

# User's Manual N2520/N2560/N4520/N4560 Series

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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 N2520/N2560/N4520/N4560 Series

Manual Version: 6.2

Release Date: July, 2013

# Limited Warranty

Thecus Technology Corporation guarantees all components of Thecus NAS products 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.

Check the functions that are available on your particular Thecus NAS model at:

http://www.thecus.com.

Safety Warnings

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

- > Read this manual thoroughly before attempting to set up your Thecus IP storage.
- Your Thecus IP storage is a complicated electronic device. DO NOT attempt to repair it under any circ umstances. 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 Thecus IP storage can operate normally under temperatures between 5°C and 40°C, with relative humidity of 20% – 85%. Using Thecus IP storage under extreme environmental conditions could damage the unit.
- Ensure that the Thecus IP storage is provided with the correct supply voltage (AC 100V ~ 240V, 50/60 Hz, 3A). Plugging the Thecus IP storage to an incorrect power source could damage the unit.
- > Do NOT expose Thecus IP storage to dampness, dust, or corrosive liquids.
- > Do NOT place Thecus IP storage on any uneven surfaces.
- DO NOT place Thecus IP storage in direct sunlight or expose it to other heat sources.
- DO NOT use chemicals or aerosols to clean Thecus IP storage. Unplug the power cord and all connected cables before cleaning.
- DO NOT place any objects on the Thecus IP storage 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**

## **1.1 Overview**

Thank you for choosing the Thecus IP Storage Server. The Thecus IP storage 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 multiple Terabyte of storage are available using RAID 5 and RAID 6. Gigabit Ethernet ports enhance network efficiency, allowing Thecus IP storage to take over file management functions, increase application and data sharing and provide faster data response. The Thecus IP storage offers data mobility with a disk roaming feature that lets you swap working hard drives for use in other Thecus IP storage, securing the continuity of data in the event of hardware failure. The Thecus IP storage allows data consolidation and sharing between Windows (SMB/CIFS), UNIX/Linux, and Apple OS X environments. The Thecus IP storage's user-friendly GUI supports multiple Languages.

## **1.2 Package Contents**

#### • N2520/N2560

The Thecus IP storage should contain the following common items:

- System Unit x1
- QIG (Quick Installation Guide) x1
- CD-Title (Universal CD) x1
- Ethernet Cable x1
- Accessory bag x1
- HDD Compatibility list Card x1
- Multiple Language Warranty Card x1
- Power adapter x1
- Power cord x1

#### • N4520/N4560

The Thecus IP storage should contain the following common items:

- System Unit x1
- QIG (Quick Installation Guide) x1
- CD-Title (Universal CD) x1
- Ethernet Cable x1
- Accessory bag x1
- HDD Compatibility list Card x1
- Multiple Languages Warranty Card x1
- Power cord x1

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

# 1.3 Front Panel

## • N2520/N2560:

The Thecus N2520/N2560's front panel shows the device's indicators and hard disk install slots:



Front Panel	
ltem	Description
1. System status	Blinking white: Diagnostic mode kick-in
1. System status	Solid white: Diagnostic completed
2. HDD1 LED	Blinking white: HDD activity
	Red: HDD failure
3. HDD2 LED	Blinking white: HDD activity
5. HDDZ LED	Red: HDD failure
4. LAN LED	Solid white: LAN Cable link
4. LAN LLD	Blinking : Network activity
	Solid white: Installed
5. USB LED	Blinking white: USB copy activity
	Solid Red: USB copy failure
6. USB Copy Button	Copies USB storage contents to N2520/N2560.
	Power the N2520/N2560 on/off.
7. Power Button/LED	Solid blue: System ready
	Blinking blue: Power on process
8. USB Port	USB 3.0 port for compatible USB devices, such as digital cameras, USB disks, and USB printers.
9. Thecus Logo LED	Solid white: System ready
9. THECUS LOYO LED	Blinking white: System booting

### • N4520/N4560:

The Thecus N4520/N4560 front panel shows the device's indicators, system information and hard disk trays:

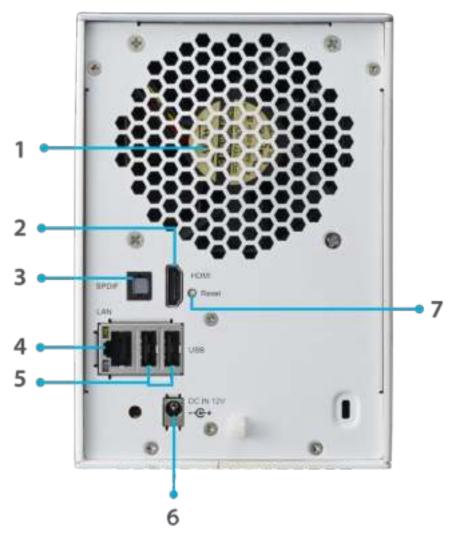


Front Panel	
ltem	Description
1. Power LED	Solid blue: Power on
2. System status	Blinking orange: Diagnostic mode kick-in
	Solid orange: Diagnostic completed
3. LAN LED	Green : Network activity
4. System Failure	Red on while diagnostic test failed.
5. USB Port	USB 3.0 port for compatible USB devices, such as digital cameras, USB disks, and USB printers.
6. Power Button	Powers the N4520/N4560 on/off.
7. Up Button	Select the previous configuration settings option.
8. Down Button	USB copy confirmation display.
9. Enter	Enter the selected menu option, sub-menu, or parameter setting.
10. Escape	Escape and return to the previous menu.
11. LCD Display	Displays current system status and warning messages.
12. HDD Tray	Four HDD trays support 4x 3.5" or 4 x 2.5" HDDs

# 1.4 Rear Panel

### • N2520/N2560:

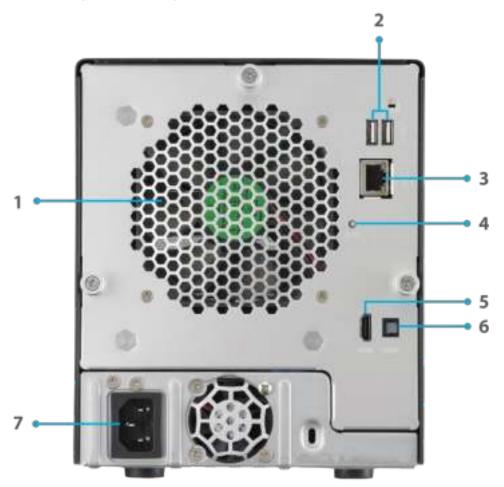
The N2520/N2560 rear panel features ports and connectors.



Back Panel		
ltem	Description	
1. System Fan	System fan that exhausts heat from the unit.	
2. HDMI	For Video/Audio out	
3. SPDIF	For Audio out	
4. LAN Port	LAN port for connecting to an Ethernet network through a switch or a router.	
5. USB Port	USB 2.0 port for compatible USB devices, such as digital cameras, USB disks, and USB printers.	
6. Power Connector	Connect the included power cords to this connector.	
7. Reset Button	Resets the N2520/N2560.	
	Pressing and holding the Reset button on the back for 5 seconds will reset your network	
	setting and password, and turn off Jumbo Frame Support.	

## • N4520/N4560:

The N4520/N4560 rear panel features ports and connectors.



Back Panel		
Item	Description	
1. System Fan	System fan that exhausts heat from the unit.	
2. USB Ports	USB 2.0 port for compatible USB devices, such as digital cameras, USB disks, and USB printers.	
3. LAN Port	LAN port for connecting to an Ethernet network through a switch or router	
4. Reset Button	Resets the N4520/N4560.	
	Pressing and holding the Reset button on the back for 5 seconds will reset your network	
	setting and password, and turn off Jumbo Frame Support.	
5. HDMI	For Video/Audio out	
6. SPDIF	For Audio out	
7. Power Connector	Connect the included power cords to this connector.	

# **§Chapter 2: Hardware Installation**

#### 2.1 Overview

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

## 2.2 Before You Begin

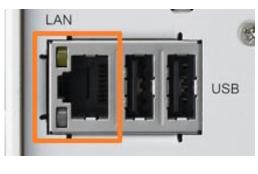
Before you begin, be sure to take the following precautions:

- 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 Thecus IP storage.
- 3. Be careful not to use magnetized screwdrivers around the Thecus IP storage's electronic components.

### 2.3 Cable Connections

To connect the Thecus IP storage product to your network, follow the steps below:

1. Connect an Ethernet cable from your network to the LAN port on the back panel of the Thecus IP storage.





▲ N2520/N2560 LAN port

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.



N2520/N2560 power socket



▲ N4520/N4560 power socket

3. Press the power button on the Front Panel to boot up the Thecus IP storage.



▲ N2520/N2560 power button



▲ N4520/N4560 power button

# **§Chapter 3: System Administration**

## 3.1 Overview

The Thecus IP storage provides an easily accessible Web Administration Interface. With it, you can configure and monitor the Thecus IP storage anywhere on the network.

# 3.2 Web Administration Interface

Make sure your network is connected to the Internet. To access Thecus IP storage Web Administra-

tion Interface:

1. Type the Thecus IP storage IP address into your browser. (Default IP address can be found through IntelligentNAS utility or LCD panel (N4520/N4560 only))



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

#### User Name: admin Password: admin

Once you are logged in as an administrator, the disclaimer page will appear as below. Please click the check box if you do not want to have this page displayed during the next login.

Desitamen	
THE DUS has no isolity, consequential, inclu without imitation, besich eesided deta the pions and the cost of the instenden of ler instenden of processors THEO, Signed at redesign eaused by any envicement of writing by methol defect in any THEO, Signeducts	e spetion beevery of petiostic ta, lest nevel phany THBCUS products, the syland any repeation, testing, o
🔲 te per territorie d'annexe princt	-

Following the disclaimer page, you will see the Web Administration Interface. From here, you can configure and monitor virtually every aspect of the Thecus IP storage from anywhere on the network.

### 3.2.1 My Favorite

The user interface with "My Favorite" shortcut allows the user to designate often used items and have them display on the main screen area. The figure below displays system favorite functions.



Administrators can add or remove favorite functions to My Favorites by right clicking the mouse on the menu tree.



#### 3.2.2 Control Panel

The Control Panel is where you will find all of the information screens and system settings of Thecus IP storage.





Control Panel		
ltem	Description	
System Management	Current system status of the Thecus IP storage.	
Storage	Information and settings for storage devices installed into the Thecus IP storage.	
File Sharing / Privilege	Allows configuration of users and groups.	
Network Service	To setup varies protocols which has supported by system	
Application Server	Application based program for system build-in, additional installed from official or 3rd party.	
Backup	Category of Backup Features setup of the Thecus IP storage.	
External Devices	Setting for devices where has installed through external interface such as USB	

In the following sections, you will find detailed explanations of each function, and how to configure your Thecus IP storage.

#### 3.2.3 Message Bar

You can get quick information about your system status by moving your mouse over these icons.



Message	Message Bar		
ltem	Status	Description	
	RAID Information.	Display the status of created RAID volume. Click to go to RAID information page as short cut.	
Ø	Disks Information.	Display the status of disks installed in the system. Click to go to Disk information page as short cut.	
A	Network.	Green: Connection to the network is normal. Red: abnormal connection to the network	

#### 3.2.4 Logout

Click to logout Web Administration Interface.



#### 3.2.5 Online Update Notification

When there is a new update for system files or applications, the system will notify you through the admin UI and also send an email. Click on the flashing icon then the system will link you directly to the associated page.



## 3.2.6 Language Selection

The Thecus IP storage supports multiple Languages, including:

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

On the menu bar, click Language and the selection list ap-

pears. This user interface will switch to the selected language for Thecus IP storage.

## 3.3 System Management

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

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

#### 3.3.1 General

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

ites

General		
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.	



#### 3.3.2 System/Service Status

From the System Management category,, choose the Status item, System Service Status and HW Status screens appear. These screens provide basic system and service status information.

Service Status N2520		Service Status N2520	
AFP Status:	Stopped	CPU ActiVity: 0.7	5.%
SMB/CIFS Status:	Running	Hermity Activity: 094	1.15
FTP Status:	Stopped	WAR/LANE: RS	0.0, TX: 0.0 MB/s
UPnP Status:	Stopped		
Rsync Status:	Stopped		

#### 3.3.3 Hardware Information

From the System Management category,, choose the Hardware Information item and the system will display the related HW details for the associated model. Below is an example of the information for a Thecus N2520.

General Network Interface Card Universal Serial Bus Disk Controller				
CPU:	Intel CPU CE5315 @ 1.20GHz			
Memory:	801 MB			
DOM:	Single DOM			

### 3.3.4 Logs

From the System Management category, choose the System 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:

wise Trime	Built management of the second second	
10.00 00 00 00 00 00	(92520): One advantaged in from 172,00.68-549	
NERVICE TERMINENT	(N25201): Univ admit reggint in Nam 172, 10,04 (21)	
HOLESS 15 42 41	[N2520P40748] : later admit logged in from 172.18.85.148	
01342373813H	[N252099798] ) that admit topped in them 172.18.04.021	
913 #0127 21(87104	[N25209949748]   then admin logged in New [72.18.64,121	
states active data	[NOTIONWINE] : Dok 3 on [NOTIONWINE] has been permoved.	
DECEMBER NO. 64 CER	[9/252099/06] 1.0v8 3 on [9/252094798] has feld.	
013.82.08 10:00(13	[W2520PW700] : Date 2 are protocolewood has been acted.	
0114236 (84118	[somewrist] - nee 3 so [somewrist] has have seriesed.	
81.1#G1 86.08.019	[N2520990198] I lease admit logged in from 175238-84348	
0124238128016	(R2S20HRTRET) liner wirrer inggelf in from 171.16.85.144	
01342-01242-01240	[N2523METAT] / User advertingged in how 171.14.85.149	
01230238 1227+6	[N2120PHTN8] > liner admin logged in from 172.18-49.149	
012-02-02-02-02-02-02-02-02-02-02-02-02-02	(\$252094048) - Dee within loggest in from 172.16.84.118	

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 er- ror messages.		
INFO	Records information about system messages.		

12

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	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.
<i>§</i>	Re-loading logs.

### 3.3.5 Syslog Management

•

Generates system log to be stored locally or remotely, it also can be chose to act as syslog server for all other devices.

These messages are stored on your NAS in: Nsync > log> messages.

Information can be obtained in two ways: locally and remotely.

• Configuration with syslog server:

# • Configuration with syslog client and target to store locally:

Syslog Deemon:	ili Erable	O Diable	Systag Diverson:	🖷 Enable	C Deable
Syslog service:	B server.	O clent	Syslog service:	C server	W clent
Targett	# Local	C.Ramanac	Terpet	il Local	🗧 Remote
Syalog foldar:	NAS_Public 9		Syllog filden	NA5_Puble M	
Log Level	14 Y		Lop Level	AL Y	
Remote IP Address:			Remote IP Address	0	
Apply			( Apple 11		

#### Configuration with syslog client and target to store remotely:



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

Syslog Managem	nent
Item	Description
Syslog Daemon	Enable/Disable syslog daemon.

Syslog service	If Server has been selected then associated syslog folder will be used to store all system logs from other NAS devices which has assigned this system for syslog server as well as syslog of this server unit. It can be seen from associated syslog folder with files "error", "Information" and "warning". If client has been selected then "Local" or "Remotely" can be choose.
Target	Choose Local, all system logs will be stored in an associated syslog folder filled in from next filed. And the syslog folder will have file "messages" to store all system logs. If Remotely has been selected, a syslog server is needed and an IP address is required.
Syslog folder	Select from a drop down share list, all of the system logs will be stored on it. This syslog folder is applied to "syslog server" or "syslog client" with "local" selected.
Log Level	The user can choose from 3 different levels. "All", "Warning/Error" or "Error".
Remote IP Address	Input the syslog server IP address if choose to store syslog info remotely.

## 3.3.6 System Monitor

The system monitor is capable to monitor system status including CPU/memory utilization, network throughput and on-line user list in various protocols.

To monitor system status, simply click on "System Monitor" from the tree menu and the screen will appear as below.

OO System	n Munitur 🗶
Hannan Cherrians Deren Stations	To Tane 1 Day 22 Hour 30 Minutes
- more Details Measure-	Course Constant Charlest-
40 m	3.0.1516
00 % Terrer: 15:040:07 (PV: 0.75 % Manoy: 41.5 %	2 0.148
0 % 15-47 1550 1551 1552 - GU - Nerrov	0 0 M0 15:50 15:52 
Ethate (1) tout ( ) Mattac-	Barana Doose (Decest+
a certo)	
Set L We	
a mos	
172,16,65.140 admin:NKS_Media	
id Sambe (1)	
172.16.65.143 root _NAS_Media	

It is divided into 4 sections. Each section can be modified to monitor specific items by using the drop down list from the "Monitors" tab, simply click on the items you would like to monitor. From each section, you can also choose to display the information graphically by selecting "Graphic" or by plain text mode by selecting "Details".



