

# **QNAP Turbo NAS**

## **Software User Manual**

### **(Version: 4.1)**

This manual is applicable to the following Turbo NAS models: TS-110, TS-112, TS-112P, TS-119, TS-119P+, TS-119P II, TS-120, TS-121, TS-210, TS-212, TS-212-E, TS-212P, TS-219, TS-219P, TS-219P+, TS-219P II, TS-220, TS-221, TS-239 Pro, TS-239 Pro II, TS-239 Pro II+, TS-259 Pro, TS-259 Pro+, HS-210, TS-269H, TS-410, TS-410U, TS-412, TS-412U, TS-419P, TS-419P+, TS-419P II, TS-419U, TS-419U+, TS-419U II, TS-420, TS-420U, TS-421, TS-421U, TS-439 Pro, TS-439 Pro II, TS-439 Pro II+, TS-439U-RP/SP, TS-459 Pro, TS-459 Pro II, TS-459 Pro+, TS-459U-RP/SP, TS-459U-RP+/SP+, TS-509 Pro, TS-559 Pro, TS-559 Pro+, TS-559 Pro II, TS-639 Pro, TS-659 Pro, TS-659 Pro+, TS-659 Pro II, TS-809 Pro, TS-809U-RP, TS-859 Pro, TS-859U-RP+, TS-859 Pro+, TS-859U-RP, SS-439 Pro, SS-839 Pro.

© 2015 QNAP Systems, Inc. All Rights Reserved.

# Table of Contents

<b>1. Notice .....</b>	<b>5</b>
1.1 Legal Notice and Disclaimer.....	6
1.2 Regulatory Notice.....	8
1.3 Document Annotation.....	10
1.4 Safety Information and Precautions .....	11
<b>2. Getting Started.....</b>	<b>12</b>
2.1 Hardware Installation .....	13
2.1.1 Hard Disk Drive Compatibility List.....	14
2.1.2 Checking System Status.....	15
2.2 Software Installation.....	19
2.2.1 Online Installation .....	20
2.2.2 Cloud Installation .....	21
2.2.3 CD Installation .....	22
2.3 Getting Utilities.....	23
2.4 Connecting to NAS Shared Folders.....	24
2.4.1 Windows .....	25
2.4.2 Mac or Linux.....	26
2.5 Connecting to NAS by Web Browser.....	27
2.6 Migrating from Old NAS.....	28
<b>3. QTS Basics and Desktop.....</b>	<b>35</b>
3.1 Introducing QTS.....	36
3.2 Using QTS Desktop.....	38
<b>4. System Settings.....</b>	<b>43</b>
4.1 General Settings.....	44
4.2 Storage Manager.....	47
4.2.1 Volume Management.....	48
4.2.2 RAID Management.....	50
4.2.3 Hard Disk S.M.A.R.T.....	63
4.2.4 Encrypted File System .....	64
4.2.5 iSCSI.....	68
4.2.5.1 Portal Management.....	69
4.2.5.2 Target Management.....	72
4.2.5.3 Advanced ACL.....	79
4.2.5.4 LUN Backup.....	80
4.2.6 Virtual Disk .....	83
4.3 Network .....	85
4.4 Security .....	96

4.5 Hardware.....	98
4.6 Power.....	101
4.7 Notification.....	104
4.8 Firmware Update.....	106
4.9 Backup/Restore.....	108
4.10 External Device.....	110
4.10.1 External Storage.....	111
4.10.2 USB Printer.....	114
4.10.2.1 Windows 7.....	116
4.10.2.2 Windows XP.....	117
4.10.2.3 Mac OS 10.6.....	118
4.10.2.4 Mac OS 10.5.....	119
4.10.2.5 Mac OS 10.4.....	120
4.10.2.6 Linux (Ubuntu 10.10).....	121
4.10.3 UPS.....	122
4.11 System Status.....	125
4.12 System Logs.....	127
<b>5. Privilege Settings.....</b>	<b>130</b>
5.1 Users.....	131
5.2 User Groups.....	135
5.3 Shared Folders.....	136
5.4 Quota.....	145
5.5 Domain Security.....	146
5.5.1 Joining NAS to Active Directory (Windows Server 2003/2008/2012).....	147
5.5.2 Connecting NAS to an LDAP Directory.....	150
<b>6. Network Services.....</b>	<b>154</b>
6.1 Win/Mac/NFS.....	155
6.2 FTP.....	159
6.3 Telnet/SSH.....	161
6.4 SNMP Settings.....	162
6.5 Service Discovery.....	164
6.6 Network Recycle Bin.....	165
6.7 Qsync.....	167
<b>7. Applications.....</b>	<b>176</b>
7.1 Station Manager.....	177
7.2 iTunes Server.....	180
7.3 DLNA Media Server.....	181
7.4 Multimedia Management.....	183
7.5 Transcode Management.....	185
7.6 Web Server.....	188

