsync task. |
| Schedule | Schedule backup of your share folders. |
| Action | Administrator can run or stop an Nsync task by pressing the action button. |
| Bandwidth Setting | Bandwidth control on Nsync tasks. |

Add Nsync Task

From the **Nsync** screen, click **Add** to display the **Add Nsync Task** screen.



| Add Nsync Task | |
|--------------------------------------|--|
| Item | Description |
| Task Name | The name of your Nsync task. |
| Target Server Manufacturer | Select whether the target is a Thecus Product (e.g. 1U4600) or FTP server. |
| Nsync Mode | Synchronize mode or Incremental mode . |
| Target Server IP Address | The IP address of your target server. |
| Source Folder | The share folder you want to backup. |
| Authorized Username on Target Server | The account name on the target server. |

| | |
|---------------------------|--|
| Password on Target Server | The password for the username on the target server. |
| Test Connection | Click to check the connection to the Target Server. |
| Schedule | Enable or Disable schedule backup of your share folders. |
| Time | The time when the Nsync task will run. |
| Type | Select whether to run the Nsync task daily, weekly, or monthly. Daily: input the time of day to execute Nsync task. Weekly: input which day of the week to execute the task. Monthly: decide which day of the month to execute the task. |
| Add | Press Add to submit your settings. |

NOTE

Before starting an Nsync Task, make sure the target server's Nsync Server (or FTP Server) is enabled.

Setting Up an Nsync Target on an Nsync Device

On the Nsync target server, the administrator of that server has to set up a user account with a folder named "nsync" and grant write access.

1. On the Nsync server, add a user for Nsync source (ex. nsyncsource1). For instructions on how to add a user on the 1U4600, see **Chapter 4: User and Groups Authentication> Local User Configuration > Add Users**.
2. On the Nsync server, grant that user (ex. nsyncsource1) write access to the **nsync** folder. For instructions on how to set up a folder's ACL, see **Chapter 4: Storage management> Share Folder> Folder Access Control List (ACL)**.
3. Once this is done, the target server will start accepting Nsync tasks from server using that ID and password.

Setting Up an Nsync Target on Another Device

If you selected "Other Device" when setting up your Nsync task, the 1U4600 will use the FTP protocol to back up the share folder. On the external storage device, make sure there is a folder named "nsync", and the Auth ID has writable permission in that folder.

Designating 1U4600 as an Nsync Target

The 1U4600 can act as an Nsync server, enabling another Nsync-equipped Thecus NAS at a remote location backup their files to this 1U4600. From the **System Network** menu, choose the **Nsync Target** item, and the **Nsync Target Server** screen appears.

| Nsync Target Server Setting | |
|-----------------------------|---|
| Item | Description |
| Nsync Target Server | Enable or Disable Nsync Target support. |

NOTE

To enable Nsync task to go thru firewall, you have to open port TCP/1194 on your firewall in both directions.

Thecus Backup Utility

The Thecus Backup Utility is on your Installation CD. When you click on the CD, the Backup Utility will be installed under **Program Groups > Thecus > Thecus Backup Utility**. If it is not installed, you can copy the file (**Thecus Backup Utility.exe**) to a convenient location on your hard disk and double click to execute it.



NOTE

If you can not find Thecus Backup Utility on your CD, please download it from the Thecus website (<http://www.thecus.com>).

When you execute this utility for the first time, it will ask you whether to create a DB file. Click **Yes**.

1. Click **Add** to create a Backup task. The **Add New Task** dialog box appears.

| Add New Task | |
|---------------------|---|
| Item | Description |
| Task | Specifies a name for the current task. |
| Source | Click to specify the source folder/file location. |
| Incremental | Click to specify whether the backup will be incremental. If unchecked, the backup will be a full backup. |
| Destination | Click to specify the destination folder/file location. |
| Excluded extensions | Files with these file name extensions will be skipped and not back up to the destination. |
| Comments | If you wish, enter comments here for your records. |

2. To schedule the task to run at regular intervals, click on the **Schedule** icon for that task. You can schedule the task to run **Monthly** or **Weekly**.
3. To check the log for that task, click on the **Log** icon for that task.

NOTE

Thecus Backup Utility also supports MAC OS X. Just copy the Thecus Backup Utility.dmg to your MAC OS X machine and double click to execute it.

Windows XP Data Backup

If you use Windows XP Professional, you can also use the Windows Backup Utility (Ntbackup.exe) to backup your files.

If you use Windows XP Home Edition, follow these steps to install the utility:

1. Insert the Windows XP CD into a drive and double-click the **CD** icon in **My Computer**.

2. When the Welcome to Microsoft Windows XP screen appears, click ***Perform Additional Tasks***.
3. Click ***Browse this CD***.
4. In Windows Explorer, navigate to ***ValueAdd > Msft > Ntbackup***.
5. Double-click ***Ntbackup.msi*** to install the backup utility.

Once installed, you can use the Windows Backup Utility by following the steps below:

1. Click ***Start***, and point to ***All Programs > Accessories > System Tools > Backup*** to start the wizard.
2. Click ***Next*** to skip past the opening page. Choose ***Backup files and settings*** from the second page, and then click ***Next***.
3. Select which option you want to back up.
4. Click ***Next*** and in the Backup Type, Destination, and Name page, specify a back up location using the ***Browse*** button.
5. Find and select the drive that specifies your 1U4600 as your backup destination and click ***Next***.
6. Click ***Next*** to display the wizard's final page and click ***Finish*** to start backing up.

Apple OS X Backup Utilities

Mac OS X does not include any backup software. However, there are a number of backup solutions available for the Mac OS X, including: [iBackup](#), [Psyncx](#), [iMSafe](#), [Rsyncx](#), [Folder Synchronizer X](#), [Tri-BACKUP](#), [Impression](#), [Intego Personal Backup](#), [SilverKeeper](#), and Apple's dotMac Backup utility to name just a few. To find even more freeware and shareware backup utilities to choose from, go to [VersionTracker](#) or [MacUpdate](#) and search on "backup".

Chapter 5: Using the 1U4600

Overview

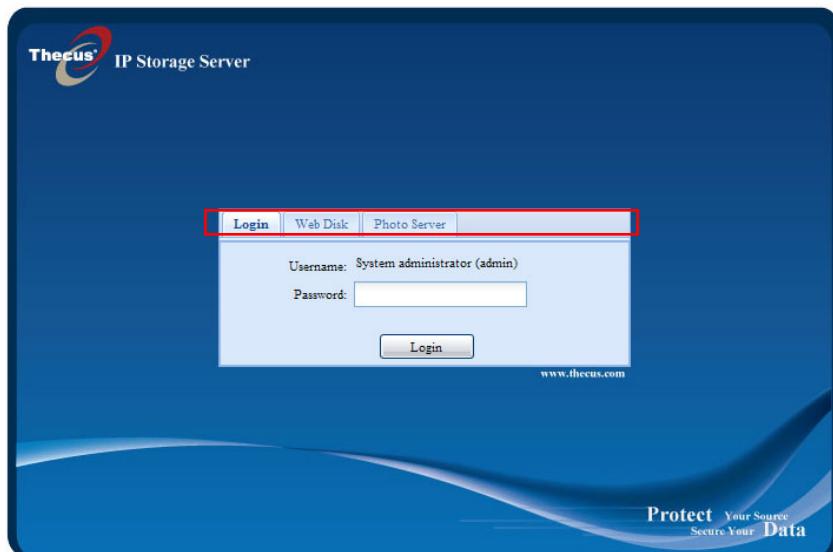
Once the 1U4600 is setup and operating, users on the network may manage all varieties of digital music, photos, or files by simply using their web browsers. To manage your personal files or access public files on the 1U4600, just enter its IP address into your browser (default IP address is <http://192.168.1.100>), and you will be taken to the **1U4600 Login** page.

NOTE

Before proceeding, make sure that WebDisk Support or Secure WebDisk Support is enabled in the Service Support screen in the system's **Network** menu. See Service Support in Chapter 4: System Network >HTTP/Web Disk.

Login Page

To login to the system, enter your user name and password, and select Web Disk or Photo server then click **Login** to log into the system. You will be taken to the **selected** interface.



Using WebDisk

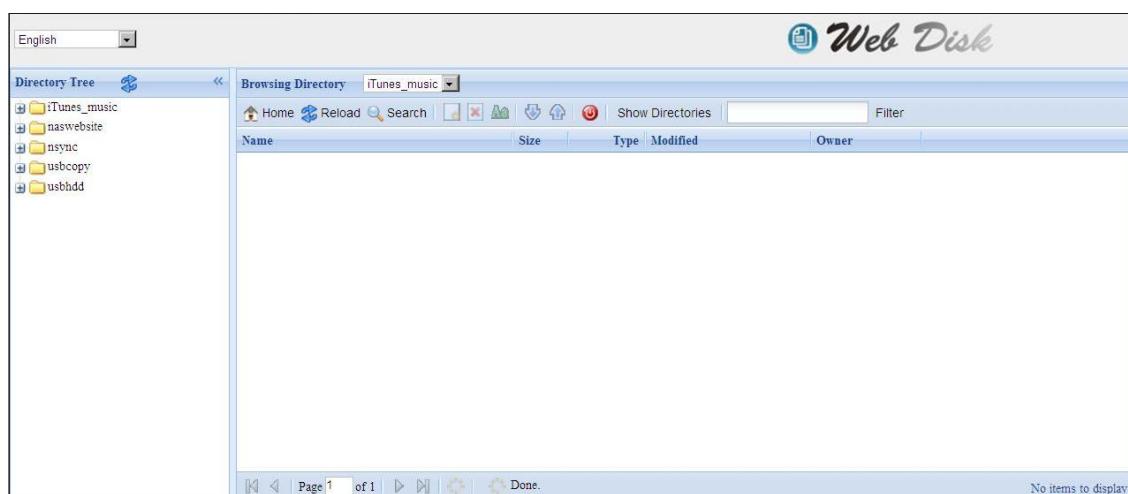
The 1U4600 provides a WebDisk function that allows you to access the system over the Internet from any browser.

1. In the Login page, type in the User ID and password that were previously set for you in the Accounts menu. See [Chapter 4:User and Group Authentication > Local User Configuration](#).
2. The WebDisk page appears showing folders made currently available to you via the **Access Control List (ACL)**.
3. Click on a folder name to enter the folder.
4. The folder's page appears displaying files and folders. Click on a file to download the file.
5. Buttons on the folder page allow you to create a new folder, upload files and delete files in the folder.

6. To create a new folder within the current folder, press the New folder button. When the screen appears enter a name for the folder. Press OK to create the folder.
7. To upload a file from your computer to the current folder, press the New file (upload) button. When the screen appears, press Browse and locate the file to upload. Press **OK** and the file is uploaded to the current folder.
8. To delete a file or folder, select the file or folder's check box. Press the Delete selected items button. You can also check the check box as the red circle indicates to select all files and folders in this folder.

To access folders with access control, you must first login with a local user account.

For more information on how to setup user rights to the folders, please check
Chapter 4: Storage Management >Share Folder > Folder Access Control List (ACL).



| Folder Page Button | |
|----------------------|---|
| Button | Description |
| Directory Tree | List all directory trees per login user's privilege. |
| Browsing Directory | Browsing selected directory of its folders and files. |
| Home | Go back to the web disk directory layer. |
| Reload | Re-load the current list. |
| Search | Search files in the current web disk directory. (Must input the complete file name.) |
| (new file/Directory) | Creates a new folder or directory. |
| (delete) | Deletes selected files or folders. |
| (Rename) | Rename a directory or file. |
| (download) | Download a file to current folder of your computer. |
| (upload) | Upload file from your computer to current web disk folder. |

| | |
|--|--|
|  (Admin) | Change password and confirm new password. |
|  (logout) | To logout of the web disk interface. |
| Show Directories | Show the files and folders in the directory. |
| Filter | Search files in the directory. (You can only input some word string.) |
| Name | Displays the names of folders and files. |
| Size | Shows the size of folders and files. |
| Type | Displays the type of folders and files. |
| Modified | Shows the time of most recent modification of folders and files. |
| owner | Owner of the file. |

There is also the way by using right click button to bring up context windows as short cut to operate what you needed.

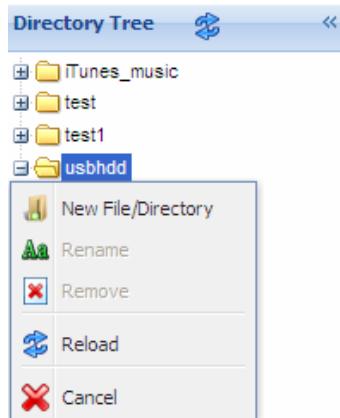


Photo Server

Using the Photo Server, users can view and share photos, and even create their own albums right on the 1U4600.