If graphic mode is chosen, 3 minutes of information is displayed on the x-axis. A resume of the information is displayed by dragging the mouse over the graphic at a specific time. See example below:



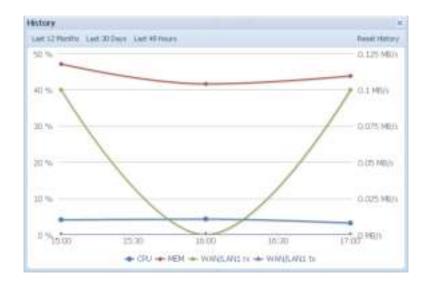


For the on-line users list, system monitor will display the on-line users and the share folder they have visited.

a cipo do		
Sys	0.25 %	
PTP (D)		
72.16:65.143	admin .	_NAS_Meda
Banha (I)		
172.16.65.143	root	NAS_Necta

System Monitor			
Item	Description		
Save Layout	Saving selected monitoring items. Layout will remain the same for future visits.		
Reset Layout	Set back to default monitoring settings and layout.		
History	Click on this check box and system monitor will write the monitoring history to a designate path in		
	the RAID volume.		
Lock Layout	All of the monitoring items are fixed and cannot be changed. Click again to unlock it.		

If the History has been enabled, click on relation and system monitor will display the history with different period for selection.



#### 3.3.7 Time: Setting system time

From the System Management category, 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 Thecus IP storage with an NTP (Network Time Protocol) Server.

Lote:	L V HALL L	3
Time (	1604 M	
Time Zone	रियम् अन्य 😭	
NTP Service:	© a ente	🛞 tal a
State – this n External NTT Solver	🛞 Ver	© 5.1
Selection external NTT selver	di kasi ng 🗠	
<u>v bā jā</u>		

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

Time	
ltem	Description
Date	Sets the system date.
Time	Sets the system time.
Time Zone	Sets the system time zone.
NTP Service	Select <b>Enable</b> to synchronize with the NTP server.
	Select Disable to close the NTP server synchronization.
Sync with external NTP	Select YES to allow Thecus IP storage to synchronize with an NTP server of your choice. Press Apply
Server	to change.

#### 3.3.8 Notification configuration

Email Notification	🛞 a sala	© tal a
Authorization Type:	uff 🕑	
SMTP Serve :		Te t
SMTP account ID		
Account Repaire d		
Log Love:	A	
Sender 12 El tro i Adoleca		
Repairing 5 mail Actives 1		
Repairing 5 mail Actives 2		
Repairing 8 mail Address 3		
Repairing 5 mail Address		
Г. Маг Тит — Аур у		

From the System Management category, choose the Notification item, and the Notification Configuration screen appears. This screen lets you have Thecus IP storage 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 buzzer that beeps when a problem occurs.
Email Notification	Enable or disable email notifications of system problems.
Authentication Type	Select the SMTP Server account authentication type.
SMTP Server	Specifies the hostname/IP address of the SMTP server.
Port	Specifies the port to send outgoing notification emails.
SMTP Account ID	Set the SMTP Server Email account ID.
Account Password	Enter a new password.
Log Level	Select the log level to send the e-mail out.
Sender's E-mail Address	Set senders email address to send email notifications.
Receiver's E-mail Address	Add one or more recipient's email addresses to receive email notifications.
(1,2,3,4)	

### 3.3.9 Schedule Power On/Off

Using the Thecus IP storage System Management, you can save energy and money by scheduling the Thecus IP storage to turn itself on and off during certain times of the day.

From the System Management category, choose the Schedule Power On/Off item and the Schedule Power On/Off screen appears.

Z trailed net	u au thui à th'			
	Aption	T To	Aption (	T To
Skineby:	Nore 💌	00:00	None 💌	00:00
Monopys	Nore 💌	00:00	None 💌	00:00
Tuckey:	Power Chi 💌	00: C 🕋	Power Citra	21:00 *
Opendately:	Power Chi 💌	10:30	Power Citra	00:00 *
The projection	Nore *	00:00	None 💌	00:00
≂ dar	None 💌	00:00	None 💌	00:00
Saturday:	Nore *	00:00	None 💌	00:00
Appy				

To designate a schedule for the Thecus IP storage 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.

Finally, click Apply to save your changes.

#### 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; Off: 16:00

System will turn off at 8:00 AM on Monday. System will turn off 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.

#### 3.3.10 Administrator Password

From the System Management category, 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.

-Change Administrator Pa	ssword
New Password:	
Confirm Password:	
Apply	

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

Change Adminis	trator
ltem	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.

### 3.3.11 Config Mgmt

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

9 на	Piccos presser a file to up part.	<b>[</b> ]
[]2j4_	المنشعا المعادية	

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

System Co	onfiguration Download/Upload	
Item	Description	
Download	Save and export the current system configuration.	
Upload	Import a saved configuration file to overwrite the current system configuratio	on.
$\odot$	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 backed up can only be restored in the same firmware version. The backup details exclude user/group accounts.	

### 3.3.12 Factory Default

From the System Management category, choose the Factory Default item and the Reset to Factory Default screen appears. Press Apply to reset Thecus IP storage to factory default settings.

Reset To Factory Default
Apply



#### 3.3.13 Reboot & Shutdown

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

Shutdown/Reboot System
Shatashii) Reboot System
Shutdown Reboot

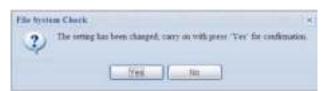
#### 3.3.14 File System Check

The File System Check allows you to perform a check on the integrity of your disks' file system. Under the System Management category, 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.

File System Check	File System Check	
Reboot	Reboot	
64	Done.	

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. Check the desired RAID volumes and click Next to proceed with the file system check. Click Reboot to reboot without running the check.

È	RAID Level	Disks	Status	Filesystem Status	Data Capacity	Last Check Time
E	RAID	1,2,3,4		Normal	2223.9	
Fil	e System Cheo	k				
		k is not support fik	a system checks!	$\mathbf{V}$		
nci			e system checkst Status	Filesystem Status	Data Capacity	Last Check Time

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

	Next Reboot	
Thatas Garant 20 Ione Information:	Prints Battle Bager.	
Reals		-
(Stat) = #about		2

Click Start to begin the file system check. Click Reboot to reboot the system.

When the file system check is running, the system will show 20 lines of information until it is complete. Once complete, the results will be shown at the bottom.

Letteri 27 Sono beformazione	<pre>[22204/87 34/8/22] 4 2 8 [22004/87 34/8/22] 4 2 8 [22004/87 34/8/22] 4 0 24 [22004/87 34/8/22] 4 0 24 [22004/87 34/8/22] 8 2 34 [22004/87 34/8/22] 8 2 34 [22004/87 34/8/22] 8 2 34 [22004/87 34/8/22] 8 3 24 [22004/87 34/8/22] 8 4 24 [22004/87 34/8/22] 8 24 [22004/87 34/8/22] 8 27 [22004/87 34/8/22] 8 27 [22004/87</pre>
Naeth-	RAID [ 1,7,3,4,5 ] Fystem Volume : Entr Code = 0 , So eccura, RAID [ 1,7,3,4,5 ] Data Volume : Entr Code = 0 , No eccura.

The system must be rebooted before Thecus IP storage can function normally after file system check completes.

#### 3.3.15 Wake-Up On LAN (WOL)

The Thecus IP storage has the ability to be awoken from sleep mode via LAN port.

Wake-On-LAN		
1000 Berki H	O Enable	😕 Distolic
( Angée )		

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

#### 3.3.16 SNMP Support (N4520/N4560 Only)

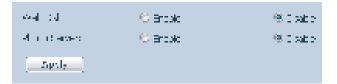
From the System Management category, choose the SNMP item and the SNMP Support screen appears. You could enable the SNMP function and filled in the related information in each fields. With the SNMP management software, you can get other system's basic information.

SNMP Service:	O Bruble 🕷 Plable	
Read Community:	1	(Adom D=R, b=C, A=Z, -, _)
Bystem Contact:		
Textern Location:		
Tran Target Sh:		

From the System Management category, choose the SNMP item, and the SNMP Support screen appears. From here, you can Enable or Disable.

#### 3.3.17 UI Login Function

Adjusts UI Login Configuration settings, you can enable/disable the Web Disk, Photo Server and modules functions, according to your needs.



#### 3.3.18 Networking

From the System Management category, choose Networking, and the Networking Configuration screen appears. This screen displays the network parameters of the global setting and available network 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:

Host Settings			
Hext Name	<u>\2120</u>	Domoin Name:	theal side
WINE Reveal 10		WINE References	
DMS 33 Set Finnings			
Minter (	O Menue		
	BHCP (Set Flom Walk(LANL)		
148-1	16016/06341		
DNS 2	108.05.1 1		
1.68			
WANZLANL			
i shis	1. mol	d means	The Brids
MaC Add box	00:14:50:17: 3:5E	Lin Stobus	Connected
a de norma e	.000 × 1-0-5		
— IPv4 ——		18vb	
Enable		Bhobke	

Network Configuration	Network Configuration (Global parameter)			
ltem	Description			
Host name	Host name that identifies the Thecus IP storage on the network.			
Domain name	Specifies the domain name of Thecus IP storage.			
WINS Server	To set a server name for NetBIOS computer.			
DNS Mode	Select the DNS server is coming from DHCP server or manual input. A total of 3 DNS servers can be input. If the DNS setting is chosen from DHCP server, then it will refer to WAN/LAN1 port.			
DNS Server 1,2,3	Domain Name Service (DNS) server IP address.			
Network Configuration	(NIC port)			
Link speed	Display associated NIC port link speed.			
Link status	Display associated NIC port link status.			
MAC address	MAC address of the network interface.			
Jumbo Frame Support	Enable or disable Jumbo Frame Support of associate interface on your Thecus IP storage.			
IPv4/IPv6	Click to enable IPv4/IPv6 for TCP/IP. The default is IPv4 enabled.			
Mode	It can choose a static IP or Dynamic IP.			
IP	IP address of associate NIC interface.			
Netmask/Prefix Length	Input netmask for IPv4 and Prefix length for IPv6.			
Gateway	Gateway for associate NIC.			
Default gateway	It can be chosen from a drop down list of default gateway that's been used for the Thecus IP storage.			



Only use Jumbo Frame settings when operating in a Gigabit environment where all other clients have Jumbo Frame Setting enabled.

Proper DNS setting is vital to networks services, such as SMTP and NTP.

A

Most faster Ethernet (10/100) Switches/Routers do not support Jumbo Frame and will not be able to connect to your Thecus NAS after Jumbo Frame is turned on.

# 3.4 Storage Management

The Storage menu displays the status of storage devices installed in the Thecus IP storage. It includes storage configuration options such as RAID and disk settings, iSCSI (N4520/N4560) and ISO Mount (N4520/N4560).

#### 3.4.1 Disks Information

From the Storage menu, choose the Disk Information item and the Disk Information screen appears. From here, you can see various installed hard disks. The disk slot position will appear if the mouse is moved over the installed disk.

Hik Infa				
Ser.	* peak het link * 5	top Twinsit Rad Block		
Disk No	Madai	Capacity	Ferrievane	Red Block
B N2528	(2Diala)			
1	WDC WD4000FY1/Z/0	3,726.08	01.0	
2	WDC WD4000Fm/2-0	3,726 GB	01.0	
otali Capa	eftri 7452 (CB)			
Hik Perw	or Management			
Hik Perw		20 × Minut	in Apple	
Hik Perw	or Management			3,7

<b>Disks Informat</b>	tion
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.
Bad Block scan	Yes to start scan Bad Block.

#### • S.M.A.R.T. Information

On the Disk Information screen, select a disk then click on "Smart" to list the S.M.A.R.T. info of the associated disk.

Smart	P Detect Bad Block	🐨 Dop Defect Rad (R	d.
Disk No	Model	Capacity	Broware
3 N7570 (	Dishe)		
1	WDC.WD4000FYYZ-0	3,726 GB	01.0
2	WDC WD4000FVYZ-0	3,726 GB	01.0

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

SM	IART INFO				×
	Info				
	Disk No.:		1		
	Model:		WDC WD4000FYY	YZ-0	
	Power On Hours	:	2114 Hours		
	Temperature:		36°C/96.8°F	34°C/93.2°F(Last)	
	Reallocated Sect	or Count:	0	O(Last)	
	Current Pending	Sector:	0	O(Last)	
	Test				
	1050			_	
	Test Type:	short	:	🔘 long	
	Test Result:	Click to s	tart		
	Test Time:				
	Test				

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 min-
	utes, 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 sec-
	tor 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 cannot 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.

#### Bad Block Scan

On the Disk Information screen, select a disk then click on "Detect Bad Block" to perform bad block scan of the associated disk. The result is only for reference and the system will not take any action from its results.

4°	🛞 Twiwe Dwi Timi	Cop Select	Dwi Ditti
1 sk No	Medic	Copadty	2 met 2
E Naras o	206463		
1	ACC 314 015 5540	0,054	P.1
2	VCC XD4000F1 Z D	5.730 GE	00

The bad block scan can be terminated by clicking on "Stop Detect Bad Block".

Esea	f Planet Sel Mink	¥ Stop Detect	Red Block
Cink No	Model	Cipicity	Stag last block and Ferriward
3 N282	WDC WD4000FYYZ-0	2.726-02	01.0
2	WDC WD4000FYYZ-0		01.0

### 3.4.2 RAID Information

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

This screen lists the RAID volumes currently residing in the Thecus IP storage. From this screen, you can get information about the status of your RAID volumes, as well as the capacities allocated for data.

(real	(cruinal	moverst					
0.0	zaatai i	()Edit	Chimill) Hot	Spann			
	Mas RAID	ID	RAID Level	Status	Disks Used	Total Capacity	Dota Capacity
۲		RAID	0	Healthy	1.2	7407 GB	0.2 GB / 7290.8 GB

<b>RAID Information</b>	
ltem	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 <i>Healthy</i> , <i>Degraded</i> , or <i>Damaged</i> .	
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.	

#### Create a RAID

On the RAID Information screen, press the Create button to go to the RAID Volume Creation 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 Configura	itions
ltem	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 aalready 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, clicks create.

C Disks Live	Dokulad					
<u> </u>	Dist No.	CREAKEY DIRE	(Maskei	1004	theed .	Thirt
	1.1	1,007,733	HOC WODRDS	-04	25	12
	1	1614	514	light.		
	1.	19.00	504	ingle -	11	
	4	16.0	N/A	10.0		
0	The distance					
0	The particular	a fan seart fa	198.40 6.64			
0	The part of	ng ipini tatana ipi	198.40 4.444			

2. On the RAID Configuration screen, set the RAID storage space as JBOD, RAID 0, RAID 1, RAID 5, RAID 6 or RAID 10 (depends on model)— see Appendix B: RAID Basics for a detailed description of each.

27

D TONNA LAN	Dide Lat.					
	Dist. Proc.	(April 1986)	Partie C	inese .	2440	lipte
	24	3,807,338	WET WEDDER	18	16	
	E	368	18/4	80.		
	2	83.	1676	81	.01	
	1.4	101 H.	19/16	4/4		
D						

3. Specify a RAID ID.



- 4. If this RAID volume is meant to be the Master RAID volume, tick the Master RAID checkbox.
- 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. Selected whether the RAID volume will be encrypted or not.

The RAID volume can protect data by using RAID Volume Encryption function to prevent the risk of data exposure. To activate this function, the Encryption option needs to be enabled while the RAID is created and followed by a password input for identification. Also, an external writable USB disk plugged into any USB port on the system is required to save the password you have entered while the RAID volume is being created. See the screenshot below for details.

-		
🕜 Telo Ltt.	RAID ID: RAT	D0
C. AAD Level Siletton	🐼 Naster RAID - Take e	ffect after checked box
	C Encryption	
RAID Property Setup	Password:	
Setuo RAID property in varies	Confirm Password:	
stuation per needed	C Quick Raid	
	2000000	
	Description:	
	RAID ID: alow 0-9, e-c, - Master RAID: optional.	A-Z and which is required and unique.
A AAAD Steeture Setue	Encryption: optional and Duick Raid: optional and	password a limited to 1-16 characters. enable this setting to enhance RAID creation time if there is no partition
-	existed inside of hard de	k.
ALCO Volume Challent Confermation ;		
C and		
		Pres Next Canod

Once the Create button has been pressed with the Encryption checkbox enabled, the following message pop-up will appear for confirmation.

AID Configuration ×
To encrypt RAID volume will cause performance down, and you used to have writikle USB disk issuet to USB port to store encrypted parameter. Strongly recommend to hackup your encrypted parameter in somewhere else safely, or the parameter line will muse data unreachable.