7.6.1 Virtual Host.....	192
7.7 LDAP Server.....	194
7.8 VPN Service.....	196
7.9 MySQL Server.....	200
7.10 Syslog Server.....	202
7.11 Antivirus.....	205
7.12 RADIUS Server.....	209
7.13 TFTP Server.....	211
<b>8. QNAP Applications .....</b>	<b>213</b>
8.1 Backup Station.....	214
8.1.1 Backup Server.....	215
8.1.2 Remote Replication .....	218
8.1.3 Cloud Backup.....	225
8.1.4 External Backup.....	227
8.2 myQNAPcloud Service.....	232
8.3 File Station.....	236
8.4 Video Station.....	246
8.5 Photo Station.....	255
8.6 Music Station.....	268
8.7 Download Station.....	275
8.8 HybridDesk Station.....	283
8.9 Surveillance Station .....	293
8.10 App Center .....	297
<b>9. Use the LCD Panel.....</b>	<b>300</b>
<b>10. GNU GENERAL PUBLIC LICENSE.....</b>	<b>306</b>

## 1. Notice

- [Legal Notice and Disclaimer](#)<sup>[6]</sup>
- [Regulatory Notice](#)<sup>[8]</sup>
- [Document Annotation](#)<sup>[10]</sup>
- [Safety Information and Precautions](#)<sup>[11]</sup>

## **1.1 Legal Notice and Disclaimer**

Thank you for choosing QNAP products! This user manual provides detailed instructions of using the Turbo NAS (network-attached storage). Please read carefully and start to enjoy the powerful functions of the Turbo NAS!

- The Turbo NAS is hereafter referred to as the NAS.
- This manual provides the description of all the functions of the Turbo NAS. The product you purchased may not support certain functions dedicated to specific models.

### **Legal Notices**

All the features, functionality, and other product specifications are subject to change without prior notice or obligation. Information contained herein is subject to change without notice.

QNAP and the QNAP logo are trademarks of QNAP Systems, Inc. All other brands and product names referred to are trademarks of their respective holders.

Further, the ® or ™ symbols are not used in the text.

### **Disclaimer**

Information in this document is provided in connection with QNAP® products. No license, express or implied, by estoppels or otherwise, to any intellectual property rights is granted by this document. Except as provided in QNAP's terms and conditions of sale for such products, QNAP Assumes no liability whatsoever, and QNAP disclaims any express or implied warranty, relating to sale and/or use of QNAP products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright or other intellectual property right.

QNAP products are not intended for use in medical, life saving, life sustaining, critical control or safety systems, or in nuclear facility applications.

In no event shall QNAP Systems, Inc. (QNAP) liability exceed the price paid for the product from direct, indirect, special, incidental, or consequential damages resulting from the use of the product, its accompanying software, or its documentation. QNAP makes no warranty or representation, expressed, implied, or statutory, with respect to its products or the contents or use of this documentation and all accompanying software,

and specifically disclaims its quality, performance, merchantability, or fitness for any particular purpose. QNAP reserves the right to revise or update its products, software, or documentation without obligation to notify any individual or entity.

Back up the system periodically to avoid any potential data loss. QNAP disclaims any responsibility of all sorts of data loss or recovery.

Should you return any components of the NAS package for refund or maintenance, make sure they are carefully packed for shipping. Any form of damages due to improper packaging will not be compensated.

QNAP, QNAP logo, QTS, myQNAPcloud and VioStor are trademarks or registered trademarks of QNAP Systems, Inc. or its subsidiaries. Other names and brands may be claimed as the property of others.

## **1.2 Regulatory Notice**

### **FCC Notice**

QNAP NAS comply with different FCC compliance classes. Please refer the Appendix for details. Once the class of the device is determined, refer to the following corresponding statement.

---

#### **FCC Class A Notice**

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

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Modifications: Any modifications made to this device that are not approved by QNAP Systems, Inc. may void the authority granted to the user by the FCC to operate this equipment.

#### **FCC Class B Notice**

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

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed



and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician for help.

Modifications: Any modifications made to this device that are not approved by QNAP Systems, Inc. may void the authority granted to the user by the FCC to operate this equipment.

## CE Notice

QNAP Turbo NAS models comply with different CE compliance classes. Please refer to the table below for details.