You will see your own Photo Gallery and all public Photo Albums on the network.

To manage any picture files, you must first select the item by clicking the box.





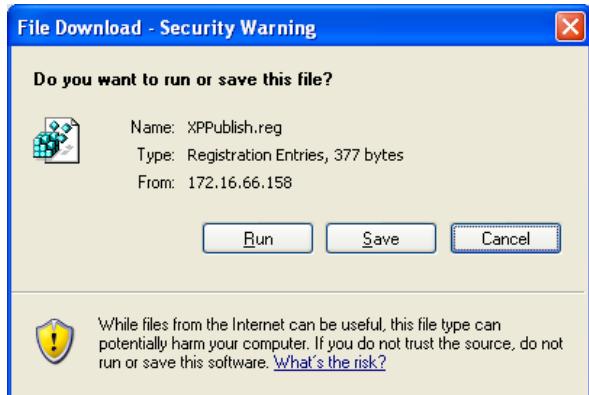
Windows XP Publishing Wizard

There are many ways for a local user to upload pictures into their photo album. Users of Windows XP can upload their pictures using the Windows XP Publishing Wizard.

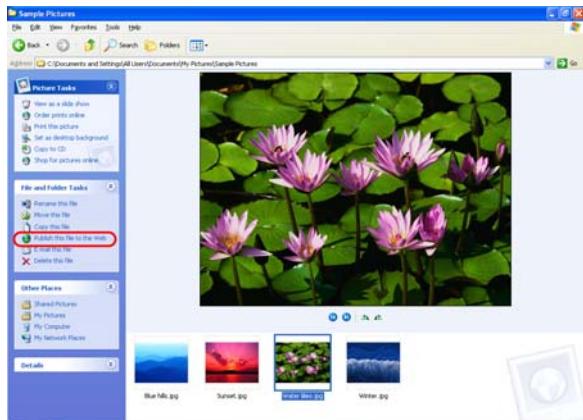
1. Click on the **XP Publishing Wizard** icon on top right corner. 
2. The **XP Web Publishing Wizard Client** screen appears. Click on the link to install the Publishing Wizard.



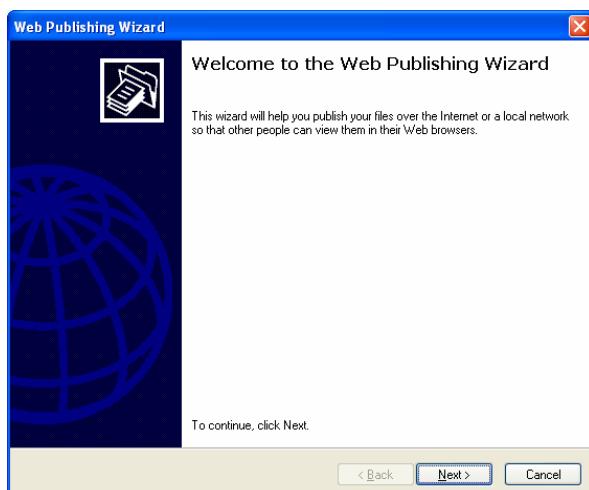
3. Windows XP will ask whether you want to run or save this file. Click **Save** to save the register file.



- Once the register file is installed, use the Windows file manager to browse the folder that contains the picture you want to publish. On the left pane, there will be an icon labeled "**Publish this folder to the Web**".



- Click on this icon and **Web Publishing Wizard** will start.



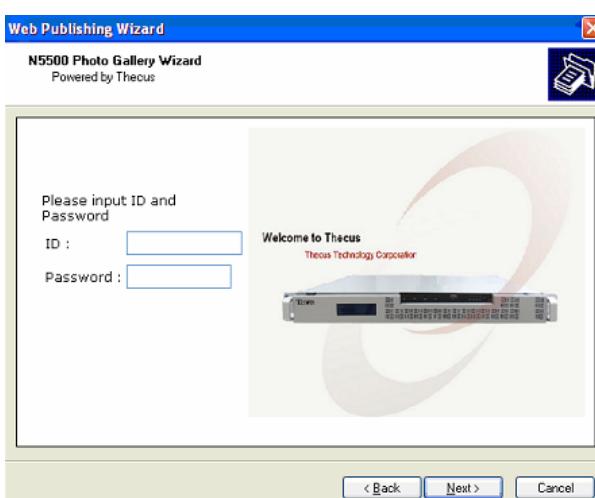
- Select the pictures you want to publish to the Photo Web Server by placing a check mark on the top left hand corner of the picture. Click **Next**.



7. Your PC will start to connect to the Photo Web Server.
8. Select **1U4600 Photo Gallery Wizard** to publish your pictures to the 1U4600.



9. Login into the 1U4600 with your local user name and password.



10. Create your album by entering an album name and clicking on the **Create Album** button.

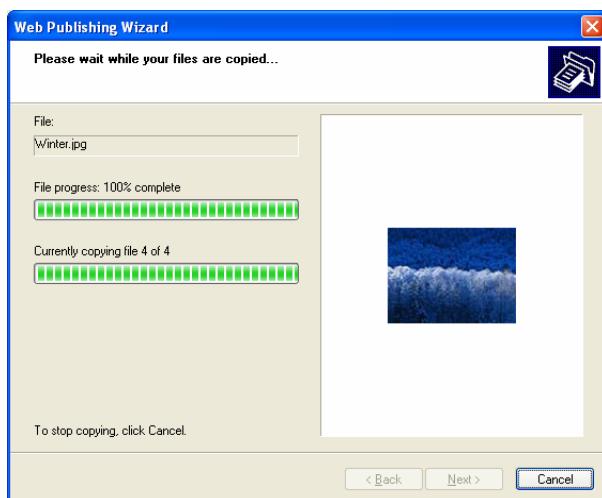


11. Select the album you want to upload your pictures to.

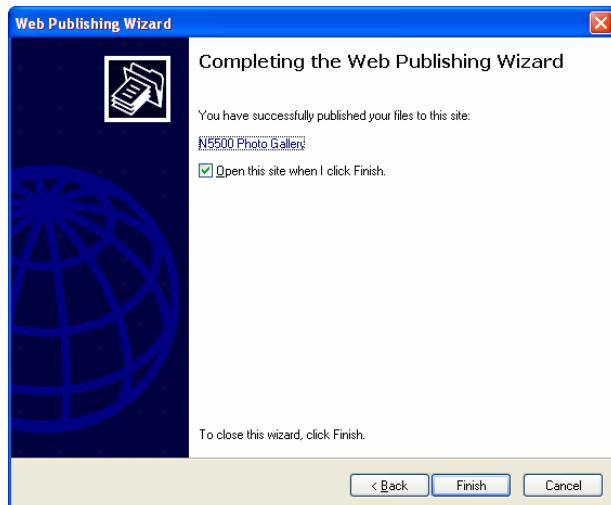
12. Confirm the target album.



13. Windows will show you that the picture upload is in progress.



14. When the upload is finished, the Wizard will ask you whether if you want to go to the website. Click **Finish** to go to your Photo Web Server.



15. Click on the user's icon to go to that user's album.



16. You will see the user's album list. Click on **Album**.



17. Finished! You will see the pictures just selected in the album.



Managing Albums and Photos

| Icon | Function | Description |
|------|------------|--|
| | Make Cover | Make selected photo your cover picture. |
| | Back | Return to the previous screen. |
| | Add | Add a new album or photos. |
| | Modify | Edit the name and description of the selected album or photo. Each name is limited to 20 characters and each description is limited to 255 characters. |
| | Delete | Delete the selected albums or photos. |

NOTE

- Only logged in users will see these icons.
- To prevent system errors, the 1U4600 sets the following limitations on photo files:
 - Each file upload is limited to a size of 8MB. Files exceeding 8MB will NOT be uploaded and no error message will appear.
 - Only these photo file types will be uploaded: *.jpg, *.gif, *.bmp, *.png, *.pcx, *.psd, *.bmp.
 - If duplicate file names exist during upload process, system will add a number in front of the original file name (abc → 1abc).

Creating Albums

To create a photo album, follow the steps below:

1. Click the **Add** button to create a new album.
2. Enter a name for the album, and enter a description if you wish. Then, click on the **Create Album** button.

Password Protecting Albums

If you would like to put a password on a particular album, follow these steps:

1. Select the album to be protected, click on the **Edit** button, and the **Album Edit** screen will appear.
2. The owner of the album can enter an album password to protect the album, so that only people with the correct password can view the album.

Uploading Pictures to Albums

Uploading pictures to albums using the Web User Interface is easy:

1. When the album is created, click the album icon to enter the album. Initially the album is empty.
2. Click the **Add** button to upload pictures into the album. The **Upload Photos** screen will appear. Users can select and upload up to 8 pictures at a time.
3. Once the picture is uploaded, you can view it in the album. The owner of the album can delete or modify the pictures with the **Delete** or **Modify** buttons on the top right hand corner

EXIF Information

While viewing pictures, you can also have the 1U4600 display the EXIF information for each photo.



Simply click the **EXIF** button to display EXIF information. To hide this information, click the **EXIF** button again.

Slide Shows

Slide shows are a great way to enjoy pictures stored on your 1U4600.

You can click on the **Start Slide Show** icon on the top right hand corner to start the slide show.



To stop the slide show, click on the **Stop Slide Show** icon on the top right hand corner.

Mapping a Client PC to the 1U4600

You can map share folders on the 1U4600 so that you can access them as if they were drives on your computer. You can connect to the shared network folders on the 1U4600 as follows:

Windows

1. Go to the **My Computer** folder in Windows.
2. In the menu bar, select **Tools** and then **Map Network Drive...**
3. The **Map Network Drive** window appears.
4. Assign a drive letter for the share folder.
5. Click the **Browse** button to find the folder over your network. Alternatively, you may enter the folder name you wish to connect to or enter its IP address. (i.e. \\192.168.1.100\share)
6. Click **Finish**. When the **Connect As...** window appears, enter your user name and password.
7. Click **OK**. The share folder appears as the drive you assigned. You can now access this folder as though it were a drive on your computer.

Apple OS X

On an Apple computer, you can connect to shared computers and servers using a network address.

1. Choose **Go > Connect to Server...**
2. Enter the network address for the server in the Server Address text box.
When connecting using SMB/CIFS protocol, type:
smb://192.168.1.100/Folder1
When connecting using AFP protocol, type:
afp://192.168.1.100/Folder1
Click **Connect**.
3. When MAC OS X is trying to connect 1U4600, it will ask for a User Name and Password which has access to the folder.
4. When MAC OS X has connected to the 1U4600 successfully, an icon representing the folder will appear on the MAC OS X desktop. You can access the folder by double clicking on the icon.

Mapping the 1U4600 as an iSCSI Drive

With the 1U4600, you are able to map it as an iSCSI drive. With iSCSI, you can remotely access the 1U4600 at great speeds, as if it were installed as a local drive in your computer.

To do this, simply follow the steps below:

Windows 2000/XP

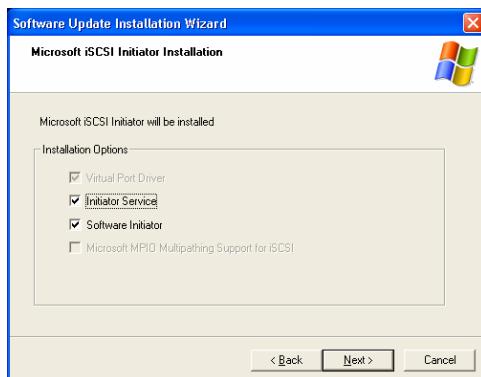
1. First, download the iSCSI Initiator from the Microsoft website (<http://www.microsoft.com>). You can find this software by entering **iSCSI Initiator** into the search box on their homepage.
2. Once the download is complete, install the iSCSI Initiator by double-clicking the EXE file. You may be presented with the following security warning. Click **Run** to continue.



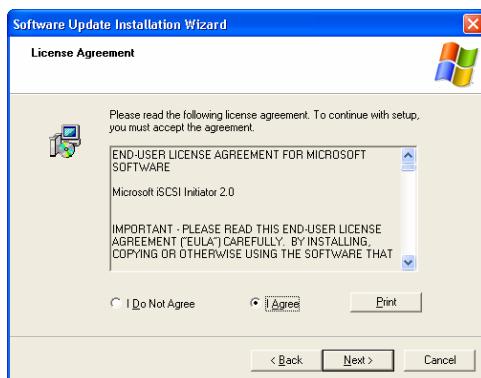
3. You will now install the iSCSI Initiator using the Setup Wizard. Click **Next** to continue.