After the RAID volume has been created, you may remove the USB disk until the next time the system boots. The RAID volume cannot be mounted if the USB disk with the encryption key isn't found in any system USB port when the volume is accessed. To activate the encrypted volume, plug the USB disk containing the encryption key and into any system USB port.

We strongly recommended copying the RAID volume encryption key to a safe place. You can find the encryption key file from the USB disk in the following format:

#### (RAID volume created date)\_xxxxx.key



RAID volumes with encryption enabled will be displayed with a key lock symbol next to volume ID name.



6. Quick RAID — Enabled the quick RAID setting is going to enhance RAID creation time.

Confirm Password:		
	Confirm Password:	
Quick Raid	Quick Raid	18

7. Specify a stripe size — 64K is the default setting.

We recom brand nev 8. Selected the file system you would like to have for this RAID volume..



9. Press Submit to build the RAID storage volume.

0	RAD WARNE O SATING	Contenation	
-	Past .	Volue.	
0	Does Lat.	LT	
-	RAD Level	84(2-1)	
0	NUE	810	
	Dails Red	300	
0	18/pi 284(10)	85.92	
	He forme	6074	
D first came i pres Carbonna	Retty MID	191	
0			
RAID Configuration All current active per	rices will be stopped when	RAID is being created. A	Are you sure to create RAID now?

10. Press "Yes" for RAID volume creation preparation. Then click "Finish" to start up with RAID volume building.

Disks List	The RAID volume creation will start after [Finish] button pressed.
RAID Level Selection	During the RAID volume creation period all of active services will be stopped.
AAD Property Setup	and and provide the second s
ALD System Setup	
RAID Volume Creation Confirmation	
Final RAID volume creation has all its setup complete	
RAID volume creation has all its setup	
RAID volume creation has all its setup	
RAID volume creation has all its setup	

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



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

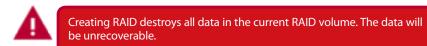
# RAID Level

You can set the storage volume as JBOD, RAID 0, RAID 1, RAID 5, RAID 6, or RAID 10 (depending on model).

Level Model	JBOD	RAID 0	RAID 1	RAID 5	RAID 6	RAID 10
N2520/N2560	•	•	•			
N4520/N4560	•	•	•	•	•	•

RAID configuration is usually required only when you first set up the device. A brief description of each RAID setting follows:

RAID Level	ls second se
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 a single disk, 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 sus-
	tain 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.



### • 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.

000	eate	C/Edit	Global	Hot Spare			
	Mas RAID	ID	RAID Level	Status	Disks Used	Total Capacity	Data Capacity
۲	*	RAIDO	3	Healthy	1	1860.5	1859.6 GB
onfigura	rtion						
D Flene;	creef.	fur1					
6.61							
Dist. File,		Cigenta (R	101	Nobil	(Bable)	Ded.	( Spire )
1		1,967,729		WDC WD3960FY15-0	DK.		
2		H/A		N/A	R/A	13	.0
2		N/A.		N/A.	3/8		
4		ALCA.		NVA.	8(A)	13	10
KID LAH KID IDI KIDIQITA	5		e	= الدي 2–6, 2–5, ۸–2 ) ( Alice		Take effect after de Carllers Passwer	
AD Levi AD 30 Scriptor Type 32 W Byte		E Par	ewent.				
AD Levi AD 30 Scriptor Type 32 W Byte	e (88)	E Par	ewent.				
Coaf	n: (KB3) m: (Romonal Iguradio	E Par			1-34 (forscrie) ) 	Carifers Passwer	h [
AD Law AD ID Scorptor Dos Ser Ante Ante Confi	n: (KB3) m: (Romonal Iguradio	E Par		(Ales	1-34 (forscrie) ) 	Carifers Passwer	h [

# Remove RAID

Click to remove the RAID volume. All user data and iSCSI created in the selected RAID volume will be deleted.

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. A confirmation screen will appear, you will have to click "Yes" to complete the "Remove RAID" operation.

AID Management	Expand				
Edit					
Disk No.	Capacity (MB)	Model	Status	Used	Spare
1	1,907,729	WDC WD2003FYYS-0	OK	1	
2	N/A	N/A	N/A		
3	N/A	N/A	N/A		
4	N/A	N/A.	N/A		
		III			,
<	JBOD	III			,
	JBOD RAID0	( Allow 0~9, a~z, A~Z )	☑ Master RAID - 1~16 characters )	Take effect after ch Confirm Passwor	ecked box
RAID Level: RAID ID:	RAID0	( Allow 0~9, a~z, A~Z )			ecked box

A

Remove RAID destroys all data in the selected RAID volume. The data will be unrecoverable.

# • Expanding a RAID(Dose not apply to the N2520/N2560)

To expand a RAID 1, RAID 5, or RAID 6 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, click Edit to open the RAID Configuration screen.
- 5. On the RAID Configuration screen, click Expand.



# • Migrating a RAID(Dose not apply to the N2520/N2560)

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 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.

theregeneit (1)	Export Migrate RAID				
Higrata KAI	D HODE				
Dek.No.	Casacity (HII)	Hodel	Status	Used :	Available Deix
1	476,940	WDC WD9663ABYX-8	0K	100	6
3	476,940	VIDIC WD3063AB100-8	OK.	381	12
3	853,870	Hitschild(573101	OK .	11	57
4.	#53,879	Htschi H0572181	(0K	迫	(C)
•	() RAD 1 = RAD 1	(Circlinii)	C ME + M		
	) for $1 \rightarrow 500$ , where $1 \rightarrow 500$ , we have $1 \rightarrow 500$ .	(Cedena)	C 1022 6 -> 102 C 1022 10 -> 102	e (Overa)	
		(Celena) (Continua)		5 6 (Donna) (0: 59 (Odmaa)	
	WE RAID I I - RAID (	e (Centeral) (CCenteral) (CCenteral)	C 8423 57 -+ 84	5 6 (Diverse) Di 30 (Diverse) Di 60 (Diverse)	
	() KAID 1 KAID 1 () KAID 2 KAID 1	e (Centeral) (CCenteral) (CCenteral)	$ \bigcirc \begin{array}{l} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 &$	5 6 (Diverse) Di 30 (Diverse) Di 60 (Diverse)	

Are you	PRAID migration may take several hours to complete depending on the sure?	
AID Configuration		
To avoid disaster data l below to proceed.	ost caused by power failure, a full data backup is strongly recommand	ed. Please type in [ Ye
Yes		
	OK Cancel	
	RAID Configuration ×	
	RAID Setting Successfully!	

Here is a list of limitation with RAID level migration function:

- 1. During RAID level migration, it is not permitted to reboot or shutdown system.
- 2. For RAID migration from R1 to R5 or R1 to R6, all services will restart and "iSCSI" volume will be in read only mode but read/write of the "user data" will be possible during the operation.

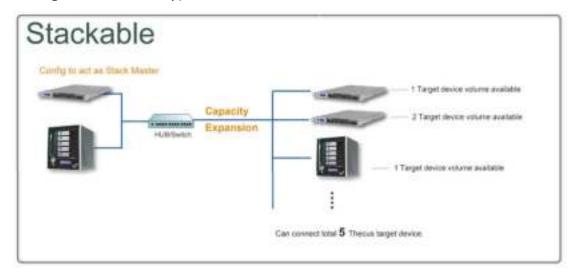
The migration scheme below is based on Thecus IP Storage product's maximum possible combination. For other model which supports less HDD, please refer to the web UI while RAID migration operates.

Below is a table listing of possible RAID migration schemes:

То			
From	RAID 0	RAID 5	RAID 6
RAID 1		[RAID 1] HDDx2 to [RAID 5] HDDx3	[RAID 1] HDDx2 to [RAID 6] HDDx4
		[RAID 1] HDDx2 to [RAID 5] HDDx4	
		[RAID 1] HDDx3 to [RAID 5] HDDx4	[RAID 1] HDDx3 to [RAID 6] HDDx4
RAID 5	Х	[RAID 5] HDDx3 to [RAID 5] HDDx4	[RAID 5] HDDx3 to [RAID 6] HDDx4

# 3.4.3 NAS Stacking (N4520/N4560 Only)

The Thecus IP storage'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.

oled Target Nerve # Councily (Tard Trial) Tales Description	

#### 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 can "Enable" or "Disable" the stack target now or later depending on usage required.

Country Control	a cut o nut	
Enable (SCSI Target:	🖲 Enable 🔘 Disable	
Stackable Target IP:	172.16.65.143	
ign:	iqn 2011-11.com thecus RAID iscsió vg0 pmdata 🗠	
Usemame:		
Password:		
Stacked Target Name:	(Limit:(0~9, a~z))	
Description:		
Browseable:	🕷 yes 🛛 no	
Publics	O ves 🔍 no	

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 the volume IP has 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.

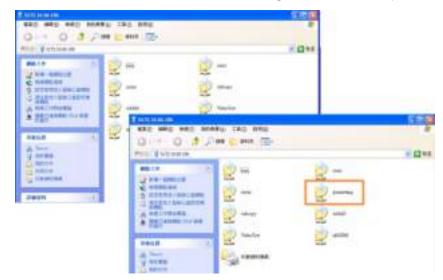
Add iSCSI Target	(Add Stack Target)	×
Enable iSCSI Target:	Enable      O Disable     Disable	
Stackable Target IP:	172.16.65.143	
iqn:	iqn.2011-11.com.thecus:RAID.iscsi0.vg0.pmdata 💙	
Username:		
Password:		
Stacked Target Name:	( Limit : ( 0~9, a~z ) )	
Description:		
Browseable:	◉ yes 🔘 no	
Public:	🔘 yes 🔘 no	
Stackable will mour	nt the first LUN of the iSCSI target if it has more than one LUN.	
Apply		

The Stacked Target name will become the network share name and will be displayed through network access such as SMB. You may refer to the figure below to see the result. Please note the naming limitation.

37

dd iSCSI Target	-			18
Enable ISCSI Target:	e Enable	Disable		
Stackable Target IP:	172.16.65.143	Discovery		
iqn:	iqn.2011-11.com	thecus RAID iscsi0 vg0.p	omdata 🖌	
Username:				
Password:				
Stacked Target Name:	pmmeeting		( Limt : ( 0~9, a~z ) )	
Description:				
Browseable:	🖲 yes 🛛 🔿	) no		
Public:	🔿 yes 🛛 💿	) no		
Stackable will mou	nt the first LUN o	of the ISCSI target if it	has more than one LUN.	
Apply				

From the figure above, the Stacked Target name is "pmmeeting". The figures below show the result before and after via Microsoft Network Access when settings have been completed.



The Browseable setting is the same method used for setting a system share folder. It designates whether or not this folder will be visible through web disk. You may refer to the figure below for reference when Yes and No are selected.

Enable ISCSI Target:	<ul> <li>Enable</li> </ul>	🔿 Disable			
Stackable Target IP:	172.16.65.1	143	Discourry.		
ign: Username: Password: Stacked Target Name: Description:	iqn.2011-11	l.com.thecus:RA	ID isesi0 vg0 pn	adata 💌	9, a~z ) )
Browseable:	yes	⊙ no			
Public: Stackable will mou	O yes nt the first L	no .UN of the ISCS	il target if it h	as more than on	e LUN.

The Public setting will be set the same way as the setting for the system share folder associated with the ACL permission is. 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 in the Stack Target List window.

Enable ISCSI Target:	Enable	O Disable	
Stackable Target IP:	172.16.65.1	43	
iqn:	iqn.2011-11	.com.thecus:RAID iscsi0.vg0.pmdata 🖌	
Username:			
Password:			
Stacked Target Name:	pmmeeting	(Limt:(0~9, a~z))	
Description:			
Browseable:	yes	© no	
Public:	🔿 yes	() no	

Click Apply to save your changes.

#### B. Activate a Stack Target

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

Local Initiator IQN: ign.2007	-08.com.thecus:stack	able-server.0014fd14fb2	28		
🔾 Add 🔅 Edit 🤤 Remov		1 m			
Stacked Target Name	IP	Capacity (Used/Total)	Status	Description	iqn

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

In general, if the attached stack target device has been used by another Thecus NAS 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 completed, 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 a stack target, click Edit for the corresponding stack target, and the system will bring up the following dialogue window:

Edit iSCSI Target				>
Enable iSCSI Target:	🖲 Enable 🛛 Disa	able		
Stackable Target IP:	172.16.65.143	Discovery		
iqn:	iqn.2011-11 com theci	us RAID isesi0.vg0.p	mdata 💌	
Username:				
Password:				
Stacked Target Name:	primeeting		( Limit : ( 0~9, a~z ) )	
Description:				
Browseable:	🖲 yes 🛛 🔿 no			
Public:	🖲 yes 📀 no			
Stackable will mou	t the first LUN of the	e ISCSI target if it h	as more than one LUN.	

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

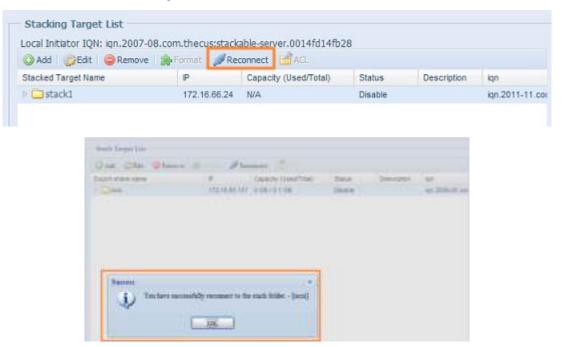
If the stack target Public setting set to Yes, then the ACL button will be grayed out. However, if Public setting is set to No, then the ACL button will be available for you to setup user access permissions for the stack target.

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

<ul> <li>Rocursive</li> </ul>	Denny	Read Only	Writable
Loral Groups (w. Britsmith.	00	0.0	0.0
latre .	Barne	Name	Name
0ers			
oers nfe			
Grings   Local Dates   AD Grings   AD Const			
the second is bottless to the second is the second			

#### E. Reconnect a Stack Target

This is used to enable stack target devices that may have been disconnected due to a power outage or a disconnected network. When this happens, the Reconnect button will become available. To attempt to reconnect the stack target, click Reconnect.



# 3.4.4 ISO Mount (N4520/N4560 Only)

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

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

Select the ISO Image Mounting function and the ISO Image Mounting window will appear as shown here.

0		
Munited Ryth -	20 http	200 See

#### A. Add an ISO file

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

*		
niyn: isbbdd asbcogy nawydolau	ISO Fuß	750 Sur
Tunes_munic		

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

12130 day			
Control Service Control Service	Distantin *	180 Pain	Pic tar
Fie Second			
	Bearington Our Dio 4000 the recent car for examined Tags 10 Montes Tags 10 Montes Tags 10 Montes Press type to the Net parts of the Diel H art to		

42

27 1813 film	(a		
+ Just Holl	Contrast Nation	DED Plan	100 Kin
- Call I head			
Cash Title Sign			
Bederic III			
C 4C1 1040			
0.400			
A RED WAR STORY			
Torte R. e.			
Carrier .			
Chair from			
	31.4 hpt 41 2 21 4	2.1	factor result with camp or disput
National Association (1996)			
dame -	Description		
	Gain 1MJ 9555 He crosse can be reasoned.		
_AND	Tag 10 f blden. Tog 10 f blden.		
Land Contraction	Raise may to the first part of the 196-12 unit	had.	
	mo time	3	
	a. Arramatic		
	2 100 11 11 11 11 11 11 11 11 11 11 11 11		
	1.12		
	7166 1 ma		
	and the second se		
	-		
	C Selent		
	a particulate Theorem 11 in a second		
	D and the Targett in a need.		
	04		

To mount the new ISO file, select one file from the list of files and input the desired mounting name into the "Mount as:" field. Click "ADD" to confirm the completion of the mounting. If nothing is input in the "Mount as" ISO file export name field, the system will automatically give an export name to the ISO file. The mounting name will then be defined by the ISO file name.

After completion, the page will display all mounted ISO files.

12 mil 40-4	@ Interest		
+ sharehour	E. Standard Pate +	50 Pu6	355.50*
BT Seel     Aust: Name: Super:     Auto: Name: Super:     Auto: Name: Nam	FTL merettet Three H	secretario Tinto II ne	00.008
TA Second	IN 4 Perf at 19-19-2	Digitely is a	al Monata (-1971
();;;A00	One Tide Hells for errors on to assess Top is Forders Top is Product Top is the Theorem type is the full path of the Tide Forder Level.		

You can click "Unmount" to eliminate a mounted ISO file.

### **B. Using ISO**

The mounted ISO file will be located in the share folder of the same name as the file. Please refer the screen shot below. Here, the ISO file "Thecus 01" wasn't assigned a mounting name, so the system automatically created a folder "Thecus 01".