FCC	CE	NAS Models
Class A	Class A	TS-EC1679U-RP, TS-EC1279U-RP, TS-EC879U-RP, TS-1679U-RP, TS-1279U-RP, TS-1270U-RP, TS-1253U-RP, TS-1253U, TS-879U-RP, TS-870U-RP, TS-853U-RP, TS-453U-RP, TS-1079 Pro, TS-879 Pro, TS-853U, TS-453U, TS-451U, TVS-871U-RP, TVS-1271U-RP
Class B	Class B	TS-853S Pro, TS-453S Pro, TS-870 Pro, TS-853 Pro, TS-670 Pro, TS-653 Pro, TS-470 Pro, TS-453 Pro, TS-253 Pro, TS-431+, TS-231+, TS-451S, TS-870, TS-851, TS-670, TS-651, TS-470, TVS-863+, TVS-863, TVS-663, TVS-463, TVS-471, TVS-671, TVS-871, TS-451, TS-431, TS-251, TS-251C, TS-231, TS-131, TS-269H, TS-212P, TS-112P, HS-251, HS-210, TS-453mini

### 1.3 Document Annotation

#### Annotations in this document

- **Warning:** This indicates the instructions must be strictly followed. Failure to do so could result in injury to human body or death.
- **Caution:** This indicates the action may lead to disk clearance or loss OR failure to follow the instructions could result in data damage, disk damage, or product damage.
- **Important:** This indicates the information provided is important or related to legal regulations.

## 1.4 Safety Information and Precautions

1. The NAS can operate normally in the temperature of 0°C–40°C and relative humidity of 0%–95%. Please make sure the environment is well-ventilated.
2. The power cord and devices connected to the NAS must provide correct supply voltage (100W, 90–264V).
3. Do not place the NAS in direct sunlight or near chemicals. Make sure the temperature and humidity of the environment are in optimized level.
4. Unplug the power cord and all the connected cables before cleaning. Wipe the NAS with a dry towel. Do not use chemical or aerosol to clean the NAS.
5. Do not place any objects on the NAS during normal system operations and to avoid overheat.
6. Use the flat head screws in the product package to lock the hard disk drives in the NAS when installing the hard drives for proper operation.
7. Do not place the NAS near any liquid.
8. Do not place the NAS on any uneven surface to avoid falling off and damage.
9. Make sure the voltage is correct in your location when using the NAS. If unsure, please contact the distributor or the local power supply company.
10. Do not place any object on the power cord.
11. Do not attempt to repair the NAS in any occasions. Improper disassembly of the product may expose you to electric shock or other risks. For any enquiries, please contact the distributor.
12. The chassis (also known as rack mount) NAS models should only be installed in the server room and maintained by the authorized server manager or IT administrator. The server room is locked by key or keycard access and only certified staff is allowed to enter the server room.

### **Warning:**

- Danger of explosion if battery is incorrectly replaced. **Replace only with the same or equivalent type recommended by the manufacturer.** Dispose of used batteries according to the manufacturer's instructions.
- **Do NOT touch the fan inside the system** to avoid serious injuries.

## 2. Getting Started

New NAS users are advised to follow the steps below one by one to complete their NAS installation. For users who already own a QNAP NAS and would like to move the data to a new QNAP NAS, please refer to Migrating from Old NAS<sup>[28]</sup> for detailed instructions.

### For New NAS Users:

1. [Hardware Installation](#)<sup>[13]</sup>
2. [Software Installation](#)<sup>[19]</sup>
3. [Getting Utilities](#)<sup>[23]</sup>
4. [Connecting to the Shared Folders](#)<sup>[24]</sup>
5. [Connecting to the NAS by Web Browser](#)<sup>[27]</sup>

### For Existing NAS Users:

- [Migrating from Old NAS](#)<sup>[28]</sup>

## 2.1 Hardware Installation

After unpacking the NAS from the package, please first follow the instructions below to install your hardware:

1. Install the hard drives. Please also make sure that the hard drives (HDDs) that you use are compatible with the NAS. Go to the Hard Disk Drive Compatibility List<sup>[14]</sup> section for more details.
2. Connect the QNAP NAS to the same network as your PC and power it on. During your installation process, please pay attention to LEDs and alarm buzzers to make sure that the NAS functions properly. Go to the Checking System Status<sup>[15]</sup> section for details.

**Note:** The steps above are also illustrated in the Quick Installation Guide (QIG) that can be found in the product package or QNAP website (<http://start.qnap.com>).

### **2.1.1 Hard Disk Drive Compatibility List**

This product works with 2.5-inch and 3.5-inch SATA hard disk drives and/or solid-state drives (SSD) from major hard drive brands. For the compatible hard disks, please check the compatibility list on QNAP website (<http://www.qnap.com/compatibility>).