4. Leave the default selections and click **Next**.



5. Read the license agreement. To continue with the installation, click **I Agree** and then click **Next**.



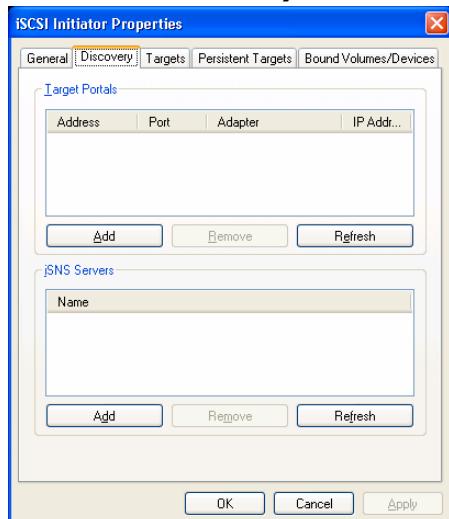
6. The iSCSI Initiator will now install automatically. Click **Finish** once completed.



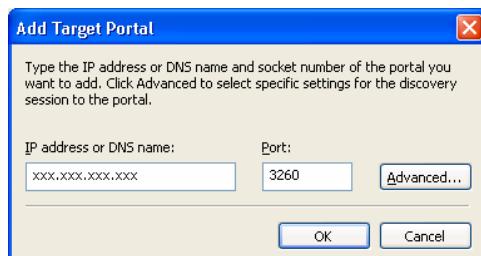
7. Start the iSCSI Initiator by double-clicking its icon on the desktop. The iSCSI Initiator properties window will appear.



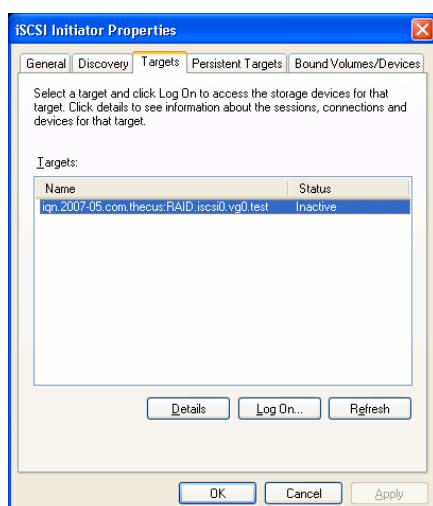
8. Select the **Discovery** tab. Under **Target Portals**, click **Add**.



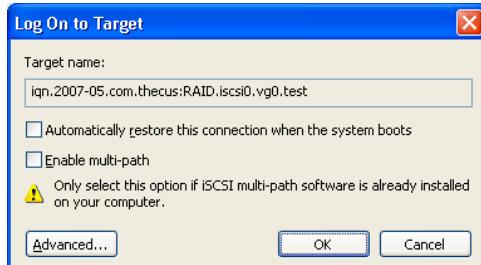
9. Enter the IP address of the 1U4600. Click **OK**.



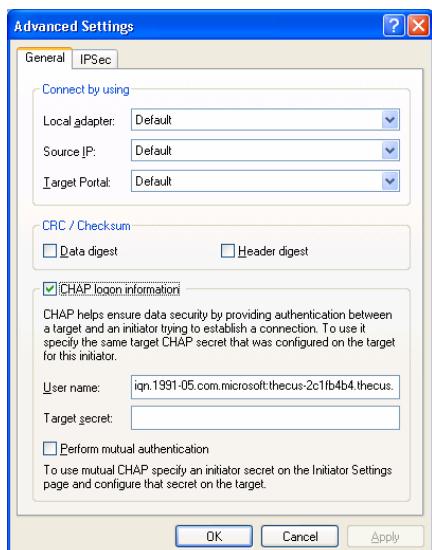
10. On the **iSCSI Initiator Properties** window, select the **Targets** tab. With the iSCSI target highlighted, click **Log On**. The **Log On to Target** dialogue will appear.



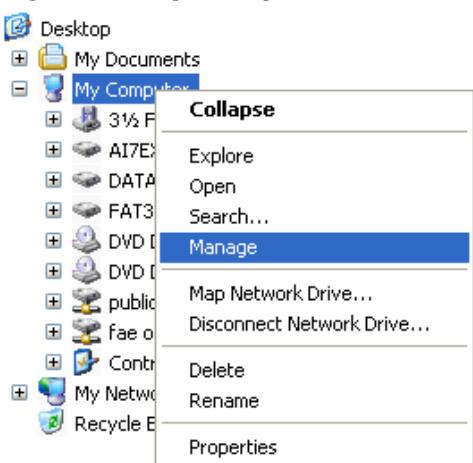
11. If you have not enabled CHAP, click **OK** to continue.



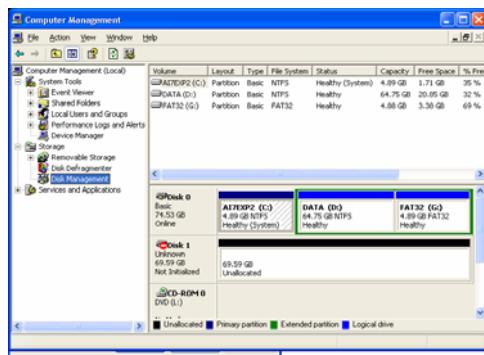
If you have enabled CHAP, click **Advanced**. Under Advanced Settings, check the **CHAP login information** checkbox and enter your username and password. Click **OK**.



12. Right click **My Computer** on the desktop and select **Manage**.



13. Click on Disk Management and you will see a new hard disk listed.



14. Initialize the new hard disk and you will then be able to use the iSCSI target as a local drive.

Windows Vista

Because Windows Vista has the Microsoft iSCSI Initiator pre-installed, you will not have to install this piece of software. Instead, start the iSCSI Initiator and follow steps 8-14 to map the 1U4600 as an iSCSI drive.

Chapter 6: Tips and Tricks

USB and eSATA Storage Expansion

The 1U4600 supports external USB hard disks through its five USB ports. Once a USB hard disk has successfully mounted, the entire volume will be linked automatically to the default USB HDD folder. The 1U4600 supports up to 5 USB external storage devices. All file names on the USB disk volume are case sensitive.

The 1U4600 also supports eSATA hard disks with its eSATA port.

Before attaching an eSATA or USB disk drive to 1U4600, you have to partition and format it on a desktop computer or a notebook first. The attached device will be located at \\192.168.1.100\usbhdd\sdf1 where 192.168.1.100 means the IP address of 1U4600 and sdf1 stands for the first partition on disk #6, the eSATA or USB disk drive. If it is an NTFS partition, NAS users can open or copy files from \\192.168.1.100\usbhdd\sdf1 but cannot add new files or modify existing files.

NOTE

If you want to write to an USB storage device, the file system must be FAT32.

| USB Storage | FAT32 Partition | NTFS Partition |
|----------------|--------------------|-------------------|
| Read | OK | OK |
| Write | OK | - |

Adding a Spare Disk

With a RAID 1, RAID 5, RAID 6, or RAID 10 volume, you can add a spare disk after the initial RAID is setup. To add a spare disk, follow the steps below:

1. On the **RAID Configuration Screen**, tick the checkbox of the hard disk you wish to designate as a spare disk.
2. Click **Add Spare**. The disk will be configured as a spare disk. The system automatically rebuilds the spare disk when one of the disks in the RAID set fails.

Remote Administration

You can set up your 1U4600 for remote administration. With remote administration, you can access your 1U4600 over the Internet, even if your 1U4600 is behind a router. This is especially useful if you are traveling and suddenly need a file from your 1U4600.

Setting up remote administration is a three-part process, and will require the following equipment:

- Thecus 1U4600 NAS device
- Cable / DSL Router with Dynamic DNS support
- Home PC
- Internet Connection

NOTE

Router setup will differ slightly depending on router used. For this example, we will use the Asus WL500g because it has support for Dynamic DNS. Contact your router hardware vendor for setup help.

Part I - Setup a DynDNS Account

1. Go to <http://www.dyndns.org> from your home PC.
2. Click on the **Sign Up Now** link.
3. Check the Check boxes, select a user name (i.e.: 1U4600), enter your email address (i.e.: xxx@example.com), check **Enable Wildcard**, and create a password (i.e.: xxxx).
4. Wait for an email from www.dyndns.org.
5. Open the email and click on the link to activate your account

Part II - Enable DDNS on the Router

1. Go to the router setup screen and select **IP Config > Miscellaneous DDNS Setting** from your Home PC.
2. Click on **Yes** for **Enable the DDNS Client?**
3. Select www.dyndns.org.
4. Go to router setup screen, and enter the following information:
 - a. User Name or E-mail Address: **xxx@example.com**
 - b. Password or DDNS Key: **xxxx**
 - c. Host Name: www.1U4600.dyndns.org
 - d. Enable wildcard? Select **Yes**
 - e. Update Manually: Click **Update**

Part III - Setting up Virtual Servers (HTTPS)

1. Navigate to **NAT Setting > Virtual Server**.
2. For **Enable Virtual Server?**, select **Yes**
3. Setup the HTTPS Server
 - a. **Well-Known Applications:** Select **User Defined**
 - b. **Local IP:** Enter **192.168.1.100**
 - c. **Port Range:** **443** (the default HTTPS port setting on the 1U4600)
 - d. **Protocol:** select **TCP**
 - e. Click **Add**.
 - f. Click **Apply**.
4. Test the HTTPS connection from another computer on the Internet
 - a. From a remote computer, open your browser and enter
<https://www.1U4600.dyndns.org>
 - b. You should see the login page of 1U4600.

Firewall Software Configuration

If you are using a software firewall (i.e. Norton Internet Security) and are having trouble connecting to the 1U4600, you can try the following steps:

1. Double click the **NIS** icon on system tray, and then configure the **Personal Firewall**.
2. On the **Programs** page, find the **SetupWizard.exe** and change its permission to "Permit All". If it's not in the program list, use the **Add** or **Program Scan** buttons to find it.
3. On the **Networking** page, manually add 1U4600 IP address (i.e. 192.168.1.100) to the **Trusted** list.

Replacing Damaged Hard Drives

If you are using RAID 1, RAID 5, or RAID 6 you can easily replace a damaged hard drive in the Thecus 1U4600 while keeping your data secure with the system's automatic data recovery.

Hard Drive Damage

When a hard drive is damaged and data in the RAID volume, the system LCD will display warning message also the system beeps.

Replacing a Hard Drive

To replace a hard disk drive in the 1U4600:

1. Remove the tray with the damaged hard disk.
2. Unscrew the damaged hard disk and remove it from the tray.
3. Slide a new hard disk into the tray and fasten the screws.
4. Insert the hard disk tray back into the 1U4600 until it snaps into place. You can also lock it with a key if desired.
5. The LED blinks green when the HDD is accessed.

RAID Auto-Rebuild

When using RAID 1, 5, 6, or 10 on the 1U4600, you can use the auto-rebuild function when an error is detected.

1. When a hard disk fails the system beeps and/or an email notification is sent to specified receivers.
2. Check the LCD to see which disk has failed.
3. Follow the steps mentioned above to replace the failed hard disk.
4. The system automatically recognizes the new hard disk and starts the auto-rebuild sequence to resume its status before the hard disk crash.

Chapter 7: Troubleshooting

Forgot My Network IP Address

If you forget your network IP address and have no physical access to the system, you can find out the IP address by either looking directly onto the 1U4600's LCD panel, or by using the setup wizard to retrieve the IP of your 1U4600.

1. Start the Setup Wizard, and it will automatically detect all Thecus IP storage products on your network.
2. You should be able to find the IP address of the 1U4600 which you have forgotten in the **Device Discovery** screen.

Can't Map a Network Drive in Windows XP

You may have problems mapping a network drive under the following conditions:

1. The network folder is currently mapped using a different user name and password. To connect using a different user name and password, first disconnect any existing mappings to this network share.
2. The mapped network drive could not be created because the following error has occurred: **Multiple connections to a server or shared resource by the same user, using more than one user name, are not allowed.**
Disconnect all previous connections to the server or shared resource and try again.

To check out existing network connections, type `net use` under the DOS prompt. You may refer the URL below for more network mapping information.

http://esupport.thecus.com/support/index.php?_m=downloads&_a=viewdownload&downloaditemid=57&nav=0

Restoring Factory Defaults

From the **System** menu, choose the **Factory Default** item and the **Reset to Factory Default** screen appears. Press **Apply** to reset the 1U4600 to factory default settings.

WARNING

Resetting to factory defaults will not erase the data stored in the hard disks, but WILL revert all the settings to the factory default values.

Problems with Time and Date Settings

The administrator is able to select an NTP Server to keep the 1U4600's time synchronized. However, if the 1U4600 can not access the Internet, you may encounter a problem when setting the Time and Time Zone. If this happens:

1. Login to the Web Administration Interface.
2. Navigate to **System Management>Time**.
3. Under **NTP Server**, select **No**.