ALES VITLANCE Committee	-		-				
SEARCH CO.	* 10	acti fam	1	Aide Aided TEPys		AMUT	
	2	and -	23	Ault Treese		Andy Workly Superi	
关格仪器		A 2040	27	Feedands OT	10	NT fiel	
<ul> <li>● 第二200 回転用目(月2,18.08.4%)</li> <li>● 和約2次件</li> <li>● お約2次件</li> <li>● お約2件</li> <li>● お約2件</li> <li>● 新約2件</li> <li>● 新約2件</li> </ul>	E	7 Dece 05	-		1	Parce () A Sector () () Sector ()	

# 3.4.5 iSCSI (N4520/N4560 Only)

You may specify the space allocated for iSCSI. See the table below to the allowed iSCSI target number per system:

CSL RAID Manu						
DOM:N	64	ab etatas	1044	( test	-bib	No sutin
NE E	15e 20 - 0	Heattry	1.22.2.4	Gamete 3229	Capiety 12.8 00 / 3223.9 08	
-Initial and	e e _ =NAG	1			( <del></del>	
OCM .		naved @leave				
	Page Che					
Contraction of the			Shitter Dealted			

### • iSCSI Target

To add iSCSI target volume, click iSCSI with associated RAID volume from its drop down list and select the desired RAID volume.

iSCSI Target	
ltem	Description
Add	Click to allocate space to iSCSI target from associated RAID volume.
Modify	Click this to modify the iSCSI Target.
Advanced	There are 3 options (iSCSI CRC/Checksum, Max Connections, Error Recovery Level) These currently
	allow the Admin to Enable/Disable the Thecus IP storage associated with the iSCSI setting.
Delete	Click this to delete the iSCSI Target.

Allocating Space for iSCSI Volume

Master UKD	.0	RA21 Level	Itation	Dails Absed	Tetal Copurts	Deta Capacity	Tile System
-	98	31	Healthy	1,24	445.4	1.2 08 / 453.3 08	161/8
BCSI 9	- trigge						
ens:		Eraber	C Date:			-	
						Lui Aeto	
ecst to	ingel						
	arget 1	N-RCS					
ISCSE.	-			_			
	South	- USAA	i gait	1			
Nare	-	-		-			
3234				English			
Nere				Rifus			

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

1. Under the iSCSI Target List, select iSCSI Target then click Add.

The Create iSCSI Volume screen appears.

1.0001(0-0, n=c)
12 (m) # None
Emit(0~9, 8~2) Emit(0~9, 8~2, 8~2) Emit(0~9, 8~2, 8~2)ampth between 12~16)
Linet (0-9, a-2, A-2) Linet (0-9, a-2, A-2) Argth Settlement 12-16)
RASE C The Preveters Testant Alecation
Lends(09, 4-43) 363 GH [1 ]08
fill Bytes(For difference)

Create iSCSI Volume	
ltem	Description
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 ex-
	port share.
iqn_Year	Select the current year from the dropdown.
Ign_Month	Select the current month from the dropdown.
Authentication	You may choose CHAP authentication or choose None.
Username	Enter a username.
Password	Enter a password.
Password Confirm	Reenter the chosen password
Mutual CHAP	With this level of security, the target and the initiator authenticate each other.

Username	Enter a username.
Password	Enter a password.
Password Confirm	Reenter the chosen password
RAID ID	ID of current RAID volume.
LUN Allocation	Two modes can be choose from:
	Thin-provision: iSCSI thin-provisioning shares the available physical capacity to multiple
	iSCSI target volumes. It allows virtual capacity to be assigned to targets prior to adding
	physical space when it has run out.
	Instant Allocation: Allocate available physical capacity to iSCSI target volumes.
LUN Name	Name of the LUN.
Unused	Unused space on current RAID volume.
Allocation	Percentage and amount of space allocated to iSCSI volume.
LUN ID	Specific Logic unit ID number.
iSCSI Block size	The iSCSI block size can be set under system advance option, default is 512 Bytes.
	[4K] block size while more than 2TB capacity will be configured in Windows XP.
	[ 512 Bytes ] block size for application like VMware etc.



Be sure the iSCSI target volume has been enabled or it will not list out while using Initiator to get associated iSCSI target volumes.



The iSCSI target volume creation will associate at least one LUN together. It can be assigned either "Thin-Provisioning" or "Instant Allocation".

- 2. Enable the iSCSI Target Volume by selecting Enable.
- 3. Enter a Target Name. This will be used by the Stackable NAS function to identify this export share.
- 4. Choose the current year from the Year dropdown.
- 5. Choose the current month from the Month dropdown.
- 6. Choose to enable CHAP authentication or choose None.
- 7. If you've enabled CHAP authentication, enter a username and a password. Confirm your chosen password be reentering it in the Password Confirm box.
- 8. Choose Thin-Provision or Instant Allocation
- 9. Enter a LUN Name.
- 10. Designate the percentage to be allocated from the Allocation drag bar.
- 11. When iSCSI target volume has been created, the LUN ID is configurable from 0 to 254 with a default of the next available number in ascending numerical order. The LUN ID is unique and cannot be duplicated.
- 12. Choose [4K] block size to have iSCSI target volume over 2TB barrier or [512 Bytes] block size in some application needed.
- 13. Click OK to create the iSCSI volume.

### Modify iSCSI Volume

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

1. Under the iSCSI Target List, click Modify.

The Modify iSCSI Volume screen appears.

ersi		
Own Crown CA	unces @petite	
tiene	Index	
(mil)	Deather	
0.000		
	and all in the second s	
		LOT ABACITIES
tione	ORM/P/CW)	1101 10004101

2. Modify your settings. Press ok to change.

Modify iSCSI Volume	
ISCSI Target Volume:	Enable
Target Name:	test1 Limit:(0~9, a~z)
iqn_Year:	2011 👻
iqn_Month:	11 💌
Authentication:	None O CHAP
	Limit:(0~9, a~z, A~Z)
	Limit:(0~9, a~z, A~Z,length between 12~16)
Mutual CHAP	
	Limit:(0~9, a~z, A~Z)
	Limit:(0~9, a~z, A~Z,length between 12~16)
Password Confirm:	
iqn:	ign.2011-11.com.thecus.n12000:iscsi.test1.raid0
	A
Initiator Information:	

### Expand Volume

The iSCSI volume is now able to expand its capacity from unused space (Instant Allocation mode only). From the volume list, simply select the iSCSI volume you like to expand and click the Expand button:

ISCSI	
Add Modify Advanced	Celete
Name	Status
1234	Disabled
5678	Disabled
	Deserts
LUN Q Add @Modfy @Expand Q Name 1234	Capacity(GB)

You will then see the dialog box displayed below. Drag the Expand Capacity bar to the size you want. Then press Expand to confirm the operation.

escsi			
- Expland ISCSELUN			
Name: Unused: Expand Capacity:	1234 462 GB	1 68	

### 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.

GAM Grodity GAD	the second se	
Name	Status	
1234 5678	Osabled Disabled	
H SH C HE	and an and a second sec	
LUN		
Q Add. @Modify @Ex	end Other	
Name	Capacity(GB)	
1234	1	
iSCSI		101
19C91		×

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

### • iSCSI Thin-Provisioning

If iSCSI Thin-Provisioning is selected when creating an iSCSI target volume, virtual memory is assigned to the target, allowing the physical memory to reach maximum capacity and adding new disks only when needed.

To setup iSCSI thin-provisioning, simply select "Thin-Provision" mode from the "Create LUN" setting screen.

SCSI	azi etali	×
Create LUN RAID ID: LUN Allocation: LUN Name: Unused:	RAID Thin-Provision Instant Allocation Limit:(0~9, a~2) 16384 GB	
Allocation: LUN ID; ISCSI Block size;	1 GB 512 Bytes(For older version)	
Please use [ 4K ] block size	e set under system advance option, default is 512 Bytes. While more than 2TB capacity will be configured in Windows XP lock size for application like VMware etc.	s.

Next, allocate capacity for the iSCSI thin-provision volume by dragging the Allocation bar to the desired size.

After the size has been determined, click OK to confirm. Now you will see the iSCSI thin-provisioning volume is available from the list. Please refer to the screenshot below.

ISCSI.	
Grade Umosty Un	dvarced 😂 Delete
Name	Status
1234	Deabled
5670	Daabled
LON	
Q Add ( Moder () E	ipent - Other
	Capacity(68)
Name	

If creating an iSCSI target volume under "Instant Allocation", physical memory is assign to the target, being limited by the available memory. For the iSCSI target volume created under "thin-provisioning", virtual memory is assigned to the volume, which can go up to 16384GB (16TB).

#### • LUN ACL

After iSCSI target has been created, you are one step away from using the iSCSI volume. Under "LUN ACL", you need to add "Initiator iqn" and setup ACL access privileges to determine the accessibility. Please refer the screen shot below for where "Initiator iqn" can be found.

The iSCSI protocol uses the following information to uniquely identify this initiator and authenticate targets. Initiator Node Name: iqn.1991-05.com.microsoft:andy-ibm To rename the initiator node, click Change. To authenticate targets using CHAP, click Secret to specify a CHAP secret. To configure IPSec Tunnel Mode addresses, click Junnel	Jeneral	Discovery	Targets	Persistent Targets	Bound Volumes/De	vices
To rename the initiator node, click Change. Change To authenticate targets using CHAP, click Secret to specify a CHAP secret. Secret To configure IPSec Tunnel Mode addresses, click	0					ēš.
To authenticate targets using CHAP, click Secret to Secret To CHAP secret.	Initiator	Node Name	iqn (	1991-05.com.micro	soft:andy-ibm	
specify a CHAP secret. Secret	To ren	ame the initia	tor node, (	click Change.	Change	B
				CHAP, click Secret	to Secio	et
			Tunnel M	ode addresses, clic	k 🚺 🚺 🚺	d
			Į.	確定	取消 新	₹( <u>A</u> )

From the LUN ACL setting screen click "Add":

Next, input "Initiator iqn" and setup iSCSI target volume access privileges from the available list. Apply by clicking the OK button.

nitiator IQN:	ign.1991-05.com.microsoft:andy-ibm			
LUN ACL				
ISCSI Target	LUN Name	Read/Write	Read Only	Deny
abc	abc1	0	0	۲
def	def1	0	0	•

The accessible Initiator will be listed as shown in the screen shot displayed below.

SI: 🔿 Enable 🖲 Disable	Apply
CSI Target	
SCSI Target LUN ACL	
🥥 Add 🛛 🎲 Modify 🛛 😂 Delete	
Initiator IQN	
ign. 1991-05.com.microsoft:andy-ibm	

The listed "Initiator iqn" can be modified or deleted by selecting the desired iqn and pressing Modify or Delete.

#### Advance Option

There are 3 available options for the user to operate Thecus IP storage associated with iSCSI setting. The details are listed in the following screenshot. If the options are modified, the system will need to reboot for the changes to take place.

m(m)		
Date ( Dates ) JA	Amont Gomes	
Page 1	mest	
Facil:	Dented	
in the second		
Data press con		
barre .	2-Gauge Ptr (100)	TAN ADDRESS
feet204		Redard Albertan

#### iSCSI CRC/Checksum

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

8031		
Advance Options		
SCE OK/Owner	C Data Digest	
	Citiesder Digest	
Hax Comectonis:	1 A 18	
- Email Recovery Level	2 #	
Emp Recovery Level	(2 )m	
Collinger		

#### **Max Connections**

The maximum number of iSCSI connections.

51

#### **Error Recovery Level**

The Error Recovery Level (ERL) is negotiated during a leading iSCSI connection login in traditional iSCSI (RFC 3720) and iSER (RFC 5046).

#### **ERL=0: Session Recovery**

ERL=0 (Session Recovery) is triggered when failures within a command, within a connection, and/or within TCP occur. This causes all of the previous connections from the failed session to be restarted on a new session by sending a iSCSI Login Request with a zero TSIHRestart all iSCSI connections on any failure.

ERL=1: Digest Failure Recovery

ERL=1, only applies to traditional iSCSI. For iSCSI/SCTP (which has its own CRC32C) and both types of iSER (so far), handling header and data checksum recovery can be disabled.

**ERL=2: Connection Recovery** 

ERL=2, allows for both single and multiple communication path sessions within a iSCSI Nexus (and hence the SCSI Nexus) to actively perform realligence/retry on iSCSI ITTs from failed iSCSI connections. ERL=2 allows iSCSI fabrics to take advantage of recovery in all regards of transport level fabric failures, and in a completely OS independent fashion (i.e. below the host OS storage stack).

# 3.5 File Sharing/Privilege

The Thecus IP storage has built-in user database that allows administrators to manage user access using different group policies. From the File Sharing/Privilege menu, you can create, modify, and delete users, and assign them to groups that you designate.

#### 3.5.1 ADS Support (N4520/N4560 Only)

If you have a Windows Active Directory Server (ADS) to handle the domain security in your network, you can simply enable the ADS support feature; the Thecus IP storage will connect with the ADS server and get all the information of the domain users and groups automatically. From the Accounts menu, choose Authentication item and the ADS Support screen appears. You can change any of these items and press Apply to confirm your settings.

Work Group/Domain Name :	Wengroup	
ADS Support 1	C Enable	# Deable
ADS Server Name :		
ADS Realm 1		
Administrator (D) I		
Administrator Password :		

#### A description of each item follows:

**ADS/NT Support** 

ltem	Description
Work Group / Domain Name	Specifies the SMB/CIFS Work Group / ADS Domain Name (e.g. MYGROUP).
ADS Support	Select Disable to disable authentication through Windows Active Directory Server.
ADS Server Name	Specifies the ADS server name (e.g. adservername).
ADS Realm	Specifies the ADS realm (e.g. example.com).
Administrator ID	Enter the administrators ID of Windows Active Directory, which is required for Thecus IP storage to
	join domain.
Administrator Password	Enter the ADS Administrator password.
Apply	To save your settings.

To join an AD domain, you can refer to the figure here and use the example below to configure the Thecus IP storage for associated filed input:

System Properties	and the second se	<u> 1 x</u>
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Windown u on the refe	ons the following internation to identify work	your computer
Full computer name ACC Server flam Deman	donan local donan local Neath Neath Annan local Neath Annan local Neath Annnan local Neath Annan local Neath Annan local Neath Annan local	Transa -
Note: The identificate - The computer is a d	on al the computer cannot be change cenan controller	fbecaue
	Of Canod	1. 246

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

(!)

- The DNS server specified in the WAN/LAN1 configuration page should be able to correctly resolve the ADS server name. The time zone setting between Thecus IP storage and ADS should
- be identical.
- The system time difference between Thecus IP storage and ADS should be less than five minutes.
- The Administrator Password field is for the password of ADS (Active Directory Server) not Thecus IP storage.

# 3.5.2 Local User Configuration

From the File Sharing/Privilege menu, choose the User item, and the Local User Configuration screen appears. This screen allows you to Add, Edit, and Remove local users.

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er 10 en		200.	
ation tion			

Local User C	Lonfiguration
ltem	Description
Add	Press the <b>Add</b> button to add a user to the list of local users.
Edit	Press the <i>Edit</i> button to modify a local user.
Remove	Press the <b>Remove</b> 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 or leave blank to use the system default value.
- 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.

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Ukor D	10.	car a	Control Name
e-o- au	+1+1	9.47	1.0.00
Contin Respond		08 (06	52 C.C.1
Group Members			searced.
10.0D	3 or 5 Name		
100	100		

# • Edit Users

- 1. Select an existing user from the Local User Configuration screen.
- 2. Click on the Edit button, and the 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.

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Local User Setting		Gioup I	Group List	
.xc Nome	andr	Searche		
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Nextool d		007	coomph	
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Group Members		0.0	sst _koya	
Grap 10 Grap Net er				
1.1 Loops				
Appt:				
<u> </u>				

#### 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 U	ser Setting	X
2	Do you want to delete this user?	
	<u>Net</u> Na	

# 3.5.3 Local Group Configuration

From the File Sharing/Privilege menu, choose the Group item, and the Local Group Configuration screen appears. This screen allows you to Add, Edit, and Remove local groups.

Q.Azz	()ear	Ofernia
Group ID		Group H
Group ID 100		LIANTS

Local Group	Local Group Configuration					
Item	Description					
Add	Press the <b>Add</b> button to add a user to the list of local groups.					
Edit	Press the <b>Edit</b> 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.

dd				
Local George Setting		lisers fist		
General Astronomics	nu les	5 Sec. 6		
Group IC:	101	Over D	Over Name	
Members List		5.05	s-dat(f)	
		08	coomph	
.x: 0	.sc \cmp	200	1	
		1001	and:	
- • 1/s				

### • 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.

.ocal Group Setting		Users List		
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nan b	2 P		Use Notte	
Members List		00	32 C.C.1	
User D	User Name		the state	
		1000	200	
		11.12	10.00	

#### 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.

Local Group Settin	1g	ж
	int delete this group?	
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	Nes Bo	

### 3.5.4 Batch Users and Groups Creation

The Thecus IP storage 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 File Sharing/Privilege menu, click Batch Input and the Batch User and Group Creation dialogue will appear. To import your list of users and groups, follow these steps:

- Click the Browse icon to locate your comma-separated text file. The information in the text file should follow this format: [USERNAME], [PASSWORD], [GROUP]
- 2. Click Open.
- 3. Click Import to begin the user list import.