**Note:** If you encounter the "Device not found" message on screen, please make sure:

1. Your NAS has been powered on;
2. The network cable is connected to the NAS and the orange and green indicator lights on its LAN port(s) are blinking; and
3. The cloud key is correct.

**Important:** QNAP disclaims any responsibility for product damage/malfunction or data loss/recovery due to misuse or improper installation of hard disks in any occasions for any reasons.

**Caution:** Note that **if you install a hard drive (new or used) which has never been installed on the NAS before, the hard drive will be formatted and partitioned automatically and all the disk data will be cleared.**

### 2.1.2 Checking System Status

#### LED Display & System Status Overview

LED	Color	LED Status	Description
System Status	Red/ Green	Flashes green and red alternately every 0.5 sec	1) The hard disk drive on the NAS is being formatted. 2) The NAS is being initialized. 3) The system firmware is being updated. 4) RAID rebuilding is in process. 5) Online RAID capacity expansion is in process. 6) Online RAID level migration is in process.
		Red	1) The hard disk drive is invalid. 2) The disk volume has reached its full capacity. 3) The disk volume is going to be full. 4) The system fan is out of function (TS-119 does not support smart fan). 5) An error occurs when accessing (read/write) the disk data. 6) A bad sector is detected on the hard disk drive. 7) The NAS is in degraded read-only mode (2 member hard drives fail in a RAID 5 or RAID 6 configuration, the disk data can still be read). 8) (Hardware self-test error).
		Flashes red every 0.5 sec	The NAS is in degraded mode (one member hard drive fails in RAID 1, RAID 5 or RAID 6 configuration).
		Flashes green every 0.5 sec	1) The NAS is starting up. 2) The NAS is not configured. 3) The hard disk drive is not formatted.
		Flashes green every 2 sec	The NAS is in S3 Sleep Mode <sup>1</sup> .

LED	Color	LED Status	Description
		Green	The NAS is ready.
		Off	All the hard disk drives on the NAS are in standby mode.
Power <sup>1</sup>	Green	Flashes green	The NAS is booting up.
		Green	The NAS is on and ready.
LAN	Orange	Orange	The disk data is being accessed from the network.
		Flashes orange	The NAS is connected to the network.
10 GbE*	Green	Green	The 10GbE network expansion card is installed.
		Off	No 10GbE network expansion card is installed.
HDD	Red/ Green	Red	A hard drive read/write error occurs.
		Flashes green	The disk data is being accessed.
		Green	The hard drive can be accessed.
USB	Blue	Flashes blue every 0.5 sec	1) A USB device (connected to front USB port) is being detected. 2) A USB device (connected to front USB port) is being removed from the NAS. 3) The USB device (connected to the front USB port) is being accessed. 4) The data is being copied to or from the external USB or eSATA device.
		Blue	A front USB device is detected (after the device is mounted).
		Off	1) No USB device is detected. 2) The NAS has finished copying the data to or from the USB device connected to the front USB port of the NAS.
eSATA*	Orange	Flashes	The eSATA device is being accessed.



LED	Color	LED Status	Description
*	e	Off	No eSATA device can be detected.

\*The 10 GbE network expansion function is only supported by the TS-470 Pro, TS-670 Pro, TS-870 Pro, TS-870U-RP, TS-879 Pro, TS-1079 Pro, TS-879U-RP, TS-1270U-RP, TS-1279U-RP, TS-EC879U-RP, and TS-EC1279U-RP.

\*\*TS-210, TS-212, TS-219, TS-439U-SP/RP, TS-809 Pro, TS-809U-RP do not support eSATA port.

<sup>1</sup>This feature is only supported by certain NAS models. Please visit <http://www.qnap.com> for details.

## Alarm Buzzer

The alarm buzzer can be disabled in "Control Panel" > "System Settings" > "Hardware" > "Buzzer".

Beep sound	No. of Times	Description
Short beep (0.5 sec)	1	1) The NAS is starting up. 2) The NAS is being shut down (software shutdown). 3) The user presses the reset button to reset the NAS. 4) The system firmware has been updated.
Short beep (0.5 sec)	3	The NAS data cannot be copied to the external storage device from the front USB port.
Short beep (0.5 sec), long beep (1.5 sec)	3, every 5 min	The system fan is out of function (TS-119 does not support smart fan).
Long beep (1.5 sec)	2	1) The disk volume is going to be full. 2) The disk volume has reached its full capacity. 3) The hard disk drives on the NAS are in degraded mode. 4) The user starts hard drive rebuilding.