4. Set the **Date, Time**, and **Time Zone**.

5. Click **Apply**.

In addition, if the 1U4600 is able to access the Internet and you want to keep the NTP Server clock.isc.org by default, please make sure the DNS Server is correctly entered, thereby allowing the NTP Server name to correctly resolve. (See **System Network > WAN > DNS Server**)

Dual DOM Supports for Dual Protection

The most advance and useful of 1U4600 is Dual DOM implemented. In the normal circumstance, it has no need to have this feature involved. But with irresistible cause like power cut or human error by accident occurred especially during system booting stage, this will become the great feature to prevent system down time. Practically while it happened, system will try to recovery the DOM 1 from DOM 2 first. If it is unachievable then system can boot from DOM 2. And all of this procedure can be operated by LCM.

NOTE

The Dual DOM in DOM1 is default master and FW upgrading will only execute in DOM1 unlike DOM2 is 'Read only' initially.
Any circumstance occurred, while DOM2 successes recover DOM1. The FW will be version of DOM2. Therefore, it may need to upgrade to the version of DOM1 it has.
If DOM1 can not be recovery from DOM2, then system will boot up from DOM2. The original configuration in DOM1 may need to setup again with DOM2 operation.

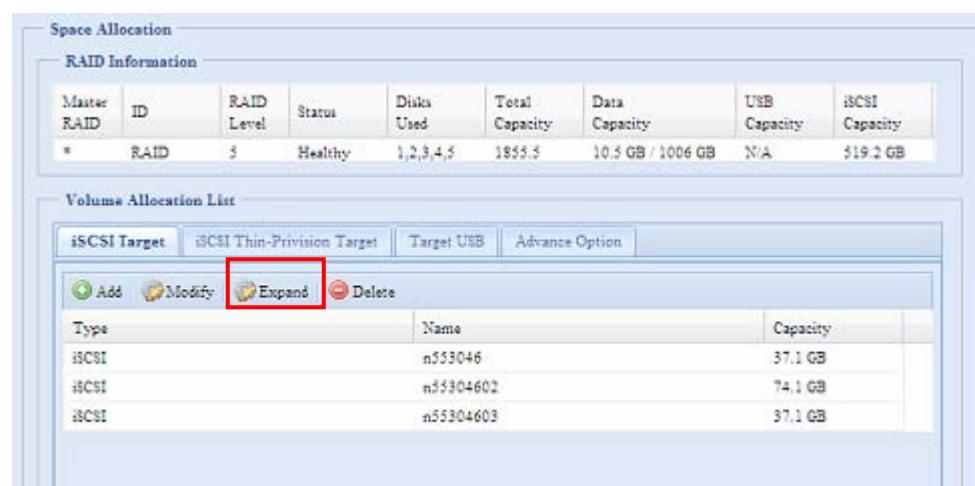
Chapter 8: Revision updated up to 3.00.04

New features phased in

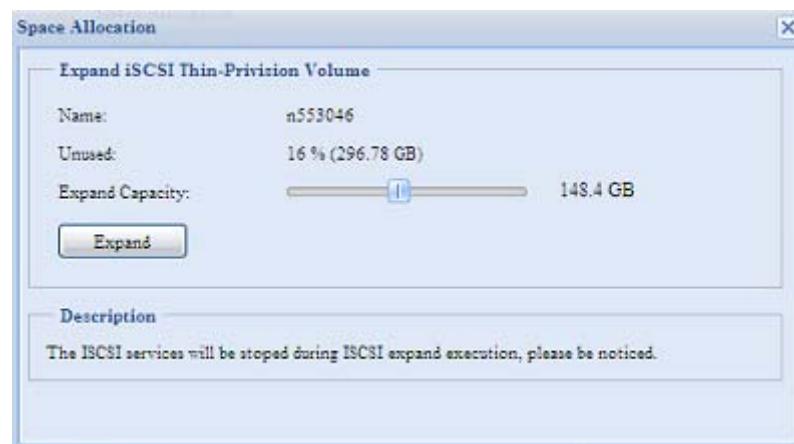
There are more features has implemented into new FW version 3.00.04 as it released.

RAID Expansion for iSCSI Target Volume

First, the iSCSI volume is capable now to expand its capacity from unused space. Simply select the iSCSI volume from the lists which you like to expand the capacity then click on **Expand** button:

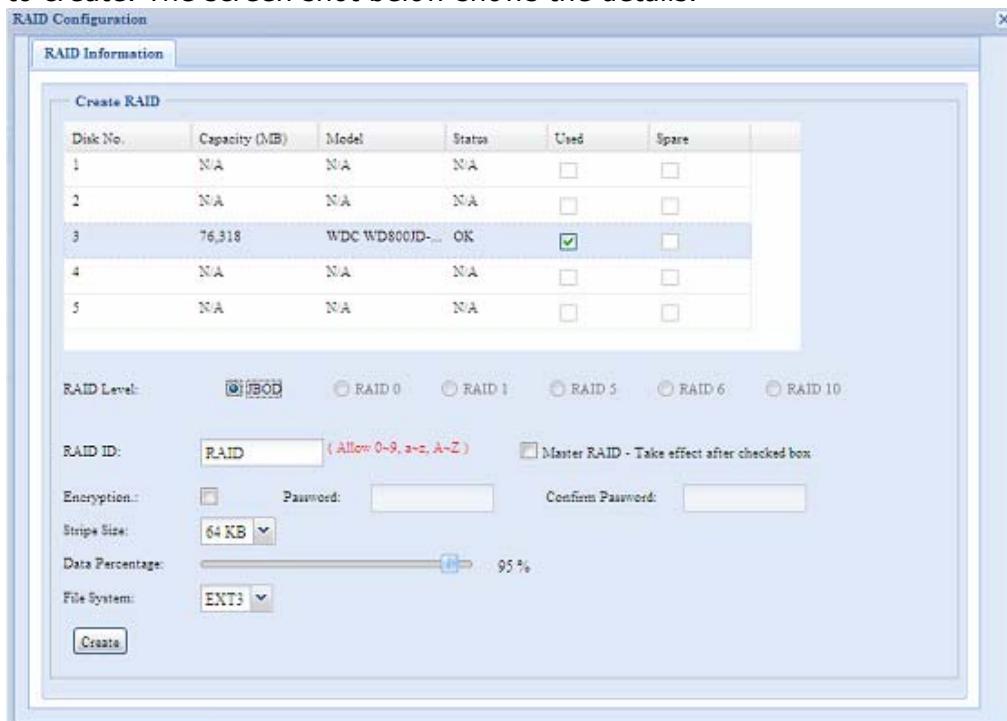


You will see the screen shot displayed as below, using the mouse to drag the bar to the size you wanted. Then press "Expand" button to confirm the operation.

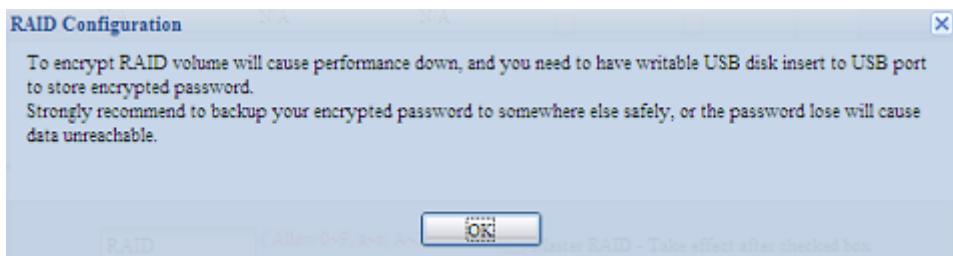


RAID Volume Encryption

With FW v3.00.04, you could protect your data by using RAID Volume Encryption function to prevent data exposure risk. To have this function active, it needs to enable the "Encryption" option while RAID is created and follow by password input for identification. The external writable USB disk is required to plug in any USB port of system to save the password you have inputted while RAID volume is confirmed to create. The screen shot below shows the details.



Once the RAID volume create button has pressed with encryption function enabled, it will have message pop-up as below for confirmation.



After RAID volume has been created you may remove this USB disk till next time while system booting. The RAID volume can not be mounted if USB disk with key can not be found in any system USB port during volume accessed. To activate encrypted volume, find the USB disk with key and plug in to any USB port.

We are strongly recommended copying the RAID volume encryption key to some other safety place. You could find the encrypted key file from USB disk in formatted "(RAID volume created date)_xxxxxx.key".

WARNING

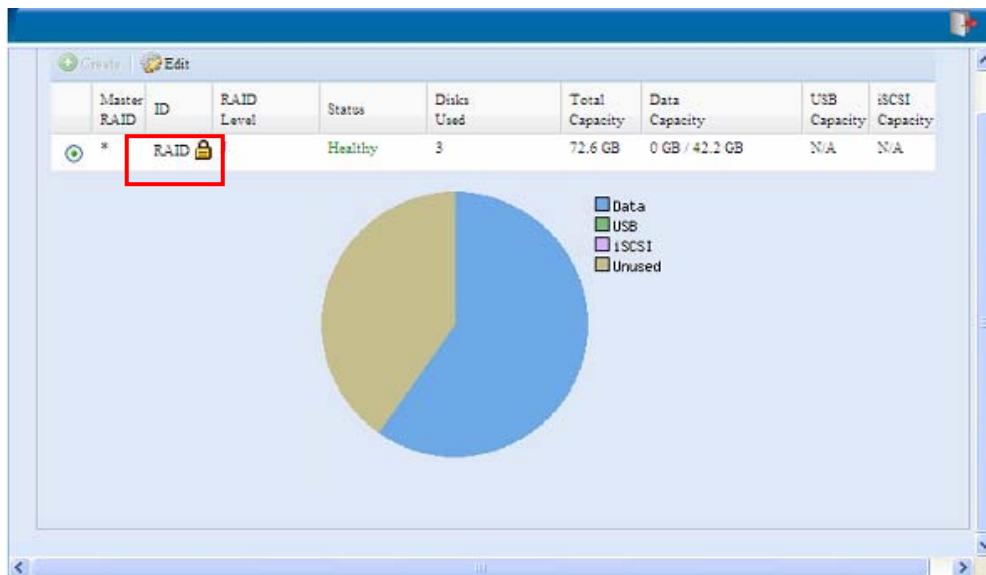
Please do keep USB disk in safety place and also backup the encrypted key to some other place.

There is no way to rescue data back if key lose.

NOTE

1. With RAID volume encryption enabled, the system performance will goes down.
2. With RAID volume encryption enabled, RAID volume expansion will operated in off line mode.

The RAID volume with encryption enabled, it will come with key lock symbol right next to volume ID name.

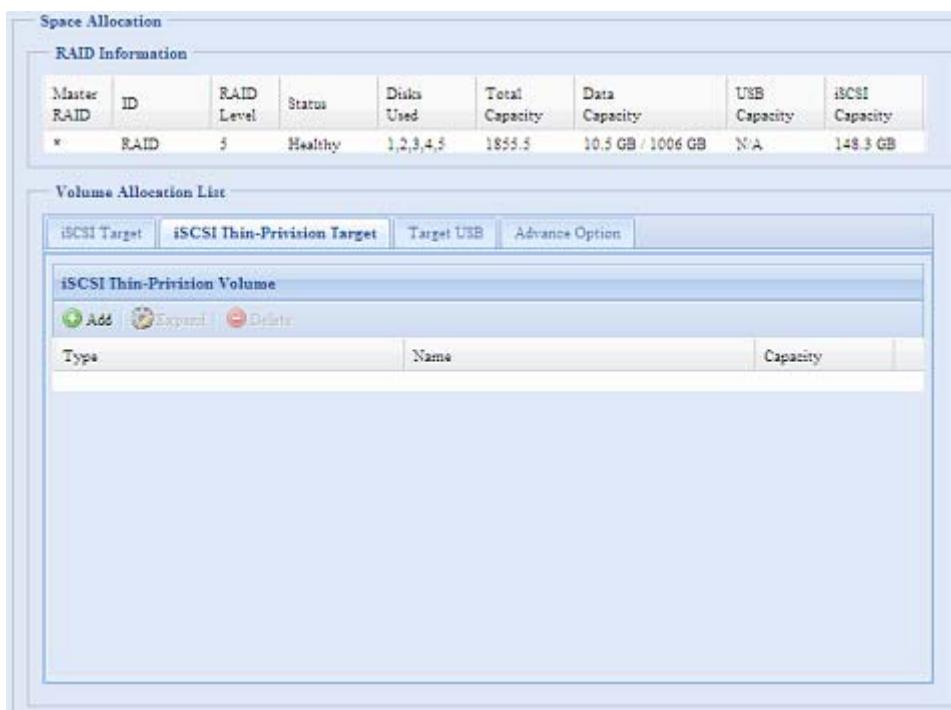


iSCSI Thin-Provisioning

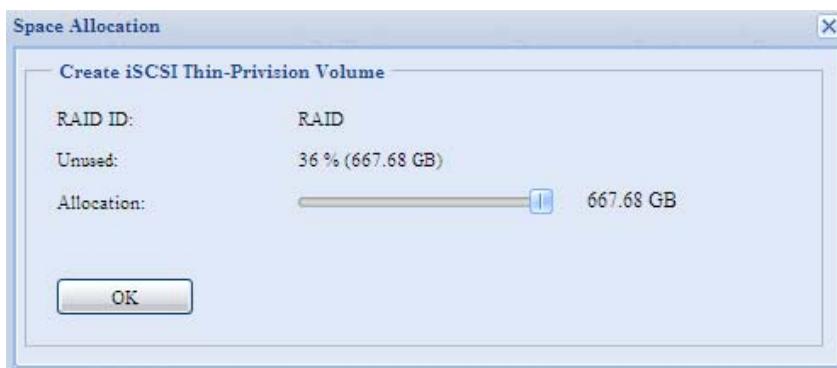
The advance feature thin-provisioning for iSCSI is available in this FW release. With this great function, the iSCSI capacity can be more flexible, more efficiency to server more users.