# 3.5.5 Share Folder

From the File Sharing/Privilege menu, choose Share Folders, and the Shared Folder screen appears. This screen allows you to create and configure folders on the Thecus IP storage 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.

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			· · · ·	Q. 1.					

Add Folder	
ltem	Description
RAID ID	RAID volume where the new folder will reside.
Folder Name	Enter the name of the folder.
Public	Admit or deny public access to this folder.
Apply	Press <b>Apply</b> to create the folder.

# • Modify Folders

On the Folder screen, press the Edit button and the Modify Folder screen appears. This screen allows

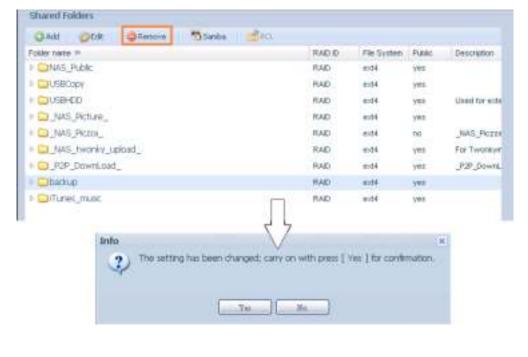
you to change folder information. After entering the information, press Apply to save your changes.

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-turin	🏽 Y-6	29 Ni	-
422.5			

Modify Folder	
Item	Description
Folder Name	Enter the name of the folder.
Public	Admit or deny public access to this folder.
Apply	Press <b>Apply</b> to create the folder.

#### 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.





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

# • NFS Share (N4520/N4560 Only)

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

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Host Name:	rea ana an in O Ruad O Ruad O Ruad O Alk O Alk O Sueet O Sueet O Sueet	ef " oo aa oo Oriy ble " Linux : system root ac system root ac	count we have ful access to the stare (rootroot).	
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145 Add soxt Name: 14 host please s holegal 05 Support: D Happing: lync / Anjing:	rea ana an in O Ruad O Ruad O Ruad O Alk O Alk O Sueet O Sueet O Sueet	ef " oo aa oo Oriy ble " Linux : system root ac system root ac	count we have ful access to the stare (rootroot).	
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NFS Share	
ltem	Description
Hostname	Enter the name or IP address of the host
Privilege	Host has either read only or writeable access to the folder.
OS Support	There are two selections available:
	Unix / Linux System
	AIX (Allow source port > 1024)
	Choose the one which best fits your needs.
ID Mapping	There are three selections available:
	Guest system root account will have full access to this share (root:root).
	Guest system root account will be mapped to anonymous user (nobody:nogroup) on NAS.
	All user on guest system will be mapped to anonymous user (nobody:nogroup) on NAS.
	Choose the one which best fits your needs.
Sync / Async	Choose to determine the data "Sync" at once or "Async" in arranged batch.
Apply	Click to save your changes.

# Samba Configuration

On the Folder screen, press the Samba button and the Samba Configuration screen appears. This screen allows you to setup samba configuration for associated folder. After entering the information, press Apply to activate input settings.

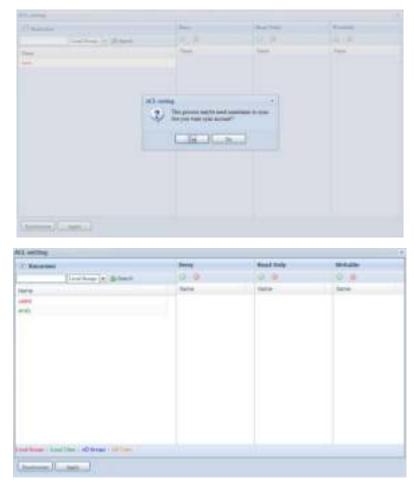
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ansync 🛄				20	RAD	xts	00
usbhda	15			15	RAD	xts	no
usbcop	W.				RAD	xfs	00
aves 🛄	bsta				RAD	xfs	yes
Tunes	munic			<b>T</b>	RAD	xfa	yes
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	Folder name:		ŧ			×	
			© No			×	

# • Folder and sub-folders Access Control List (ACL)

Admit or deny public access to this folder. Press **Apply** to create the folder.

Public Apply

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	
ltem	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.
- 2. 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.
- 3. Continue selecting groups and users and assigning them access levels using the column buttons.
- 4. To remove a group or user from an access level column, press the Remove button in that column.
- 5. When you are finished, press Apply to confirm your ACL settings



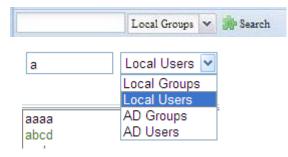
If one user has belonged to more than one group with different privilege, then the priority of the privilege will be as followed: Deny > Read Only > Writable

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.

name » nayno usbhdd usbopy	RAID ID aaaa aaaa	File System ext3	Public no	Description
usbhdd		ext3	00	
	aaaa			nsync
abcopy		ext3	yes	usbhdd
	0000	ext3	no	usbcopy
naswebsite	aaaa	ext3	no	naswebsite
Tunes_music	8888	ext3	yes	Tunes_mus
test	8888	ext3	yes	
lest]	aaaa	ext3	no	
ECR			no	
NetBench				

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

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



# 3.5.6 User Quota

The Thecus IP storage support local or AD users with storage quota limitations in each RAID volume of the system. To enable this function, simply click "Enable", then apply.

Over Que la	Carele.	®itala	
Manual Opdate Local C	bens -		

Next, each user can be setup a global storage quota size for each RAID volume. Simply click on "Quota Size" for each user and input the desired capacity. After the setup is complete, please click on "Apply" to activate the user quota size.

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# 3.5.7 User and Group Backup

The user and group backup feature allow system users and groups to be backed up to another location and be restored if needed.

Please note, when restoring previous backup users and groups, the current users and groups list will be replaced from this restore file's contents.

User and grou	up settings download/upload	
Optional Inc.	wherease in the rest of the term prime.	5
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# 3.5.8 LDAP Support (N4520/N4560 Only)

The LDAP is the other way to authenticate login users who has joined LDAP server, fill in the LDAP server information and get LDAP authentication started. Please make sure that the LDAP server has a Samba sam and a POSIX ObjectClass account.

UDAP Sumper:	Citride	# Daile	
LOAD Server (P -			
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Pauroverd :			
that dischart	(Assis)		
L LDAP arrivel true	t contain at least 21	eda SAN account and POSDE account elepertities. 200 user and group its. 2116 Junits serves to selant.	

# A description of each item follows:

LDAP Support	
ltem	Description
LDAP Service	Enable or Disable LDAP service.
LDAP Server IP	Input LDAP server IP address.
Base Domain	Input base domain information ex. dc=tuned, dc=com, dc=tw
Manager	Input manager's name.
Password	Input manager's password
Apply	Click <b>Apply</b> to save your changes.
Check ObjectClass	Click this checkbox to ensure LDAP server has a Samba sam and a POSIX account or it may not work properly
·	for LDAP client authentication.

# 3.6 Network Service

Use the Network Service menu to make network service support settings.

# 3.6.1 Samba / CIFS

There are options allow Admin to Enable/Disable to operate Thecus IP storage associated with Samba / CIFS protocol. With the option changed, it will need to reboot system to activate.

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Sambo Anonimolas Login Authoritications	🔿 Bracka	🛞 Citable
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### • 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



# 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.

### • Samba is Native mode

The Thecus IP storage is supported Samba mode options. In the ADS environment with "Native" mode selected then Thecus IP storage is capable to become local master position.

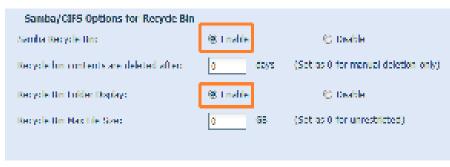
### UNIX Extension

The default is enable for Samba usage, with situation using Mac OSX with smb connection may have permission issue. When it happened, please setup "UNIX Extension" disable to get issue solved.

### • Samba Recycle Bin

The Thecus IP storage is supported recycle bin via SMB/CIFS protocol.

Simply enable the "Recycle Bin" function and "Recycle Folder Display" then all of deleted files/folders will reside in the "\_NAS\_Recycle\_(Associated RDID Volume)" share folder.

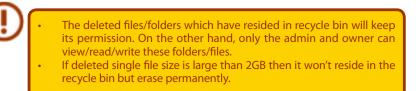


For example, the system has created 2 RAID volumes with ID "RAIDpm" and 'RAID". Then it will have 2 recycle bin folder appear as "\_NAS\_Recycle\_RAID" and "\_NAS\_Recycle\_RAIDpm".

		Mas RAID	ID	RAID Level	File System	Status	
	۲		RAIDpm	J	EXT4	Healthy	
	$\bigcirc$	*	RAID	J	XFS	Healthy	
	NAS_Recycle_RAIDNAS_Recycle_RAIDpm						
endv							

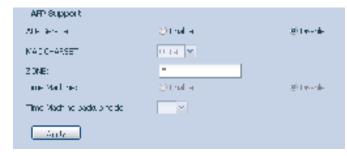
There are 2 more setting could help to manage the recycle bin for deleted folders/files.

- 1. Setup the "Day" to remove deleted folders/files which has resided in recycle bin permanently. Left default value "0" if desired to clean up recycle bin manually.
- 2. Setup the "Size" for recycle bin to allow deleted folders/files can store. Left default value "0" with no limitation.



# 3.6.2 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 Thecus IP storage with MAC OS-		
	based systems.		
MAC CHARSET	Specifies the code page from the drop down list.		
Zone	Specifies Zone for Applet Talk service.		
	If your AppleTalk network uses extended networks and is assigned with multiple		
	zones, assign a zone name to the Thecus IP storage. If you do not want to assign a		
	network zone, enter an asterisk (*) to use the default setting.		
Time Machine	Click the enable checked box if you would like your MAC system to use the Thecus		
	IP storage as MAC time machine backup.		
Time Machine backup folder	Select from the drop down list to designate the folder for time machine backup		
	destination.		

# 3.6.3 NFS Setup (N4520/N4560 Only)

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

NPS: :	O truble @ Deable
C	1
Description	
The _1645_NF Please refer to	5_Exports_ is a system fielder which cannot be accessed. The following examples of host to mount a network device.
	-t.nh.192.188(3:254)/sid0/6xta/_NAS_NPS_Exports_/SAMPLE /mit/sample

A description of each item follows:

NFS Server Setting			
Item	Description		
NFS	Enable or Disable NFS support.		
Apply	Click <b>Apply</b> to save your changes.		

### 3.6.4 FTP

The Thecus IP storage can act as an 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.

FTP Support		
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Option to Evently	3	- 0 nd
Download Educe dth	6	Un = ted
Appt:		

#### A description of each item follows:

FTP	
ltem	Description
FTP	Enables FTP Service on the Thecus IP storage.
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.
External IP	Input the public IP address of the router when the Thecus secure FTP server has been enabled.
	This can help to respond to the ftp client with proper communication information.
Passive Port Range	Limited port range for the FTP server to use.
(30000-32000)	
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 for file uploads. Selections include Unlimited, 1
	~ 32 MB/s.
Download Bandwidth	You may set the maximum bandwidth allocated for file downloads. Selections include Unlim-
	ited, 1 ~ 32 MB/s.

To access the share folder on the Thecus IP storage, 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).

#### 3.6.5 TFTP (N4520/N4560 Only)

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

TFTP:	C Enable	Oisable
IP:	WAN/LAN	(172.16.66.24)
	🗐 LAN2 (192	.168.2.254)
Port:	69	
Share Folder:	~	
The folder [] is not Folder Permissions:	the second s	ne list.

A description of each item follows:

TFTP	
Item	Description
TFTP	Enables TFTP Service on the Thecus IP storage.
IP	Checked WAN/LAN1 or LAN2 to enable port use
Port	Specifies the port number of an incoming connection on a non-standard port.
Share Folder	Select the file stored folder, it cannot be empty.
Folder Permission	Select the folder permission

# 3.6.6 WebService

From the Network Service menu, choose the WebService item, and the WebService 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.

- WebService (00.02) Support	I					
She vçe	🛞 Encolo	@ 1 sabo				
44	1.1					
Secure WebService (Secure	HTTP) Support					
disense in the second	🛞 a - de	C tala				
net -	1 :					
Certification (						
Collificate Lev Flict		E				
CARE CHELH						
Apply Survey and S.L. Vertebrida Plane						
liss relian	- Des rydno					
(1) The file sum of more very non-up parameters of the first restance with processing end of the more very sum						

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.			
Certificate Type	Select "User" if there is available Certification ID ex. Apply from VeriSign. Or using system default			
	by select "System".			
Certificate File	Upload Certificate File if choose Certificate type "User".			
Certificate Key File	Upload Certificate Key File if choose Certificate type "User".			
CA Certificate File	Upload CA Certificate File if choose Certificate type "User".			
Restore All SSL Certificate Files	Click to set back to default certification details.			
Apply	Click "Apply" to confirm the changes.			



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

#### 3.6.7 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 Thecus IP storage.

UPoP Support	© E vabo	🔍 l sabe
tesang ben	-	
Apptr		

#### 3.6.8 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.

Bonjour Support		
Bonjour Service:	enable	🔘 Disable
Apply		

# 3.6.9 SSH

The device is now SSH protocol supported. It allows user to use SSH and have console to manipulate as needed. The SSH default login user name is "root" with full privilege and password is admin's password. The default admin password is "admin" so once the admin password has changed then SSH login need to change the password too.

A description for each item as following:

SSH	
ltem	Description
SSH Service	Enable or disable SSH service.
Port	The port number is default 22.
SFTP	Enable or disable SFTP protocol under SSH service.
Apply	Click "Apply" to confirm the changes.

55H Support		
CONTRACTOR	🕲 that e	201 m-min
Fort:	23	
3.12	Strate:	(#) Les-rai-
<u>ank</u>		
<ul> <li>Fort without it</li> <li>When onto A</li> <li>Criticio &amp; gat</li> </ul>	tust bél k 1024 pr AS SSH contice, di taga he name apa	ore space in pose-pret to CCCSC or Fort IS2 assingt celete or medity any fleytoken, it maybe cause NAS to gene ato end as duing = replationator, place chable UTPS endeding option (Vineos UTPS endeding for filehames ich)

# 3.6.10 DDNS

To set up a server on the Internet and enable the users to connect to it easily, a fixed and easy-to remember host name is often required. However, if the ISP provides only dynamic IP address, the IP address of the server will change from time to time and is difficult to recall. You can enable the DDNS service to solve the problem.

After enabling the DDNS service of the NAS, whenever the NAS restarts or the IP address is changed, the NAS will notify the DDNS provider immediately to record the new IP address. When the user tries to connect to the NAS by the host name, the DDNS will transfer the recorded IP address to the user.

The NAS supports the DDNS providers:

DyDNS.org(Dynamic DNS),DyDNS.org(Custom DNS),DyDNS.org(Static DNS),

www.zoneedit.com,www.no-ip.com.

DDNS Support		
DDNS:	🔘 Enable	Oisable
Register:	DynDNS.org (Dynamic DN	IS) 🔽
User Name:		
Password:		
Domain Name:		
Apply		

A description for each item as following:

DDNS	
Item	Description
DDNS Service	Enable or disable DDNS service.
Register	Choose the service provider from the drop down list.
User name	Input user name with DDNS registry.
Password	Input password with DDNS registry.
Domain name	Input domain name with DDNS registry.
Apply	Click "Apply" to confirm the changes.

### 3.6.11 UPnP Port Management

One of the most convent way to allow users to access required services such as FTP, SSH, web disk and http etc. from Internet environment is setting UPnP port management.

To set up this UPnP port forwarding feature, please be sure that the router has "UPnP Service" Enabled. The following is an example from one of the router manufacture with UPnP Configuration page.

UPnP Service	💌 Enable 🔍 Disable
Clear port forwards at startup	Enable  Disable

After the router has enabled "UPnP Service" then you will have information come from associated router to UPnP port management as shown in the screen shot below.

Information			
Forstly Name	SPOP HOUSE		
Handricturer URL:	inter/torneloads.org/		
Holisi matiket	1		
Hodel MRL-	Witz-(Norwised.org)		
Aubel description:	UH oute		
LEDHE .	unite/p/002 +628-4246 -6286-7696	ACCENTER 1	
Port -	Postacol	Description	
F Prov Local Service			
11/07	LEAR		
11767	TOP		
20427	104		
29433	TOP		
45631	TOP		
\$200E	109		
\$206	10		

And click "Add Rule" to add more port mapping from Internet to access desired services or press "Refresh" to get most updated list.