The idea for iSCSI thin-provision is shared the available physical capacity to number of iSCSI target volume and also setup virtual capacity to expand the physical size while it needed.

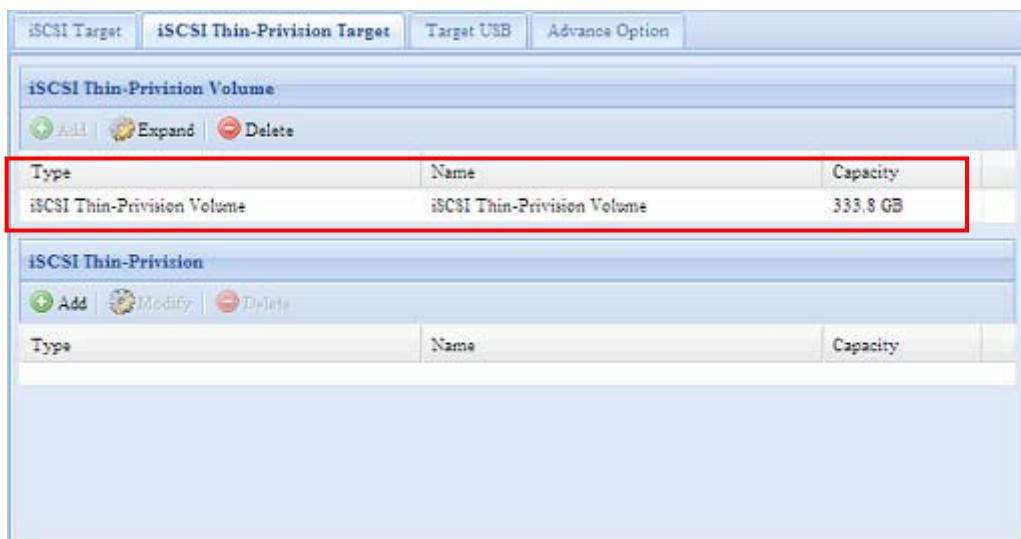
To setup iSCSI thin-provisioning, go to "Space Allocation" under "Storage" category. The iSCSI thin-provisioning volume need to be created first. Simply click on "iSCSI Thin-Provision target", please refer the screen shot below.



Next, setup the physical capacity for iSCSI thin-provision volume by using mouse to drag the bar to size it needed.



After the size has determined, click OK to confirm it. Now you will see the iSCSI thin-provision volume is available from list. Please refer the screen shot below.



Now

you could start to create iSCSI target to join created iSCSI thin-provision volume. Basically the iSCSI target under iSCSI thin-provision has exactly same setting screen as standard iSCSI target volume creation, the only difference is "Virtual Size" of capacity.

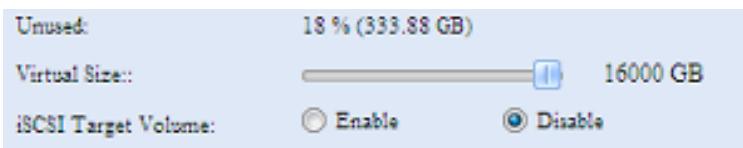
Unlike standard iSCSI target volume been created, the capacity is physically been allocated. The iSCSI target volume creation under thin-provision is virtually up to 16000GB (16TB).

Let's take example below for more illustration:

1. The physical size for iSCSI thin-provision volume is 333.88GB, you may refer the screen shot above.
2. The iSCSI target volume under thin-provision start with 333.38GB in physical size and you may use mouse to drag the virtual size for it needed. The maximum virtual size is up to 16000GB.
3. In this case if you make the iSCSI target volume is 1700GB then the virtual size is available fro next iSCSI target volume under thin-provision is 14300GB (16000-1700).
4. Till the 5 iSCSI target volumes under thin-provision or the virtual size 16000GB has run out when ever it comes first to reach its limitation.

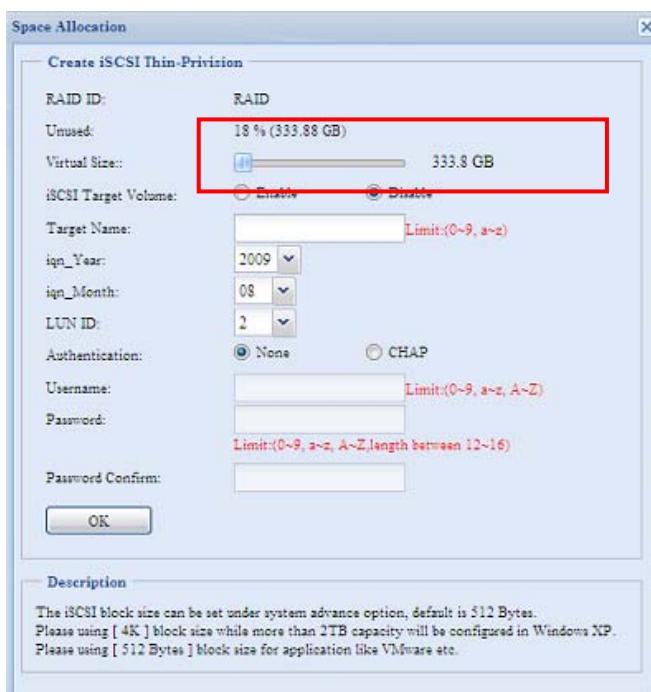


iSCSI Thin-provision physical size start with 333.8GB



The virtual capacity is limited to 16000GB

The screen shot for iSCSI target volume creation under thin-provision, physical capacity 333.8GB.



The screen shot to setup iSCSI target volume under thin-provision 1700GB.

This screenshot shows two windows side-by-side. The top window is titled 'iSCSI Thin-Prvision Volume' and contains a table with one row: 'iSCSI Thin-Prvision Volume' with a capacity of '333.8 GB'. Below it is another window titled 'iSCSI Thin-Prvision' with a table containing two rows. The first row is 'iSCSI Thin-Prvision' with a capacity of '1700 GB'. The second row is also 'iSCSI Thin-Prvision' but its capacity is not visible. Both tables have columns for 'Type', 'Name', and 'Capacity'. A red box highlights the second row in the 'iSCSI Thin-Prvision' table.

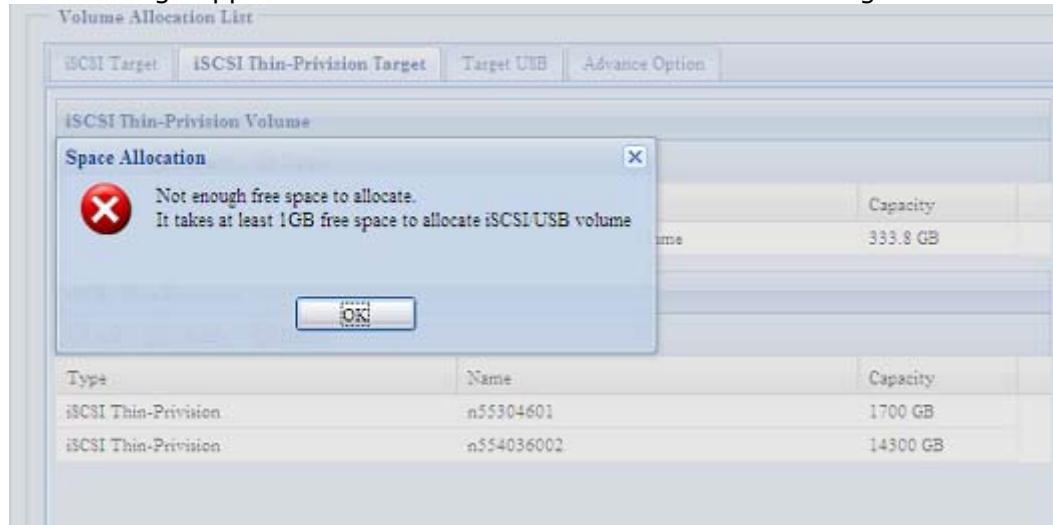
The next iSCSI target volume creation, the virtual size maximum is 14300GB (16000GB – 1700GB(1st iSCSI target volume)).

This is a 'Space Allocation' dialog box for 'Create iSCSI Thin-Prvision'. It has several fields: 'RAID ID:' (RAID), 'Unused:' (18 % (333.88 GB)), 'Virtual Size:' (a slider set to 14300 GB, highlighted with a red box), 'iSCSI Target Volume:' (radio buttons for 'Enable' and 'Disable', with 'Disable' selected), 'Target Name:' (a text input field with a placeholder 'Limit:(0~9, a~z)'), and 'Exp Year:' (a dropdown menu showing '2009').

The screen shot of lists for iSCSI target volumes created under thin-provision. The 2nd iSCSI target volume under thin-provision has created in capacity (14300GB).

This screenshot shows the same two windows as the previous one. The top window 'iSCSI Thin-Prvision Volume' still shows the single entry with 333.8 GB capacity. The bottom window 'iSCSI Thin-Prvision' now shows three entries: the first is 'iSCSI Thin-Prvision' with 1700 GB capacity; the second is 'iSCSI Thin-Prvision' with 14300 GB capacity; and the third is another 'iSCSI Thin-Prvision' entry whose details are not fully visible. A red box highlights the second row in the 'iSCSI Thin-Prvision' table.

The message appears there is no more room for new iSCSI target creation.

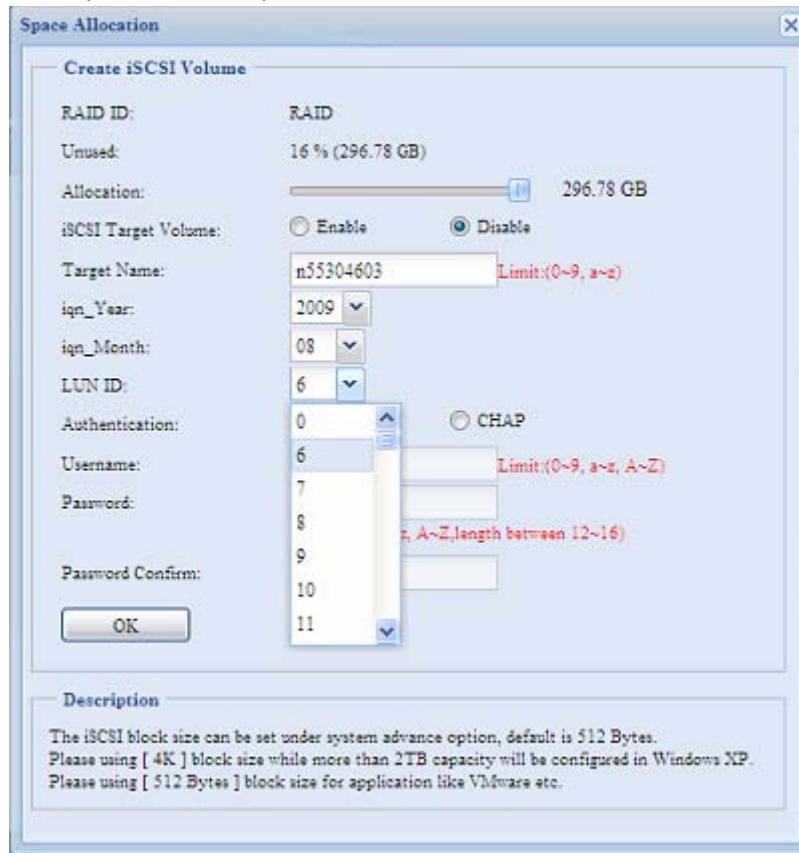


NOTE

1. Each RAID volume can only create one iSCSI thin-provision volume.
2. Each thin-provision volume can only create 5 iSCSI target volumes.
3. The notification will send out while the physical size of iSCSI thin-provision capacity has used up to 90%.

iSCSI LUN ID

With iSCSI target volume been created, there is default LUN ID 0 in previous FW version and un-configurable. From v3.00.04 and after it is configurable from 1 to 254 with default next available number in order. The LUN ID is unique and can not be duplicated except LUN ID 0.



Error Corrections

None

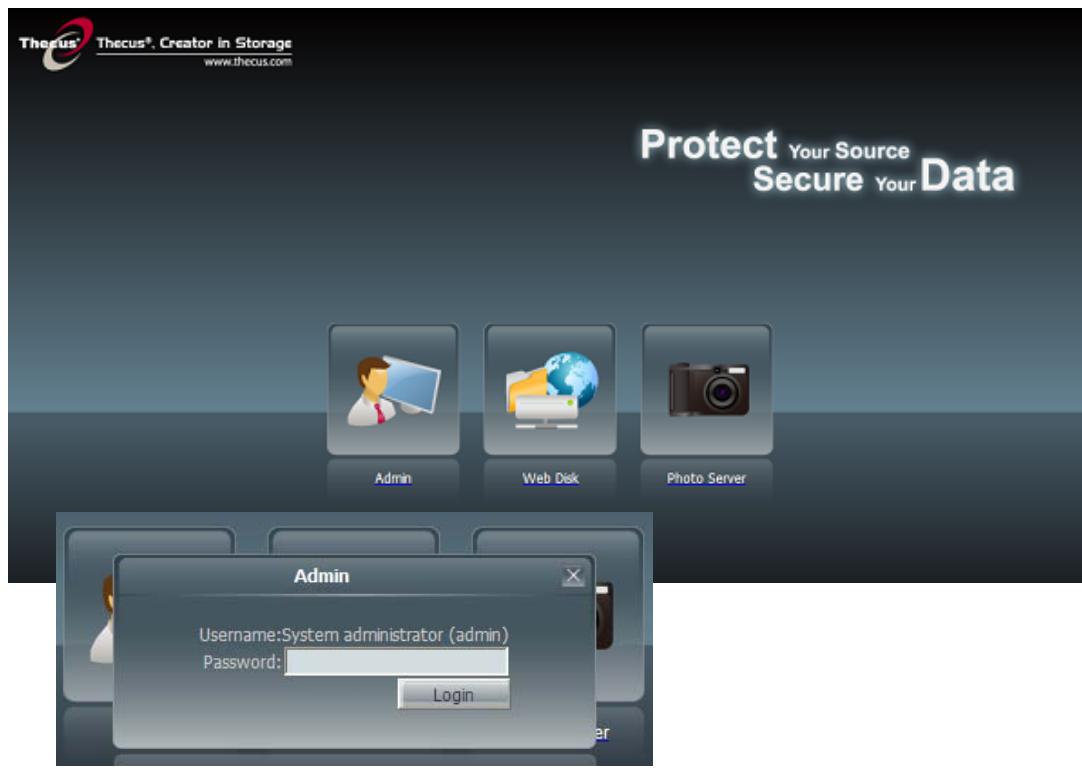
Chapter 9: Revision updated up to FW 3.00.08

What's New

There are additional features implemented into the new 3.00.08 version firmware.

Updated Login User Interface

There is a brand new design for the admin login UI.

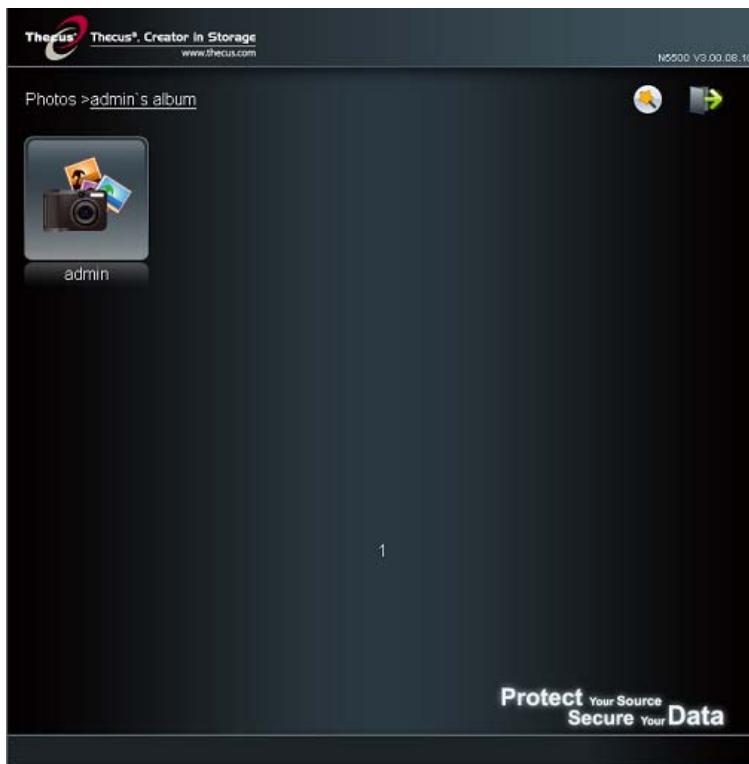


NOTE

The previous chapters have screenshots of the original user interface. Please note that all changes are visual only. There are no functional changes.

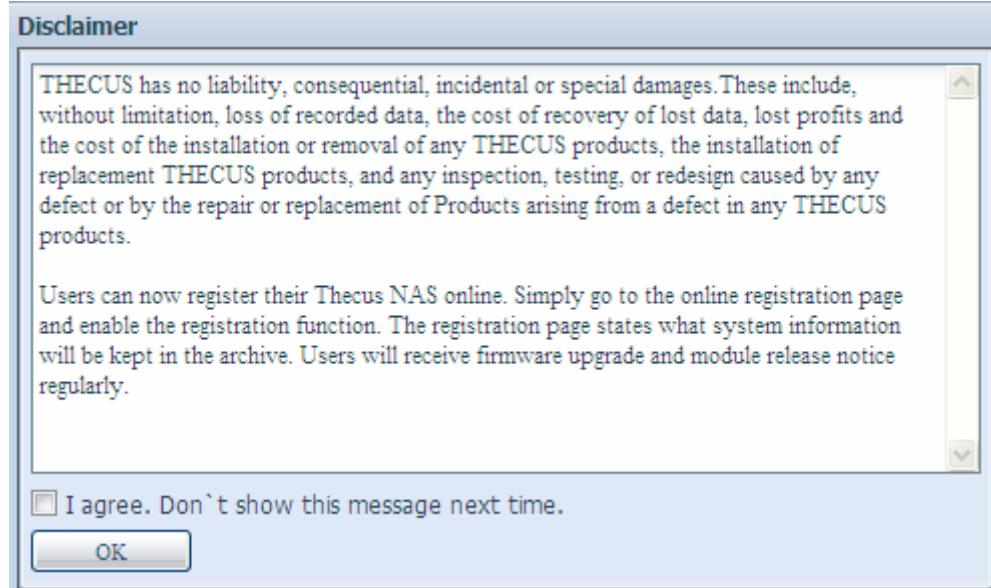
Updated Photo Server User Interface

Same as the admin login user interface, the photo server has a brand new art design from its previous version.



Disclaimer Page Added

The following disclaimer page has been added to this firmware release. Please click the check box if you do not want to have this page displayed during the next login.



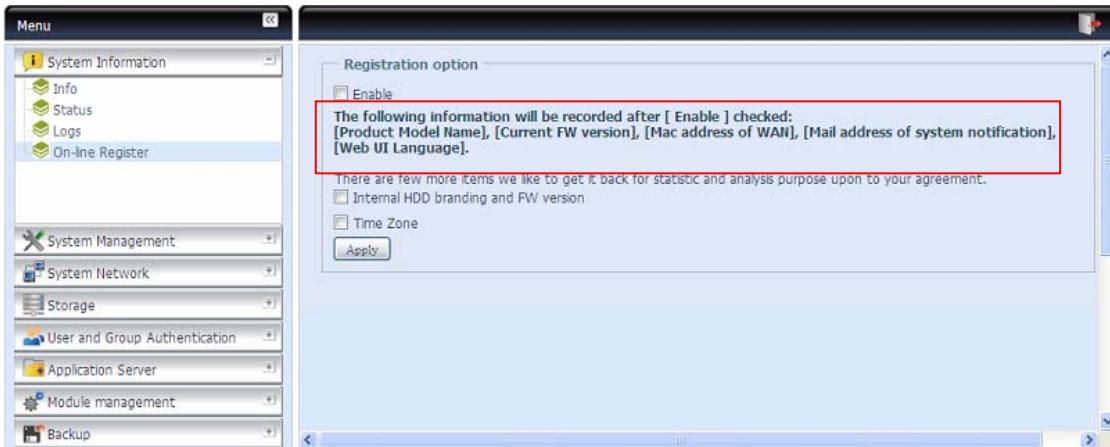
Updated Main User Interface

The look and icons of the main user interface have been updated.



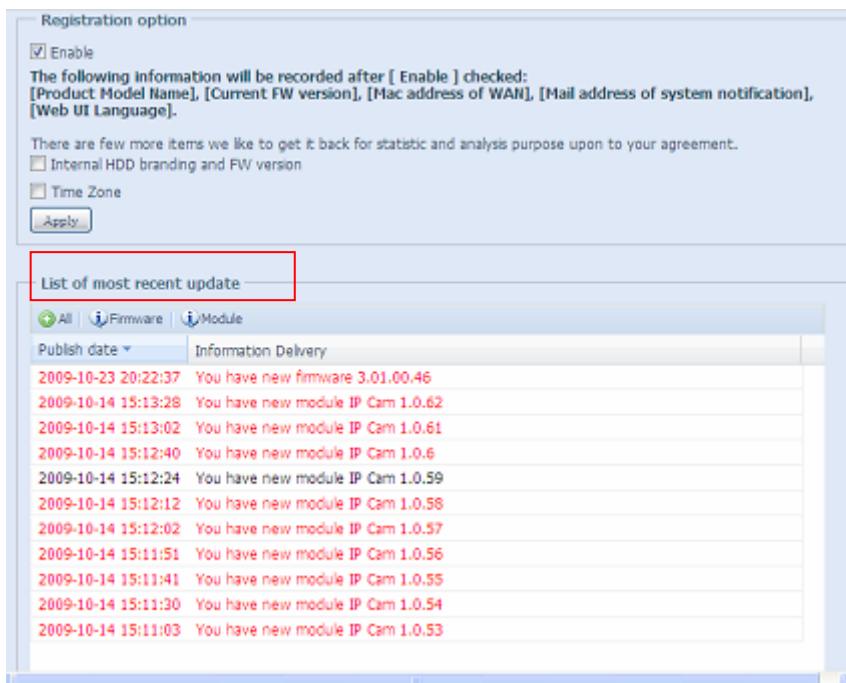
Add On-Line Register Service

From main menu tree, there is a new "On-line Register" option added with this firmware release.



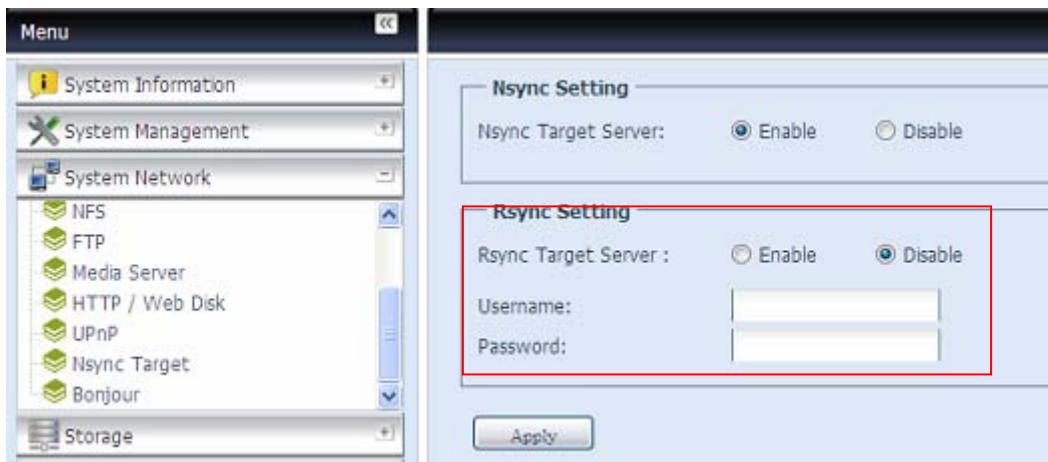
This on-line register service can periodically update the user when new firmware and software modules are released by Thecus. To enable this service, simply check the "Enable" check box. By enabling this service, the items in bold will be sent to Thecus via the Internet.