Start port: 80 End port: 90 Protocol: 00
and the second se
Protocol
and the second se
Description: TCP

A description for each item as following:

UPnP Port N	lanagement
ltem	Description
Start port	Specific port number starts with.
End port	Specific port number ended
Protocol	Choose the protocol for port forwarding needed.
Description	Specific the port services if applicable.
Apply	Click "Apply" to confirm the changes.
Cancel	Click "Cancel" to abort the changes



Some of the routers do not allow the input of port number below 1024. So it may have resulted "setting fails".

# 3.7 Application Server

The Thecus IP storage supports built-in application such as iTunes server as well as add-on official or third -party applications.

# 3.7.1 iTunes<sup>®</sup> Server (Built in)

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

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

- dones the diquestion		
Filmer Service:	🛞 Enable	O Décole
a unexperventier er	-11-0	
Fee-pre:		
Bergericht bere-so	30 m n. tes 🕋	
NPE Tog Character Set:	100 <b>M</b>	

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

<b>iTunes Configuration</b>	n
Item	Description
iTunes Service	Enable or disable the iTunes Service.
iTunes Server Name	Name used to identify Thecus IP storage to iTunes clients.
Password	Enter a 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 Thecus IP storage. All ID3 tags will be sent out in UTF-8 for-
	mat.

Once the iTunes service is enabled, Thecus IP storage will make all music located in the Music folder available for iTunes-equipped computers on the network.

# 3.7.2 Add-on Official Applications

There are several default pre-loaded official applications such as WebDisk, Piczza (Photo server) and Transmission-Kit (BT download manager) that can be found from the Application Server category.

# 3.7.3 Module Installation

From the Application Server Category, choose the Module Installation item and the Module Management screen appears. Here is the entry for all of third party user module could install from.

75

	Module Ins	stallation			
C:\fakepath\Access_Guard.tar.g	JZ		Insta	a	
ement					
Name	Version	Description	Last Status	Action	
Access_Guard	1.00.02	Access_Guard	(j)	▶ ×	

# 3.7.4 NAS Application

Click on NAS Application from the Application Server category, it will list the current system software and official application status.

Filter • Ipdate G	E Patrace	
Mandatory	Managera y Service	Uspata
10% Deen on	Nog Daenny law ve	u istallet
P 2000	Dinata Service	Uspate Pethove
There in services	Fairs resourt Service	Conste Remove
Teac yricaa	Teonicy Morile server	Renewa
recround	Wise/edual to NVH user withe	u istal
wahilikik	Wester Service	Uspate Primave

# 3.8 Backup

There are a number of ways to back up data with the Thecus IP storage.

# 3.8.1 Rsync Target Server

When it comes to backing up your data, it's very important to have flexibility. Data guard provides you with many options, including full backup for all shares, custom backup for selected shares and iSCSI volume backup. Being based on the Linux operating system, it is also much more stable and experiences much less frequent data loss during transfer than other remote backup systems.

-For this tutorial you will need to use Rsync Target Server (Step 1) and Data Guard (Step 2+3) under Backup for this client/server backup feature. It also can be named for function "Remote Replication".

#### Step 1 – Enabling Rsync on your target (backup) NAS

-Log in to your target (backup) NAS through the UI in your web browser

-Go to Rsync Target Server under Backup in the menu of the UI

Regna Lengel Settinage		
Ray no Tanget Bol ker	🛞 Brook:	€ Cabe
	a h	
Pestine di		
a service despire	🛞 a she	C Collin
A proof IF 1	173.10.01.143	
in medie 2		
A prod IF 3		
Public Feet Optional:	Flower choose of the to Upletd	
Private Key(Cg. Initial):	Fearer Courses Centrality Inc.	
Anty Received of	is Deale IK y	

- 1. Enable Rsync Target Server
- 2. Add a username and password (they can be different than your NAS's username and password)
- 3. Select Apply



You will need this user name and password while the data is going to remotely backup to this Rsync target server.

Now Rsync is turned on your NAS, which means it can be used as a target for Rsync backup, in other words, only the backup NAS needs to be activated in this way.

# 3.8.2 Data Guard (Remote Backup)

#### Step 2 – Setting up your backup task and schedule on your source NAS

-Log in to your other NAS (your source NAS) through the UI in your web browser

-Go to Data Guard under Backup in the System Management category of the UI

-From the Data Guard function list, choose Add

🔾 Add 🎡 Edit						
Task Name	Source Path	Source Folder	Target Path	Last Run Time	Backup Type	Status

Remote Data backup	
Item	Description
Add	Add new task.
Edit	Edit select task.
Remove	Remove select task
Start	If associated task has been setup in schedule and like to start at once, click on to start task right
	away.
Stop	Stop the associated running task. The other scenario is if a task has been setup in real-time then
	clicking "Stop" can terminate the running process. Simple click 'Start" to re-start the real-time
	operation.
Restore	Restore the associated task
Log	Click to view the associated task in process details.
Restore NAS Configuration	Click to restore system configuration from selected destination to source unit. More details will
	describe in sections.

The data backup setup wizard appears as below, click on 'Remote Backup'':

	Local Backup Backup to follers / devices / 6CSI targets on local
84	Backup to folders / devices / ISCSE targets on local
	NAS NAS
ama	Amazon S3
💗 websi	ervices Backup to Amazon S3 Service

Then 3 different selections appear and can be chosen from:

		ed
-	Custom Backup Manually select folders (NOT including ISCSI folders) to back	ю.
	ISCSI Backup Backup ISCSI folders to remote target. (ISCSI target will be a during backup task running.)	top :

Remote Data backup	
ltem	Description
Full Backup	The "Full backup" will have all shares from source backup to destination. It could also create shares
	automatically from destination if it is not existent. This only applies if the target server is the same
	model as the source.
Custom Backup	The "Custom backup" allows user to choose desired shares backup to destination.
iSCSI Backup	The "iSCSI backup" can backup iSCSI volume as single file to destination.

# • Full Backup

Click on full backup and the setup screen appear as below. Fill in the remote target IP (Destination) and port (need to be changed only if this port is already in use).

If encryption is required then enable it. Please make sure the associated target server also has encryption enabled.



Carry on with inputting valid remote target server account name and password.

After the settings are complete, please click on "Connection Test". The source unit will try to connect with the associated target system. If a connection can be built up successfully then "Connection passed" will be prompted, otherwise "Failed" will appear.

			Second Street St
	Remote Target:	172.16.64.131	Port: E73
	Encrypt with SBH	e off O on	
	Account #	cberyl	
And and a second se	Palitword 1		
	Connection Test		
	Connection test pas	and Olds Next to continuite	

Click "Next" and more setting will appear.

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4	Tack Namer	fulbackup01	
14 16	Backup Type:	W Realize	C Schedule
	Sync Type:	Sync.	C Incremental
	Compress:	æ orr	(C) On
-	Backup NAS Configs:	e ori	CON
	Recurse Partial Files:	∉ off	(C) ON
	Hande Space Flet	e off	(C-On
	Keep ACL Settings	e on	(C 0)
	Log Locations	555 *	
	Speed Limit: Timeout Limit:	600 590	set 0 to unlimit)
	Liënable Schodu	er;	

-Fill out all the necessary details and choose your parameters

Add Rsync Backup Tas	C
Item	Description
Task Name	This is how this task will appear in the task list.
Backup Type	Real time:
	It will backup folders/files from source to target on the fly. On the other hand, any
	changes from the source will back up to the target right away.
	Schedule:
	The task will start only according to the schedule.
Sync Type	Sync mode:
	Makes your source match your target completely; deleting and adding files on your
	target as they are deleted and added on your source.
	Incremental Mode ·
	Makes your source match your target and keep all old files; adding files on your target
	as they are added on your source, but NOT deleting files on your target as they are de-
	leted on your source.
Compress	With this option, compress the file data as it is sent to the destination machine, which
Compress	reduces the amount of data being transmitted – something that is useful over a slow
	connection.
Backup NAS Config	Enabling this will back up the source unit system configurations to the designed path
buckup tv is coning	on the target system.
Resume Partial File	
Handle Sparse File	Try to handle sparse file efficiently so they take up less space on the destination.
Keep ACL Setting	It will backup not just data itself but also ACL configuration with associated folders/
	files.
Log Location	Choose the folder to save the log details while the task is executed.
Speed Limit	Input the bandwidth control for data backup operation.
Timeout Limit	Setup the timeout when trying to build up a connection in between the source and
	the target system.
Enable Schedule	If backup is set as "Schedule", please input the related period and time.

After the required fields are filled and the parameters are setup, click 'Finish" to complete. The data guard task will appear in the list as shown below.

QAM DER	GRamoe FStart	# Stop Statute	glog		4	Restore NAS Configuration
Task Norce	Source Path	Source Folder	Target Puth	Last Bun Time	Bediap Type	Status
Calegory) rea	ater (1)					

From the task list, you can now see the newly added task "fullback01". The backup is setup as "real time". From the status field, "Processing" can be read as the back-up is performed on the fly.

## Custom Backup

The custom backup setting is similar to the full backup. The only differences are explained below:

1. Inputs the share folder name of target sever where the source is going to backup. The subfolder can be left as blank.

Remote Backup > Custo	m Backup	
	Remote Target: Bnorgot with SDH Account : Password ! Target Folder : Connection Test pass	172.16 64.131     Fort:     973       If Off     On       dheryl       Baclup     /       Baclup     /       Jac
		Heat Cancel

2. Select the source share folder(s) which are desired to be backed up to the target server. You can also click on "Select All" from top right corner check box.

¥1	Notice: Click highlight row to enter the folder	
State 1	Select Folders to Backup	Select All
	🍓 Return to Parent Folder	
-	a anas_public	
	🕘 IVI USBCopy	
	🔐 🗂 "Modulė "Folder"	
	过 🖸 _NAS_Module	
	过 🔿 _NA5_Picture_	
	🔐 🗇 Tunes jmusic	
	过 🗵 mapihot	

3. Click "Next" and more setting appears. These are the as the settings for "Full backup"

10000	Task Name:	custombackup	
100	Bachup Type:	W Restme	C) Schedule
	Sync Type:	@ Sync	C incremental
All and a second se	Compressi	* Cff	(C) On
	Badsap NAS Configs:	ie on	(C) On
	Resume Partial Files:	· or	© On
	Hando Spane Files	⊛ off	© On
	Keep AQ, Settings:	e off	(Clion
	Log Location: Speed Limit: Timeout Limit: Litinable Schedur	600 Sec	et () to unimit()

4. Click "Finish" and the data guard task will appear in the list as shown below.

Tel: Name	Source Path	Saurce Politier	Tarpet Pulls	Last Run Taras	Bedita Type	Watue
il Calegory: inter	ie (1)					
nationbackup	KAD	USBODD, inight	172.10.54 121./84	c	Realtrie	Processing

From the task list, you can now see the newly added "customback01". This backup is setup as "schedule".

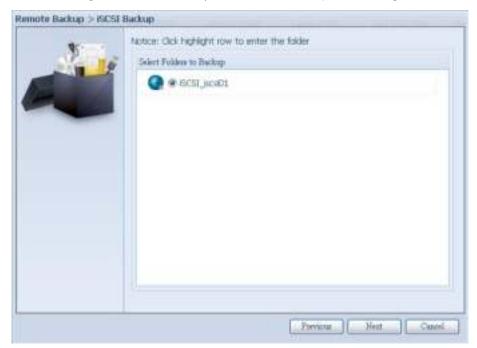
# • iSCSI Backup

If the source unit contains iSCSI volume, it can be backed up to the target unit as a single file. The procedure is the same as for the previous "Full backup" and "Custom backup", select "iSCSI backup" from data guard wizard.

1. Inputs the share folder name of the target sever where the source is going to backup. The sub-folder can be left as blank.

Remote Backup > ISESI	Backup		
1	Remote Target: Encrypt with SSH: Account 1 Password 1	172 16 64 191 © Off © O [dhery]	Port: [673] h   
	Target Folder 1 Convection Test par	(Eachup) /	а.
			Bent Curri

2. Select the iSCSI target volume which you wish to back up to the target server.



3. Click "Next" and more settings will appear. It is slightly differing from "Full backup" and "Custom backup". Only "Schedule" backup is supported with less options.

Remute Backup > ISCS	I Backup	
	Tak flame: Log Locatory Speed Linit: Trineout Linit: Leftenable Sche Time: Schedule:	Scsbachup DD5 W 0 MB/Sec( set 0 to unlimit) 600 Sec dule 00 Y = 00 W 0 Weskly # Daty 10 Monthly 10 Monthly
		Previous Fauch Cancel

4. Click "Finish" and the data guard task will appear in the list as shown below.

Task haroe	Source Path	Source Folder	Target Fath	Last Run Time	Badkup Type:	Status
Calegory: min	ate (D)					
milladup		COLUMNOS	172.18.64.131	la:	Schebarthah)	

From the task list, you can now see the newly added "iscsiback". This backup is setup as "schedule".

()	The source folder name will use iSCSI_+target volume name. So here it is displayed as "iSCSI_pmtest". pmtest is the iSCSI target name when the iSCSI target was created.
----	--

The iSCSI backup can see the result as below. The task "iSCSI\_pmtest" has backup to target 172.16.66.131 and share folder NAS\_Public with file "iSCSI\_pmtest".

名稱		修改日期	類型	大小
🕌 iSCSI_pmte	st	2012/6/28 下午 0	福寨資料夾	

#### Restore

To restore a backup from the backup task, simply select a task from the task list then click "Restore" from the function bar. The restore task will start to have the associated files/folders from the target server restored to the source.

Task Name	Source Path	Source Folder	Target Path	Last Run Time	Backup Type	Status
E Category: rei	note (3)					
	note (3)	*	172.16.66.11	2012/06/29	Realtime	Processing
3 Category: rei fulbackup01 iscsiback01	note (3) / /	* iSCSI_pmtest	172.16.66.11 172.16.66.11			Processing Finish

### Restore NAS Configuration

This is a useful feature if the system configuration needs to be restored to a brand new unit. Let's go thru the following example to see how it works.

The original source system has 3 RAID volume, "RAID", 'RAID10" and "RAID20", and has backed up the system configurations to the target server.

Cr	eate	Çi Edit	🔅 Global Ho	t Spare			
	Mas RAID	ID	RAID Level	Status	Disks Used	Total Capacity	Data Capacity
,	*	RAID	J	Healthy	10	929 GB	11.4 GB / 928.7 GB
5		RAID01	J	Healthy	9	929 GB	928.5 GB
5		RAID20	3	Healthy	8	929 GB	928.5 G8

The brand new source unit only has a 1 RAID volume 'RAID".

0	reate	()Edit	Global Ho	t Spare			
	Mas RAID	ID	RAID Level	Status	Disks Used	Total Capacity	Data Capacity
	*	RAID	3	Healthy	10	929 GB	11.4 GB / 928.7 GB

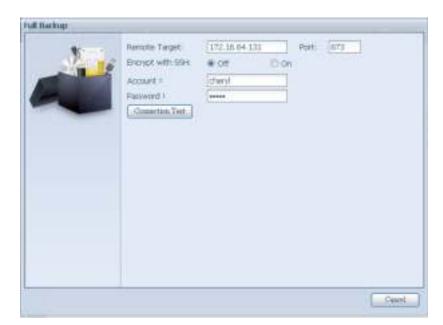
1. When adding a new backup task with "Full backup" or "Custom backup" and enabling the option "Backup NAS Config" as shows below, the source unit system configurations are then backed up to the designed path on the target system every time the task is executed.

	Tail: Name	Pulliciup	1
	Ballup Type:	· Risutzne	C) (ktracké
	Sync Type:	# time	O bezimental
the second	Compress	# cff	0 0n
	Beliup NAS Cordige	D.Off.	# On
	Autorne Partial Files	# Off	O On
	Hande Toarse Res.	# 0R	0.04
	Kiele AG, Settings	# off	() On
	Log Location:	125	
	Speed Linit: Timeout Linit: Insuble Schedu	600 Sec	() to unimit)
			Pressore    Fault    Cancel

2. Click on "Restore NAS Configuration" and the screen shown below will appear. Input the target server's IP address where the system configuration has been backed up, and necessary authentication info. Confirm by doing a "Connection Test" to make sure the communication between the source and the target server works.

Q'Add Otda	Glenow Rither	Pillie Stedon	Stor			Ellecture NAL Configuration
Task Name	Source Path	Source Folder	Target Path	Last Run Time	Bachup Type	5454

85



3. Click "Next" and a screen will appear as shown below. It has the listed available system configuration backup files. Select the one you want and click next. You also have the option to download the current system configuration before restoring from the backup file.