Other than the defined items sent upon registration, there are also two additional items: "HDD Info" and "Time Zone". These two optional items can also be sent to Thecus anonymously for analysis and statistics purposes. To send these items, simply check the desired checkboxes to help Thecus improve its products and services.



Added Rsync Setting under Nsync Target

The Thecus Nsync feature has added a third way to use Rsync to replicate data between two systems. For the target side to allow source cross data, the Rsync target server needs to first select "Enable" and then assign a username and password for authentication.



NOTE

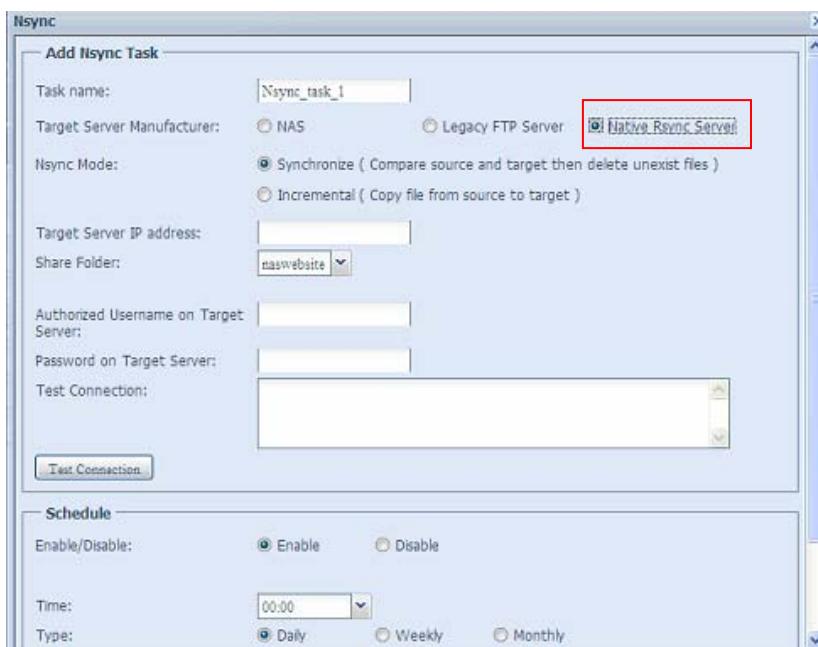
The Rsync target server username and password is used for this replication feature only. It is not related to the standard local user.

Added Rsync Backup Feature

Thecus Nsync now provides backup features to other Thecus NAS with VPN protection or legacy FTP server with the added Rsync option.

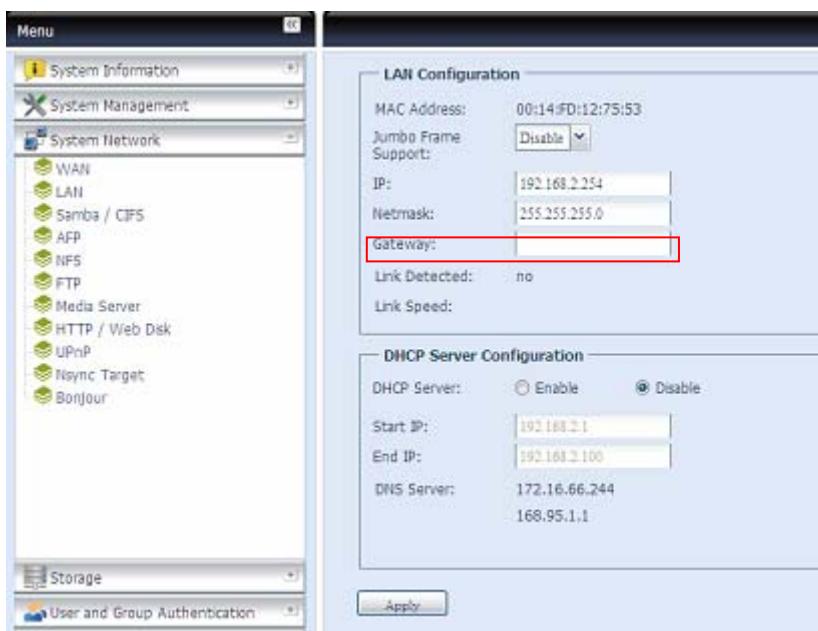
Using "Rsync" to backup data to other Thecus NAS devices uses the exact same procedure as the original Nsync method. The only thing that needs to be done is to

enable the sync target server and input a valid username and password to grant access permission.



Added 2nd Gateway for Clients of DHCP Server Route

The adding of a 2nd gateway has been phased in to serve clients that use their Thecus NAS as a DHCP server to have another route to balance traffic bandwidth.



NOTE

If the IP sharing mode setting is set to "Enable" under WAN port, then this 2nd gateway cannot be configured.

Added Dual DOM for Auto Repair

The unique Dual DOM feature can now perform “Auto Repair”. The Thecus NAS will backup up to five versions of the system configuration either by the default timing of 1:00am every day automatically or as scheduled by the user.

This unique “Auto Repair” will be triggered if the primary DOM has a booting issue. In this instance, the 2nd DOM will take over the boot function. Then, the system will automatically load the most recent system configuration backup image to repair the primary DOM.

The screenshot shows the Thecus NAS web interface with the following details:

- Menu:** A sidebar on the left containing links to System Information, System Management, System Network, Storage, User and Group Authentication, Application Server, Module management, and two expanded sections: **Backup** (Nsync, Dual DOM Backup) and **System Configuration** (Dual DOM, System Configuration).
- Dual DOM Schedule Backup:** A configuration section with the following settings:
 - Enable/Disable Dual DOM schedule backup
 - Auto (selected)
 - Daily: Set to 00:00
 - Weekly: Set to Sunday at 00:00
 - Monthly: Set to 1st at 00:00
- Dual DOM Backup Status:** A table showing the history of backups:

| Task name | Date | Firmware |
|----------------|------------------|------------|
| backup_0000004 | 2009/11/10 01:00 | 3.00.08.10 |
| backup_0000003 | 2009/10/28 19:30 | 3.00.08.10 |
| backup_0000002 | 2009/10/27 19:30 | 3.00.08.10 |
| backup_0000001 | 2009/10/26 19:30 | 3.00.08.10 |

Appendix A: Product Specifications

Hardware Specifications

| Product Model | 1U4600R | 1U4600S |
|--------------------|---|---|
| Network Interfaces | | |
| WAN | Gigabit RJ-45 connector | |
| LAN | Gigabit RJ-45 connector | |
| Storage | | |
| HDD Bays | 4 x 3.5" SATA II HDD, hot-swappable | |
| HDD Support | SATA II HDDs up to 2000GB | |
| eSATA | 1 x eSATA connector for capacity expansion | |
| I/O Interfaces | | |
| USB Ports | 3 x USB type A ports (Host mode), 1 x USB type B ports (Device mode) | |
| System Information | | |
| LCD Control Panel | For basic configurations and status display | |
| System LED Display | 4 x LED (System Busy, Network Activity x 2, System Power) | |
| Physical | | |
| Height | 44 mm | |
| Width | 430.5 mm | |
| Depth | 567.6 mm | |
| Power Supply | 250W redundant power supply 100~240V AC, 50/60Hz | 200W power supply 100~240V AC, 50/60Hz |
| Security | Lockable disk trays | |
| Environment | | |
| Temperature | 5 ~ 40°C | |
| Humidity | 20 ~ 85% relative humidity (non-condensing) | |
| Certifications | CE, FCC, BSMI, C-Tick, RoHS Compliant | |

Software Specifications

| | |
|------------------------|--|
| Network File Protocols | Microsoft Networks (CIFS/SMB) Apple Filing Protocol (AFP 3.0) Network File System (NFS v3) File Transfer Protocol (FTP) Hyper Text Transfer Protocol (HTTP) Secure Hyper Text Transfer Protocol (HTTPs) |
| Authentication | Local User Account Microsoft Active Directory Authentication (AD)* |
| Network Client Type | Microsoft Windows NT/2000/XP/2003/Vista Unix/Linux/BSD MAC OS X/9 |
| Network Configuration | Fixed IP address Dynamic IP address 802.3ad based failover and link aggregation |
| Disk Management | Disk status monitoring (S.M.A.R.T.) Disk idle spin-down |
| RAID | RAID 0, 1, 5, 6, 10 and JBOD Supports multiple RAID modes – users can create |

| | |
|-----------------------|--|
| | multiple RAID volumes with different RAID levels in one system Auto rebuild Hot swappable Hot spare Disk roaming RAID level migration RAID expansion |
| iSCSI Target | Supports: Microsoft iSCSI Initiator v2.0.4 StarPort Initiator V3.5.2 MAC OS: globalSAN iSCSI initiator version 3.0 (1150) Linux: open-iscsi 2.0-865 |
| Folder Management | Share and sub-folder level permission Public folder |
| Quota Management | Share folder quota control |
| Backup | Thecus Backup Utility (Windows XP/2000 and MAC OS X) Thecus Nsync |
| System Management | Web GUI Multilingual support (English, French, German, Italian, Traditional Chinese, Simplified Chinese, Japanese, Korean, Spanish, Russian and Polish) NTP support Wake-on-LAN Scheduled Power On/Off |
| Event Notification | Email notification Buzzer notification LCD |
| UPS Support | UPS monitoring via RS-232 or USB interface , and system shutdown on low battery |
| Printer Server | USB Printer (IPP support) |
| Supported USB Devices | USB Printer External HDD/flash disk USB IEEE 802.11 b/g dongle w/AP mode support** |
| Setup Utility | Windows 2000/XP/2003 MAC OS X |

*AD support: Works as a client member in a Microsoft Active Directory domain, allowing the 1U4600 to utilize the domain users and groups setting for authentication to the system and authorization to the share folders.

**For supported USB dongles, please contact sales@thecus.com

Appendix B: Customer Support

If your 1U4600 is not working properly, we encourage you to check out **Chapter 7: Troubleshooting**, located in this manual. You can also try to ensure that you are using the latest firmware version for your 1U4600. Thecus is committed to providing free firmware upgrades to our customers. Our newest firmware is available on our Download Center:

<http://www.thecus.com/download.php>

If you are still experiencing problems with your 1U4600, or require a Return Merchandise Authorization (RMA), feel free to contact technical support via our Technical Support Website:

http://www.thecus.com/support_tech.php

Customers in the US should send all technical support enquiries to the US contact window included in the following web page:

http://www.thecus.com/support_tech.php

For Sales Information you can e-mail us at:

sales@thecus.com

**Thank you for choosing
Thecus!**



Appendix C: RAID Basics

Overview

A Redundant Array of Independent Disks (RAID) is an array of several hard disks that provide data security and high performance. A RAID system accesses several hard disks simultaneously, which improves I/O performance over a single hard disk. Data security is enhanced by a RAID, since data loss due to a hard disk failure is minimized by regenerating redundant data from the other RAID hard disks.

Benefits

RAID improves I/O performance, and increases data security through fault tolerance and redundant data storage.

Improved Performance

RAID provides access to several hard disk drives simultaneously, which greatly increases I/O performance.

Data Security

Hard disk drive failure unfortunately is a common occurrence. A RAID helps prevent against the loss of data due to hard disk failure. A RAID offers additional hard disk drives that can avert data loss from a hard disk drive failure. If a hard drive fails, the RAID volume can regenerate data from the data and parity stored on its other hard disk drives.

RAID Levels

The Thecus 1U4600 supports standard RAID levels 0, 1, 5, 6, 10, and JBOD. You choose a RAID level when you create a system volume. The factors for selecting a RAID level are:

- Your requirements for performance
- Your need for data security
- Number of hard disk drives in the system, capacity of hard disk drives in the system

The following is a description of each RAID level:

RAID 0

RAID 0 is best suited for applications that need high bandwidth but do not require a high level of data security. The RAID 0 level provides the best performance of all the RAID levels, but it does not provide data redundancy.

RAID 0 uses disk striping and breaking up data into blocks to write across all hard drives in the volume. The system can then use multiple hard drives for faster read and write. The stripe size parameter that was set when the RAID was created determines the size of each block. No parity calculations complicate the write operation.

RAID 1

RAID 1 mirrors all data from one hard disk drive to a second one hard disk drive, thus providing complete data redundancy. However, the cost of data storage capacity is doubled.

This is excellent for complete data security.

RAID 5

RAID 5 offers data security and it is best suited for networks that perform many small I/O transactions at the same time, as well as applications that require data security such as office automation and online customer service. Use it also for applications with high read requests but low write requests.