2	Attention Return config will reset al config. ) driverical current config file. Then a the lat.	tou can old, the under button to elect the config you want to restore for	m
	Config Hirs List		
	faintei 165550_00.14.F0-16-9F-9A_Mibaok	Ovite 2013/01/22 10:19:04	
	(4)	Car	8

4. After clicking "Next", a screen will appear as shown below. Listed on the left hand side, you will see the configuration backup details which contain the 3 RAID volumes. On the right hand side, you will see a list of single "RAID" volume. You may roll back to previous page to recall the example we have taken.

	Backup Folder - IIAID Mappi	ng	1
1	The under let shows the RAD inght column to change the set	etting in config file. You can imply click the ing.	
Carlos and	RAID setting in config file	RAED	1
-	RAD	II.A3D	
	R/432003	RAID	
	RA3020	#A3D	
			1
	System needs to be	eboot after configuration reitoring.	
			1

- 5. The backup configuration has different numbers of RAID volume than the current system (3 vs 1). It can be kept as the RAID volume mapping arranged by the system, then carry on to click "Finish". This means that all 3 RAID volumes configuration such as share folder etc. will all restore to the current unit in the RAID volume "RAID".
- 6. In other circumstances, if the current unit contains 2 RAID volumes, then it can be chosen from the left hand side of system backup configuration RAID volume list which RAID volume to map to the current system.

Let's see the following screen to make it clearer.

The current system has 2 RAID volumes, "RAID" and "RAIDa". Select the RAID volume from the backup configuration volume list which is going to be mapped to the RAID volume of the current system. Simply click on the right hand side of "RAIDa" and a drop down list will appear. Now you can choose which volume to map with. In this case the "RAID01" volume from the system backup configuration will be mapped to the volume "RAIDa" of the current unit. Once again, it means all the shares that were created in the volume "RAID01" will be restored to volume "RAIDa" of the current system.

1	Backup Folder - RAID Mappi The under lot shows the RAID - right column to change the set	etting in config file. You can simply click the	
-	RAID setting in config file	RAID	1
-	CLAS	RAD .	1
	RAID	RAIDe 💌	
	843029	RAID	
		RAIDe	

# 3.8.3 Data Guard (Local Backup)

The Thecus product provides complete backup solution between Thecus NAS systems as well as between folders of local systems.

Task Name	Source Path	Source Folder	Target Path	Last Run Time	Backup Type	Status

Remote Data backup	
Item	Description
Add	Add a new task.
Edit	Edit selected task.
Remove	Remove selected task.
Start	Click on start to start a scheduled scan task right away.
Stop	Stop the associated running task. Also can be used if a task has been setup as real-time, clicking "Stop"
	can terminate the running process. Simply click 'Start" to re-start the real-time operation.
Restore	Restore the associated task.
Log	Click to view the associated task process details.
Restore NAS Configuration	Click to restore the system configurations from a selected destination to a source unit.

From the Data Guard function list, select Add. The data backup setup wizard appears as below, click on "Local Backup":



The local backup has 6 different selection you can choose from.

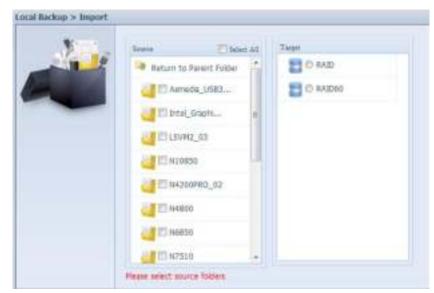


Local Data backu	p
ltem	Description
Import	This is associated with external devices which are added to the system such as USB disk. You can select a
	folder from an external device and import it to the NAS as a share folder.
Сору	Copy folder to folder or NAS folder to external device or external device to NAS folder. This backup is within
	folder level.
Realtime Backup	The task will be executed on the fly between the source and the target. In other word, any changes made
	at the source will sync to the destination immediately.
Schedule Backup	The task will be executed on schedule between the source and the target.
iSCSI Backup	The iSCSI volume will be backup to the destination as a single file.
iSCSI Import	The iSCSI file can be imported from the iSCSI backup back to the destination as an iSCSI volume.

 Import: click on "Import" and a screen will appear as below. If there is an external device installed on system such as USB disk, then it will be listed in the Source pane.

*	-	Teller
	🖉 Teners_USB Fish Dakl	C RAD C RADES
	_	
	Please select source folders	

Click on the associated external device and the contain folders will be listed. Select the folders that are going to be imported to the NAS and select the available RAID volume which is listed in Target pane.



In here, we have selected the "Intel Graphi..." and "N10850" folders from the external device and

imported them to the NAS under the RAID60volume.

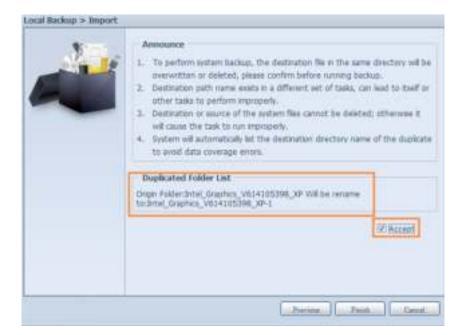
Sec.	lease 1	Talaci All	Tept
1	Ratum to Parant F	older	E G RAID
	Asreda_US8	1_	E REALED
-	Wintel_GraphL		
	USVM2_03		
	00 N10855		
	U_014200PH0_0	2	
	11 114800		
	UTI NEESO		
	ES N7510	-	
			Total share folder count (

Next, please select the path from the drop down list to save the log. Also, give the access permission whether these selected folders will be "Public" or not after the import.

*	Set Public	# off O ds	
	Log Locatient	Distal Graphes_VEL410 * HA5_Puble EXandy USBCODy USBCODy USBCOD Hodule_Solder_ _TA5_Picture_ andy_bcal eSATAHOD BCS1_scam502 Turnet_mask *	

Read the notes and check the "Accept" box for confirmation. If a share name already exists for the import, then the import will be rename automatically to "existing share name -1".

For esample, if the NAS RAID volume "RAID60" already has a folder named "Intel\_Graphics\_ V614105398\_XP", the import folder will then be rename to: "Intel\_Graphics\_V614105398\_XP-1".



Now, you will see in the data guard task list that you have created a task .

Task Illarter	Source Path	Source Folder	Target Path:	Last fluer Time	Backup Type:	Status
Category In	(1) ha					

And that the system has created 2 new share folders from the task just created.

Faster name in	RAD O	File System	Public .	Description
Calintel_Graphics_V614185398_30F	RADIE	0.04	798	
Intel_Graphics_V604185308_38F-1	84268	8204	yes	
» Waaese	RAEAU	axd4	784	
I CINAS_Public	RAD	wald	ves	

Copy: click on "Copy" and this screen appears.
 3 different options can be selected, folder to folder, folder to external device or external device to folder.

Local Bachup > Copy	3.5	RAID Folder -> RAID Folder To adact more than one folder to copy to a single destruction fold
		RAID Folder -> External Device
	*	External Device -> RAID Folder Crosse external device to sage to a angle fulder

Folder to Folder

•

•



Folder to external device

100 A	direct.	Tage
1	E ALD	🖉 () Genera, 258
	RA2060	

**External device to Folder** 



Let's take "Folder to External device" as an example. In the source pane, select the desired RAID volume and its associated folder list will appear; same method in the target pane for the associated external device.

Nici.	Source	Select All	Target	
	Return to	Parent Folder	Return to Parent Folder	^
	J 🔤 🗉 Intel	_Graphi	0 LSVM2_03	
-	Jintel	Graphi	📑 🔿 N10850	
	J 🗆 N108	350	0 N4200PRO_02	
	📑 🖾 R6an	dy	Candy 🕑 R6andy	-
			🥶 🛛 Realtek_LAN	
			🥶 🛛 W2008_W7	
			ggofactory	
			🧾 🔿 temp	

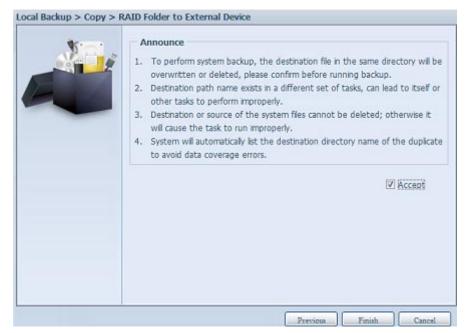
Select a folder from the source pane which is going to be copy over, then select in target pane it's destination.

2.01 -	Source	Select All	Target	
	Return to	Parent Folder	USVM2_03	- 1
	J 🔤 Intel	_Graphi	0 N10850	-1
-		_Graphi	Bandy	
			C Realtek_LAN	
	R6an	dy	@ W2008_W7	
			ggofactory	
			🤤 🕷 temp	
			🥶 🛇 xp3264-v5.71	
	1.			

Choosing the sync type, "Incremental" or 'Sync", and select the log path from the drop menu list.

W	Sync Type:	Incremental O Sync
	Log Location:	Intel Graphics_V614105398_XP
		Intel_Graphics_V61410 Intel_Graphics_V61410 N10850 NAS_Public R6andy USBCopy USBHDD _Module_Folder_ _NAS_Module_Source_ _NAS_Picture_ andy_local eSATAHDD iSCS1_iscsiv502 iTunes_music

Read the notes and check the "Accept" box for confirmation.



Now, you will see in the data guard task list that you have created a task.

Task Name	Source Path	Source Folder	Target Path	Last Run Time	Backup Type	Status
E Category: lo	cal (2)					
import	Generic_USB	Intel_Graphic	RAID60	2012/07/25	Import	Finish
CODY	RAID60	R6andy	Generic USB	2012/07/25	Copy	Finish

Realtime Backup: click on "Realtime Backup" and this screen will appear.
 2 different options can be selected from, folder to folder, folder to external device.

Let's take "Folder to Folder" backup for example. Select from the source pane the folder "NAS\_ Public", then select its destination in the target panefolder "R6andy".

94

Source		Target
Return to Parent Folder	-	Return to Parent Folder
INAS_Public		Jntel_Graphi
USBCopy		🕘 🗇 Intel_Graphi
Module_Folder_		🕘 🔿 N10850
<pre></pre>	E	e R6andy
C_NAS_Picture_		
🕘 💿 andy_local		
🕘 🔿 (Tunes_music		
Snapshot		

Next, fill in the task name and related settings.

W	Task Name:	realtimebac	k		
No I	Sync Type:	Increment	ital (	🗇 Sync	
	Backup Symbolic Link:	Off	(	🕑 On	
	Log Location:	Intel_Graph	ics_V61410539	8_XP ¥	
	Filter	A SAN		one direct	
	File Size				
		¥	GB 💌		
	Include File Ty	and the second se	Provide State		
	Document	Picture	Video	Music	
	Other				
	Exclude File Ty	pe			
		Picture	Video	Music	
	Other				

Realtime Backup	
ltem	Description
Task Name	Input the task name, length limited to 4~12 characters.
Sync Type	Select "Incremental" or "Synchronize".
Backup Symbolic Link	Choose to backup symbolic link which is included in the source.
Filter	The filter can be set to be executed only in certain circumstances. If none of them has been selected, it
	will do the real time backup from the source to the destination in full.
	File size: From xx ~ xxx
	If $xx=1$ and $xxx$ blank then only file size > $xx$ will execute real time backup.
	If xx=1 and xxx=2 then only size in between xx and xxx will execute real time backup.
	If xx blank and $xxx=2$ then only file size < xxx will execute real time backup.
	li XX blatik alid XXX—2 then only the size < XXX will execute fear time backup.
	Include File Type: Only the associated file format will do the real time backup.
	Exclude File Type: The excluded file format won't be included in the real time backup.
	For document file format: doc, xls, pdf, docx, xlsx, txt, ppt, pptx, html, htm
	For picture file format: jpg, bmp, tif, png, pbm, tga, xar, xbm
	For video file format: avi, mpg, mp4, mkv, fli, flv, rm, ram
	For music file format: mp3, wav, wma, acc, dss, msv, dvf, m4p, 3gp, amr, awb
	User defined can be input in other box.

Read the notes and check the "Accept" box for confirmation.

**	Announce
	<ol> <li>To perform system backup, the destination file in the same directory will be overwritten or deleted, please confirm before running backup.</li> <li>Destination path name exists in a different set of tasks, can lead to itself or other tasks to perform improperly.</li> <li>Destination or source of the system files cannot be deleted; otherwise it will cause the task to run improperly.</li> <li>System will automatically list the destination directory name of the duplicate to avoid data coverage errors.</li> </ol>
	P Accept

Now, you can see in the data guard task list that your created task is listed. The task status will say "Processing" untill the "Stop" button is pressed.

ADD CEDI	t 🤤 Remove 🕑 Star	stop Skest	tore Larog		- Re	store NAS Configuration
Task Name	Source Path	Source Folder	Target Path	Last Run Time	Backup Type	Status
E Category: lo	cal (3)					
import	Generic_USB	Intel_Graphic	RAID60	2012/07/25	Import	Finish
сору	RAID60	R6andy	Generic_US8	2012/07/25	Сору	Finish
realback01	RAID	NAS Public	RAID60/R6andy	2012/07/25	Realtime	Processing

 Schedule Backup: click on "Schedule Backup" and this screen will. 2 different choices can be selected from, folder to folder, folder to external device.
 Let's use "Folder to External device" backup for our example. From the NAS volume RAID in

Let's use "Folder to External device" backup for our example. From the NAS volume RAID in the Source pane select the folder "NAS\_Public", then in the target pane select the external USB disk folder "N10850".

Source	Select All	Target	
Return to Parent	Folder	😽 Return to Parent Folder	1
V NAS_Public		0 LSVM2_03	
USBCopy		🧾 🏽 N10850	
Module_Fo	ider_	0 N4200PRO_02	=
Inas_Modu	le E	C R6andy	
NAS_Pictur	re_	🕘 🔿 Realtek_LAN	
🕘 🖾 andy_local		🚭 © W2008_W7	
🧾 🗇 iTunes_mus	ic	ggofactory	۲
snapshot	-	📴 🔿 temp	,
	Return to Parent	Return to Parent Folder	Image: Constraint of the constraint

Next, fill in the task name and related settings.

Schedule Backup	
ltem	Description
Task Name	Input the task name, length limited to 4~12 characters.
Create Sub-folder	If you choose to create a sub-folder, then it will use the task name as folder name then copy the source
	under it. Or it will copy the source to the same level as the destination.
Sync Type	Select "Incremental" or "Synchronize".
Log Location	Select from the drop down list where the task log will be stored.
Enable Schedule	Click to enable. If it is not checked, the task won't start unless you select the associate task and click "Start"
	from the task list page.
Time	Specify the time for the backup to start.
Schedule	Can choose daily, weekly or monthly.

**	Task Name:	shdback01	
	Create Subfolder:	Oreate(named as task      name)	Don not create(directly ackup to target)
2	Sync Type:	Incremental	) Sync
	Log Location:	Sandy 💌	
	Enable Sche	dule	
	Time:	00 🛩 : 00 🛩	
	Schedule:	O Monthly O Weekly	O Daily
		00 👻 Monday 👻	
	- 1		

Read the notes and check the "Accept" box for confirmation.

<ol> <li>To perform system backup, the destination file in the same directory will be overwritten or deleted, please confirm before running backup.</li> <li>Destination path name exists in a different set of tasks, can lead to itself or other tasks to perform improperly.</li> <li>Destination or source of the system files cannot be deleted; otherwise it will cause the task to run improperly.</li> <li>System will automatically list the destination directory name of the duplicat to avoid data coverage errors.</li> </ol>
Rccent

Now, you will see in the data guard task list that you have created a task.

	In the second second		and the second second			
Task Name	Source Path	Source Folder	Target Path	Last Run Time	Backup Type	Status
E Category: lo	cal (4)					
import	Generic_USB	Intel_Graphic	RAID60	2012/07/25	Import	Finish
сору	RAID60	R6andy	Generic_USB	2012/07/25	Сору	Finish
realback01	RAID	NAS_Public	RAID60/R6andy	2012/07/25	Realtime	Processing
shdback01	RAID	NAS Public	Generic USB	2012/07/26	Schedule	Finish

5. iSCSI Backup: click on "iSCSI Backup" and screen appear as below. It can be backup to two different storage pool, iSCSI to folder, iSCSI to external device.



Let's take example to have "iSCSI to Folder" backup, from existed iSCSI volume "iSCSI\_iscsiv502" to volume RAID folder "andy\_local".

The source pane listed "iSCSI\_iscsiv502" and "iSCSI\_iscsiv50" where are iscsi volume has existed in this system with name "iSCSI\_+iscsi target volume name".

5	Source	Target	
	SCSL iscsiv502	Return to Parent Folder	^
	SCSI_iscsiv50	INAS_Public	
		USBCopy	
		C	
		O_NAS_Module	E
		O_NAS_Picture_	1
		e andy_local	1
		🕘 🔿 iTunes_music	
		Image: State of the state of	

Next, provide the task name and where the task log will store.