RAID 5 includes disk striping at the byte level and parity information is written to several hard disk drives. If a hard disk fails the system uses parity stored on each of the other hard disks to recreate all missing information.

RAID 6

RAID 6 is essentially an extension of RAID level 5 which allows for additional fault tolerance by using a second independent distributed parity scheme (dual parity). Data is striped on a block level across a set of drives, just like in RAID 5, and a second set of parity is calculated and written across all the drives; RAID 6 provides for an extremely high data fault tolerance and can sustain two simultaneous drive failures.

This is a perfect solution for mission critical applications.

RAID 10

RAID 10 is implemented as a striped array whose segments are RAID 1 arrays. RAID 10 has the same fault tolerance as RAID level 1.

RAID 10 has the same overhead for fault-tolerance as mirroring alone. High I/O rates are achieved by striping RAID 1 segments.

Under certain circumstances, RAID 10 array can sustain up to 2 simultaneous drive failures

Excellent solution for applications that would have otherwise gone with RAID 1 but need an additional performance boost.

JBOD

Although a concatenation of disks (also called JBOD, or "Just a Bunch of Disks") is not one of the numbered RAID levels, it is a popular method for combining multiple physical disk drives into a single virtual one. As the name implies, disks are merely concatenated together, end to beginning, so they appear to be a single large disk.

As the data on JBOD is not protected, one drive failure could result total data loss.

Stripe Size

The length of the data segments being written across multiple hard disks. Data is written in stripes across the multiple hard disks of a RAID. Since multiple disks are accessed at the same time, disk striping enhances performance. The stripes can vary in size.

Disk Usage

When all 5 disks are of the same size, and used in RAID, 1U4600 disk usage percentage is listed below:

| RAID Level | Percentage Used |
|-------------------|------------------------|
| RAID 0 | 100% |
| RAID 1 | $1/n \times 100\%$ |
| RAID 5 | $(n-1)/n \times 100\%$ |
| RAID 6 | $(n-2)/n \times 100\%$ |
| RAID 10 | 50% |
| JBOD | 100% |

n : HDD number

Appendix D: Active Directory Basics

Overview

With Windows 2000, Microsoft introduced Active Directory (ADS), which is a large database/information store. Prior to Active Directory the Windows OS could not store additional information in its domain database. Active Directory also solved the problem of locating resources; which previously relied on Network Neighborhood, and was slow. Managing users and groups were among other issues Active Directory solved.

What is Active Directory?

Active Directory was built as a scalable, extensible directory service that was designed to meet corporate needs. A repository for storing user information, accounts, passwords, printers, computers, network information and other data, Microsoft calls Active Directory a "namespace" where names can be resolved.

ADS Benefits

ADS lets the 1U4600 integrate itself with the existing ADS in an office environment. This means the 1U4600 is able to recognize your office users and passwords on the ADS server. Other major benefits ADS support provides include:

1. Easy integration of the 1U4600 into the existing office IT infrastructure

The 1U4600 acts as a member of the ADS. This feature significantly lowers the overhead of the system administrator. For example, corporate security policies and user privileges on an ADS server can be enforced automatically on the 1U4600.

2. Centralized user/password database

The 1U4600 does not maintain its own copy of the user/password database. This avoids data inconsistency between the 1U4600 and other servers. For example, without ADS support, an administrator might need to remove a specific user privilege on the 1U4600 and each individual server. With ADS support, the change on an ADS server is known to all of its ADS members.

Appendix E: UPS Compatibility List

| Brand | Series | Model | Notes |
|---------------------|---|--|-------|
| Ablerex | MS-RT | | |
| ActivePower | 1400VA | | |
| AEC | MiniGuard UPS 700 M2501 cable | | |
| APC | Back-UPS Pro | | |
| | Matrix-UPS | | |
| | Smart-UPS | | |
| | Back-UPS | 940-0095A/C cables, 940-0020B/C cables, 940-0023A cable | |
| | Back-UPS Office | 940-0119A cable | |
| | Masterswitch Not a UPS - 940-0020 cable | | |
| | Back-UPS RS 500 custom non-USB cable | | |
| Belkin | Regulator Pro serial | | |
| | Resource | | |
| | Home Office | F6H350-SER, F6H500-SER, F6H650-SER | |
| | Universal UPS | F6C800-UNV, F6C120-UNV, F6C1100-UNV, F6H500uKUNV | |
| Best Power | Fortress (newer) | | |
| | Fortress Telecom | | |
| | Axxium Rackmount | | |
| | Patriot Pro | | |
| | Patriot Pro II | | |
| | Patriot INT51 cable | | |
| | Micro-Ferrups | | |
| Centralion | Fortress/Ferrups f-command support | | |
| | Blazer | | |
| | ST-800 | | |
| | T1500h | | |
| | Cyber Power Systems | 320AVR, 500AVR, 650AVR, 700AVR, 800AVR 850AVR, 900AVR, 1250AVR, 1500AVR, Power99 550SL, 725SL, CPS825VA, 1100AVR, 1500AVR-HO | |
| | | | |
| Deltec | PowerRite Pro II | | |
| Dynex | 975AVR | | |
| Effekta | MI/MT/MH 2502 cable | | |
| Energy Sistem | (various) | | |
| ETA | mini+UPS WinNT/Upsoft cable | | |
| ETA | mini+UPS PRO UPS Explorer cable | | |
| Ever UPS | NET *-DPC | | |
| | AP *-PRO | | |
| Ever-Power | 625/1000 | | |
| Exide | NetUPS SE | | |
| Fenton Technologies | PowerPal P-series | | |
| | PowerPal L-series | | |
| | PowerOn | | |
| | PowerPure | | |
| Fairstone | | L525/L625/L750 | |

| Brand | Series | Model | Notes |
|-----------------|--------------------------------------|--|-------------|
| Fideltronik | Ares 700 and larger | | |
| | Other Ares models | | |
| Fiskars | PowerRite MAX | | |
| | PowerServer | 10, 30 | |
| Gamatronic | All models with alarm interface | | |
| | MP110/210 | | |
| | MS-T | | |
| | MS | | |
| | PS3/1 | | |
| Gemini | UPS625/UPS1000 | | |
| HP | R3000 XR | | |
| | R5500 XR | | |
| INELT | Monolith 1000LT | | |
| Infosec | iPEL | 350, 500, 750, 1000 | |
| Ippon | (various) | | |
| Liebert | UPStation GXT2 contact-closure cable | | |
| Masterguard | (various) | | |
| Meta System | HF Line | 1..4 boards, /2 5..8 boards | |
| | HF Millennium | 810, 820 | |
| | HF TOP Line | 910, 920, 930, 940, 950, 960, 970, 980 | |
| | ECO Network | 750, M1000, M1050, M1500, M1800 M2000, M2100, M2500, M3000 | |
| | ECO | 305, 308, 311, 511, 516, 519, 522 | |
| | ally HF | 800, 1000, 1250, 1600, 2000, 2500 | |
| | Megaline | 1250, 2500, 3750, 5000, 6250, 7500, 8750, 10000 | |
| MGE UPS SYSTEMS | NOVA AVR 600 Serial | | |
| | NOVA AVR 1100 Serial | | |
| | Pulsar Ellipse | USBS Serial cable, S, Premium USBS Serial cable, Premium S | |
| | Ellipse Office | 600 Serial cable, 750 Serial cable, 1000 Serial cable, 1500 Serial cable | |
| | Pulsar EXtreme C / EX RT | | |
| | Comet EX RT | Serial port, 3:1 Serial port | |
| | Pulsar Esprit | | |
| | Evolution S | 1250, 1750, 2500, 3000 | Serial Port |
| | Pulsar M | 2200, 3000, 3000 XL | Serial Port |
| | Pulsar | 700, 1000, 1500, 1000 RT2U, 1500 RT2U, MX 4000 RT, MX 5000 RT Evolution, EXtreme C, ES+, ESV+, SV, ESV, EX, EXL, PSX, SX, Extreme | Serial Port |
| | Comet EXtreme | | |
| | Comet / Galaxy (Serial) | Utalk Serial Card (ref 66060), HID COM Serial Card (ref 66066) | |
| MicroDowell | B.Box BP | 500, 750, 1000, 1500 | |
| Microsol | Solis | 1.0 1000VA, 1.5 1500VA, 2.0 2000VA, 3.0 3000VA | |
| | Rhino | 6.0 6000VA, 7.5 7500VA, 10.0 10000VA, 20.0 20000VA | |
| Mustek | Various | | |
| | Powermust | 400VA Plus, 600VA Plus, 800VA Pro 1000VA Plus, 1400VA Plus, 2000VA USB | |
| Nitram | Elite | 500, 2002 | |

| Brand | Series | Model | Notes |
|-------------------|---|---|-------|
| Oneac | EG/ON Series advanced interface | | |
| Online | P-Series | | |
| OnLite | AQUA 50 | | |
| Orvaldi | various not 400 or 600 | | |
| Powercom | SMK-800A | | |
| | ULT-1000 | | |
| | TrustTrust 425/625 | | |
| | BNT-1000AP | | |
| | Advice Partner/King Pr750 | | |
| | BNT-2000AP | | |
| PowerGuard | PG-600 | | |
| PowerKinetics | 9001 | | |
| PowerTech | Comp1000 DTR cable power | | |
| Power Walker | Line-Interactive VI1000 | | |
| Powerware | | 3110, 3115, 5119, 5125, 5119 RM, PW5115 PW5125PW9120, PW9125, 9120, 9150, 9305 | |
| Powerwell | PM525A-625A-800A/-1000A/-1250A | | |
| Repotec | RPF525/625/800/1000 | | |
| | RPT-800A | | |
| | RPT-162A | | |
| SMS (Brazil) | Manager III | | |
| SOLA | | 325, 520, 610, 620, 330 | |
| SOLA/BASIC Mexico | various ISBMEX protocol | | |
| Socomec Sicon | Egys 420 VA | | |
| Soltec | Winmate 525/625/800/1000 | | |
| Soyntec | Sekury C | 500, 800 | |
| SquareOne Power | QP1000 | | |
| SuperPower | HP360, Hope-550 | | |
| Sweex | 500/1000 smart - shipped with SafeNet | | |
| | 500/1000 contact closure - shipped with UPSmart | | |
| | BC100060 800VA | | |
| Sysgration | UPGUARDS Pro650 | | |
| Tecnaware | Easy Power 1200 | | |
| Tripp-Lite | SmartUPS | | |
| | SmartOnline | | |
| | (various) Lan 2.2 interface - black 73-0844 cable | | |
| Trust | UPS 1000 Management PW-4105 | | |
| UNITEK | Alpha | 500 IC, 1000is, 500 ipE | |
| UPSonic | LAN Saver 600 | | |
| | Power Guardian | | |
| Victron/IMV | (various) | | |
| | Lite crack cable | | |

NOTE

- The UPSes marked **Blue** have been tested and work well
- If your UPS is not in the support list, be sure that the UPS supports one of following protocols:
 - SEC protocol
 - Generic RUPS model
 - Generic RUPS 2000 (Megatec M2501 cable)
 - PhoenixTec protocol
 - Safenet software

Appendix F: Licensing Information

Overview

This product included copyrighted third-party software licensed under the terms of GNU General Public License. Please see THE GNU General Public License for extra terms and conditions of this license.

Source Code Availability

Thecus Technology Corp. has exposed the full source code of the GPL licensed software. For more information on how you can obtain our source code, please visit our web site, <http://www.thecus.com>.

Copyrights

- This product includes cryptographic software written by Eric Young (eay@cryptsoft.com).
- This product includes software developed by Mark Murray.
- This product includes software developed by Eric Young (eay@cryptsoft.com).
- This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (<http://www.openssl.org/>).
- This product includes PHP, freely available from (<http://www.php.net/>).
- This product includes software developed by the University of California, Berkeley and its contributors.
- This product includes software developed by Winning Strategies, Inc.
- This product includes software developed by the Apache Group for use in the Apache HTTP server project (<http://www.apache.org/>).
- This product includes software developed by Softweyr LLC, the University of California, Berkeley, and its contributors.
- This product includes software developed by Bodo Moeller.
- This product includes software developed by Greg Roelofs and contributors for the book, "PNG: The Definitive Guide," published by O'Reilly and Associates.
- This product includes software developed by the NetBSD Foundation, Inc. and its contributors.
- This product includes software developed by Yen Yen Lim and North Dakota State University.
- This product includes software developed by the Computer Systems Engineering Group at Lawrence Berkeley Laboratory.
- This product includes software developed by the Kungliga Tekniska Högskolan and its contributors.
- This product includes software developed by the Nick Simicich.
- This product includes software written by Tim Hudson (tjh@cryptsoft.com).
- This product includes software developed by Christopher G. Demetriou for the NetBSD Project.

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Version 2, June 1991

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