W	Task Name:	iscsiback01
	Log Location:	NAS_Public USBCopy USBHDD _Module_Folder_ _NAS_Picture_ andy_local eSATAHDD ISCSI_iscs/S02 ITunes_music snapshot

Reading the note and check on "Accept" for confirmation.

99

Announce     To perform system backup, the destination file in the same directory will be     overwritten or deleted, please confirm before running backup.     Destination path name exists in a different set of tasks, can lead to itself or     other tasks to perform improperly.     Destination or source of the system files cannot be deleted; otherwise it     will cause the task to run improperly.     System will automatically list the destination directory name of the duplicate
to avoid data coverage errors.

task list will have created task listed. To start the iSCSI volume backup, select the task and click "Start" from task bar.

Task Name	Source Path	Source Folder	Target Path	Last Run Time	Backup Type	Status
Sector Sector						
Category: lo	cal (3)					
mport	silconpowe	NAS_Public, u	RAID1	2012/07/23	Import	Finish
			DATD1/MAC D	2012/07/23	Conv	Finish
сору	raid0iscsi0	msvs2010	KAIDI/NA5_P	2012/0//25	copy	( I HOH

Once "Start" click, the associated iSCSI volume will not allow to I/O during backup processing. And the task status will change to 'Processing".

Q Add GEdt GRenove 'F Start 'F GRestore 'Blug GRestore 146 Co					store NAS Configuratio
Source Path	Source Folder	Target Path	Last Ron Time	Backup Type	Statue
cal (3)		- And			
slicon_powe	NAS_PUBIC, MAL	RAIDL	2012/07/23	Import	Finish
raid0iscsi0	mivii2010	RAID1/HA5_P	2012/07/23	Copy	Finan
	f5CST_iscsiv502	RAID/andy_local		5CSI	Processing
	Source Path cal (3) sliconpowe	Source Path Source Folder all (7) silicon_powe NA5_Public, u rad0iscsi0 mws2010	Source Path Source Folder Target Path all (3) silicon_powe NA5_Puthic, u, RAID1 rad0iscsi0 mws2010 RAID1/IIA5_P	Source Path Source Folder Target Path Last Run Time cal (8) silicon_powe NAS_Public, u RAIDL 2012/07/23	Source Path         Source Folder         Target Path         Last Ron Time         Backup Type           call (8)         siliconpowe         NA5_Public, u         RAID1         2012/07/23         Import           raddlessi0         mwie2010         RAID1/IIA5_P         2012/07/23         Copy

States change to "Finish" after task complete.

🕜 Add 🏀 Edit	e 😂 Remove 🕞 Star	t 🖲 Stop 😗 Rest	ore 🕲 Log		BR	store NAS Configura
Task Name	Source Path	Source Folder	Target Path	Last Run Time	Backup Type	Status
Category: lo	cal (3)					
import	silconpowe	NAS_Public, u	RAID1	2012/07/23	Import	Finish
сору	raid0iscsi0	msvs2010	RAID1/NAS_P	2012/07/23	Сору	Finish
iscsiback01		iSCSI_iscsiv502	RAID/andy_local	2012/07/26	ISCSI	Finish

From the RAID volume folder 'andy\_local', it has backup iSCSI volume file stored. This backup iSCSI volume file is needed while it required import to storage. Next topic will describe about this.

andy_local or	1 N8900pm (172.16.64.191)
File Edit View	Favorites Tools Help
G Back 🔹 🐑	) · 🏂 🔎 Search 🍋 Folders 💷 ·
ddress 🥝 \\172.1	.6.64.191\andy_local
File and Folder	Dest_best of
WED	File Edit View Favorites Tools Help
Other Places	🚱 Back 🔹 🕥 - 🏂 🔎 Search 🌔 Folders 🛄 -
😼 N8900pm (	Address in 1/172.16.64.191\andy_locally5C51_iscsiv502
My Docume Shared Doc My Comput	File and Folder Tasks (8) File

6. iSCSI Import: click on "iSCSI Import" and screen appear as below.

It can be imported from two different storage pools, folder to iSCSI or external device to iSCSI. It is depend on where iSCSI volume has backup to.



Let's take example to import "RAID folder to iSCSI" which is the iSCSI volume we have backup earlier to RAID volume folder andy\_local than import to volume RAID.

0	Source		Target
	Return to Parent Fold	er 🔺	🔡 🗇 RAID5
	O NAS_Public	E RAID	
	USBCopy		RAID60
	Unduke_Folder_		
	O_NAS_Module	. <sub>E</sub>	
	O_NAS_Picture_	Source	
	e andy_local		eturn to Parent Folder
	Jo iTunes_music		SCSI isosiv502
	🕘 🔘 snapshot	-	and the former of strange of the following strategy of the following s
			1

Next, provide where the task log will store.



Reading the note and check on "Accept" for confirmation.



Now, from the data guard task list will have created task listed.

	Remove 🕞 Start					store NAS Configu
Task Name	Source Path	Source Folder	Target Path	Last Run Time	Backup Type	Status
E Category: los	al (5)					
import	Generic_US8	Intel_Graphic	RAID60	2012/07/25	Import	Finish
сору	RAID60	R6andy	Generic_USB	2012/07/25	Copy	Finish
realback01	RAID	NAS_Public	RAID60/R6andy	2012/07/26	Realtime	Lose target
shdback01	RAID	NAS_Public	Generic_USB	2012/07/26	Schedule	Finish
import_iscsi	RAID/andy_local	iSCSI_iscsiv502	RAID	2012/07/26	iSCSI Import	Finish

# 3.8.4 ACL Backup and Restore

The ACL backup and restore feature enables the system ACL (Access Control List) to be backed up on the RAID volume based to other location and restored if needed.

Let's look at the example bellow to see how it works.

We have one system with a RAID volume "RAID", select "Backup" to backup this RAID volume's ACL to other location. The current RAID volume "RAID" has share folder as listed on right hand screen shot.

-ALL Backspy's	test une	O AN OFAT OF
A IL Sontioc:	🖗 Badio p 🕐 Rostono	Folder name IP
sauto e	RAIL ··· Ric Statement	P CANAS, Public
and a fi	(ba)	In Colorado y
Robursko	H 1 Apples A IL to all contoined sub follows as the . New externel este offer 1 the 1	COLUSERCO     MAS_Picture_
<ul> <li>A state of the second se</li></ul>	then Willige Total is the field of hydrogenerative measures a meast finance of the maximum memory finance for work of measurements and the finance filled for the filled Community work could be store applied in a filled with a meast react with a measure of a stap is written as expressions as some filled with	[I] _NAS_Picza_     [I] _NAS_tworky_upload_     [I] _P3P_DownLoad_     [I] backup     [I] backup     [I] funes_munc

For the ACL restore, it can be restored in the same system or used in another unit. For example, let's restore the ACL backup file to another unit. This unit has a RAID volume "RAIDpm" with share folders as listed on right hand screen shot.

		Shared Folders
Atl Rackup/	Resture	0.00 0 0 0 0 0
AG. Serves	O tackap # Radare	Folder name in
Rad Name:	Allym w. He lyterada	e 🖾 neyroc
tokadi	C taqui bier al la	in 🛄 udatuda
Recurrent:	[1] ( Applies ALL to all contarred sub-histers as well. Way extend restanding time. )	2 Linibrary
[ See ]		> Canaswebsite
NI.		D 🛄 (Tunés_music
Generation		> 🛄 Hobik Folder
<ul> <li>ACL restoratz</li> <li>Recurster ACL</li> <li>White the ICA</li> </ul>	uit be heathyritegneted. ar hone a 255 Sk rytefann can amly les applied to another 275 Sk existen. creatoration floes not apply to the USBADC/solineb fibble. 21 partition is restoring tasking up ACL, for follow will not be allown anther the USL minatule convert the weeker to another tables.	> D MAL Module_Source

After inputting the ACL backup file and clicking the "Next" button, the system will show another screen to list the matched folders in between the backup file and this RAID volume. Just select the desired folders for the ACL restore.



The ACL backup will only back to share folder level; it does not apply to its sub-layer. If recursive has been checked during the ACL restoration, it will apply to all of its sub-folders with the same permission.

# 3.8.5 Data Burn

The data burn is featured to support 3 different modes of data burning for files/folders to and from image file and physical optical disk.

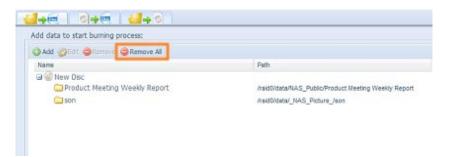
The 3 different modes are "Write Files/folders to disc", "Write image to disk" and "Write files/folders to image".

0.44 0 0	process:		
	-	60	
Tiery Dec			

1. Write Files/folders to disc

Add youte Re/folders to dec	and a second sec	
liane	E. Contraction of the	
C New Disc		
Add data to start humang pro-	0996	
		Diter ( bed)
Big HAS, Public     B	rame I NAS_Jubix UBRCoy USEADO I USEADO I USEADO I NAS_PADAR, I N	
	C tet	

- a. Click the Add button and the NAS share list appears.
- b. Select files/folders which you would like to burn. All of the selected folders/files will be seen under the disc label name "New Disc". The disc label name can be changed by clicking on it and press "Edit" from menu bar. The selected folders/files also can be removed by clicking on them and then pressing "remove" or "remove all" for all selected items.



- c. Select from the installed USB burning devices. Please click the "detect disc" button to check the status once the disc is inserted.
- d. Select the burning speed from the drop down list.

Disc:	MSI WIND DRIVE UO882 V Detect disc
Disc information:	CD-R (Empty), Disc space:702.82 MB
Speed:	24x ¥
Disc data verification:	

- e. Select whether disc data verification is required or not.
- f. Click "Burn" to start disc burning.
- 2. Write image file to disc.

150 fec	Write maps Ne to due	(Dismost)
Dec		and a second
Dat information:	University	
50940		
Dwc.data verification:	0	

a. Click "Browser" and the NAS share list will appear to locate the desired image file to burn.

	💷 View 🔻 🔍 Search :	
NAS_Public     Alhet 6600PR0     Product Meeting We     dom_trepair_log     USBCopy     USBCopy     USBHDD    NAS_Module_Folder_    NAS_Module_Folder_    NAS_Module_Source_    NAS_NODULE_Source_    NAS_NODULE_Source_    NAS_NODULE_Source_    NAS_NODULE_Source_    NAS_NODULE_Source_    NAS_NODULE_SOURCE_SOUR	<ul> <li>name</li> <li>Allnet 6600PRO</li> <li>Product Meeting Weekly Report</li> <li>XenServer-6.0.0-install-cd.iso</li> <li>dom_backup_log</li> <li>dom_repair_log</li> <li>productmeetingimages.iso</li> </ul>	

b. Select the ISO file.

	<u>                                     </u>	
ISO file:	id0/data/NAS_Public/XenServer-6.0.0-install-cd.iso	Browse

- c. Select from the installed USB burning devices. Please click the "detect disc" button to check the status once the disc is inserted.
- d. Select the burning speed from the drop down list.
- e. Select whether disc data verification is required or not.
- f. Click "Burn" to start disc burning.
- 3. Create image file from files/folders

ISO file:	Create image file from file/folders Browse
Disc:	Select V Detect_disc_
Disc information:	Unknown
Speed:	
Disc data verification:	

- a. Click the Add button and the NAS share list will appear.
- b. Select the files/folders which you would like to burn. All of the selected folders/files will appear under the disc label name "New Disc". The disc label name can be changed by clicking on it and pressing "Edit" from the menu bar. The selected folders/files also can be removed by clicking on them and pressing "remove" or "remove all" for all the selected items.



- c. Input the path where the ISO file is going to be stored, you can press the "Browse" button to have the share list appear.
- d. Input the ISO file name for burned image file.
- e. Click "Burn" to start the ISO file burning.

The data burn does not support rewriteable media if it has been burned with left space. On the other hand, the used rewriteable media will be erased first then carry on with burning.

# 3.9 External Devices

The Thecus IP storage supports printer server and UPS via USB interface. The integrated Print Server allows you to share a single USB printer with all users on the network. For the UPS, Thecus IP storage support via USB, Series and Network interface. The following section shows you how.

# 3.9.1 Printers

From the External Devices 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.

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Manufa Inter	Nº
Kocel	N/4
that is:	No Parties to an en
Rome-bicod, montiment guolebi	Press
Restart printe iso « co	Ditte:

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 Thecus IP storage 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:// Thecus IP storage IP\_ADDRESS:631/printers/usb-printer" into the URL field.
- 7. Your Windows system will ask you to install drivers for your printer. Select the 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 that if a multi-function (all-in-one) printer is attached to the Thecus IP Storage, 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.

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E Provense E Provense E Provense	4		natta Localtan Historetti (P) Document Vidar	Mular.
Mara =		Vew Set by Group by Dark Str Advant Trans	04-2	

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

(no	ose a local or network printer
*	Add a local printer Use this option only if you don't have a USB printer. (Windows automatically installs USB printers when you plug them in.)
•	Add a network, wireless or Bluetooth printer Make use that your computer's convected to the network, or that your Bueton ar availest printer's turned on.
-	

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

Searching for available pr	rinters_
	(Jun

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.

👾 Add Drietar	
Find a printer by name or TCP/IP address	
C Brogae for a pirtar	
· genet a shared printer by name	
http:///Texa.jub/JP=631(printers).sb-printer	Rouse
Example: "(computernane/proternane) or http://camputernane/printers/proternane/proter	
Add a privitar using a TCP/JP address or hostname.	
	Tiet Cancel

Type http://<Thecus\_NAS>:631/printers/usb-printer in the box, where <Thecus\_NAS\_IP> is the IP address of Thecus IP storage. Click Next.

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

Manufacturer		Firsten	1
HP IBM Infotec Konica INDNICA MINOL TA	•	HP Desk Mr 615C HP Desk Mr 615C HP Desk Mr 640C-642C-648C HP Desk Mr 6500 Series HP Desk Mr 6507 10 11 11	

7. Windows will attempt to connect to the printer.

Windows Printer Installation	
Connecting to	
http://172.16.66.64:631	/printers/usb-printer
2	
<u>.</u>	
	Cancel

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.

🕑 👾 Add Parter	-
You've successfully added usb-printer on http://172.16.66.64:631	
To see if the pentar is nonling correctly, or to one traubled-booting information for the printer, print is test page.	
Finish Cancel	I.

# 3.9.2 Uninterrupted Power Source

From the External Devices menu, choose the Uninterrupted Power Source item and the UPS Setting screen appears. Make any changes you wish, and press Apply to confirm changes.

UPS Settings			
UPS Monitoring:	O Enable	III Disable	
Remote UPS Monitoring:	() Enable	🐨 Osable	
Remote UPS IP:			
Manufacture:	Powercom 💌		
Model:	34. *		
Battery Status: Power:	"product has been tested for compatibility N/A N/A		
Seconds between power	falure and first notification	(H)	
Seconds between subsec	uent power failure notifications		30.6
Shutdown the system wi	ten the battery charge is less than	1	

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

UPS Setting	
ltem	Description
UPS Monitoring	Enable or disable UPS monitoring.
Remote UPS Monitoring	Enable or disable Remote UPS monitoring.
Remote UPS IP	Input the IP address of the NAS that the UPS device is connected to via USB or RS232.Input the
	IP address of your network UPS.
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 fail-	Delay between power failure and first notification in seconds.
ure and first notification	
Seconds between subsequent	Delay between subsequent notifications in seconds.
power failure notifications	
Shutdown the system when	Amount of UPS battery remaining before system should auto-shutdown.
the battery charge is less than	
Apply	Press <b>Apply</b> to save your changes.

# Appendix A: Customer Support

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

#### http://www.thecus.com/sp\_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/sp\_tech.php

For Sales Information you can e-mail us at:

sales@thecus.com

# Thank you for choosing Thecus!



# Appendix B: 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 IP storage 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 disks are of the same size, and used in RAID, Thecus IP storage disk usage percentage is

# listed below:

RAID Level	Percentage Used
RAID 0	100%
RAID 1	1/n x 100%
RAID 5	(n-1)/n x 100%
RAID 6	(n-2)/n x 100%
RAID 10	50%
JBOD	100%

n: HDD number

# Appendix C: 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 Thecus IP storage integrate itself with the existing ADS in an office environment. This means the Thecus IP storage is able to recognize your office users and passwords on the ADS server. Other major benefits ADS support provides include:

- 1. Easy integration of Thecus IP storage into the existing office IT infrastructure The Thecus IP storage 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 Thecus IP storage.
- 2. Centralized user/password database The Thecus IP storage does not maintain its own copy of the user/password database. This avoids data inconsistency between Thecus IP storage and other servers. For example, without ADS support, an administrator might need to remove a specific user privilege on Thecus IP storage and each individual server. With ADS support, the change on an ADS server is known to all of its ADS members.

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