	1	<p>1) The NAS is turned off by force shutdown (hardware shutdown).</p> <p>2) The NAS has been turned on and is ready.</p>
--	---	---

## 2.2 Software Installation

After installing the NAS hardware, proceed to software installation. There are three approaches for software installation:

1. Online Installation<sup>[20]</sup>
2. Cloud Installation<sup>[21]</sup>
3. CD Installation<sup>[22]</sup>

Online installation and cloud installation are available for all new NAS models, while CD installation is only for certain models (please check your package content and see if the installation CD is available.) All users are encouraged to use cloud and online installation if possible. For all problems encountered in the installation process, please contact our technical support department (<http://www.qnap.com/support>.)

### **2.2.1 Online Installation**

Follow the steps in this section to complete online installation for your NAS:

1. Go to <http://start.qnap.com>.
2. Choose the number of HDD bays and the model of your NAS and click "Start Now".
3. Click "Hardware" and follow the on-screen instructions to get hardware ready.
4. Scroll down to "Install firmware" and click "Local Installation".
5. Choose your operating system to download, install and run Qfinder.
6. After installing Qfinder, the built-in Qfinder Setup Wizard will guide you along the way to complete firmware installation. Next, you can use QTS account username and password to log in (QTS is the operating system for the Turbo NAS.)
7. Log in QTS.

### 2.2.2 Cloud Installation

Follow the steps in this section to complete cloud installation for your NAS:

1. Connect your NAS to the Internet, and on your PC, go to "start.qnap.com" and scroll down until the "Install firmware" section. Click "Cloud Installation" and in the "Start Cloud Installation" step, click the "Start Cloud Installation" button.  
Alternatively, you may scan the QR code using your mobile phone to start cloud installation.
2. Enter the cloud key (cloud key can be found from the sticker on top of your QNAP NAS) and click "Enter". Before proceeding to Step 4, please be sure to activate your myQNAPcloud account after your account registration is confirmed (an email will be sent to the email address provided to create your myQNAPcloud account, and the account activation link will be included in that email.) For details, please refer to the chapter on myQNAPcloud Service<sup>232</sup> in this manual.
3. Fill out all fields to register your myQNAPcloud account or sign in your myQNAPcloud account. check "I agree to myQNAPcloud Terms of Use and QNAP Privacy Policy" and click "Next Step". If you already have a myQNAPcloud account, please select "Sign in myQNAPcloud account" and login with your account credentials.
4. Type in the name of your Turbo NAS to register it and click "Register".
5. Install a hard drive on your Turbo NAS if you have not already done so.
6. Click "Begin" to install firmware on your Turbo NAS.
7. Click "Start" to start the quick setup.
8. Confirm all details and click "Proceed".
9. Follow the onscreen instructions.
10. Click "Connect and Login QTS".
11. Key in the user ID and password to login your Turbo NAS.

**Note:** If you encounter the "Device not found" message on screen, please make sure:

1. Your NAS has been powered on;
2. the network cable is connected to the NAS and the orange and green indicator lights on its LAN port(s) are blinking; and
3. The cloud key is correct.

### **2.2.3 CD Installation**

Follow the steps in this section to complete CD installation for your NAS:

1. Install the QNAP Qfinder from the product CD-ROM.
2. Run the QNAP Qfinder. If the QNAP Qfinder is blocked by your firewall, unblock the utility.
3. The built-in Qfinder Setup Wizard will guide you along the way to complete firmware installation. Next, you can use QTS account username and password to log in (QTS is the operating system for the Turbo NAS.)

**Note:**

- Some new NAS models, such as TS-x12, TS-x20 and TS-x21, no longer have the installation CD included.
- The default login ID and password of the NAS are both admin.

## 2.3 Getting Utilities

QNAP has prepared a number of practical and useful utilities to enhance your NAS experiences. After setting up your NAS, please choose from the following two methods to install the utilities:

### Method 1: Downloading from the QNAP website

Type <http://www.qnap.com/> in your browser, go to "QTS 4.1" > "For Home" ("For Business" if you are business users). Scroll down to the bottom of the screen and click "Utilities". Choose to download and install utilities on your PC.

### Method 2: Installing from the product CD-ROM

The product CD-ROM contains software utilities QNAP Qfinder, myQNAPcloud Connect, NetBak Replicator, and QGet.

Browse the CD-ROM and access the following contents:

- Quick Installation Guide: View the hardware installation instructions of the NAS.
- Install QNAP Qfinder: The setup program of the QNAP Qfinder (for Windows OS.)
- Install myQNAPcloud Connect: The setup program of the myQNAPcloud Connect (for Windows OS.)
- Install NetBak Replicator: The setup program of NetBak Replicator (Windows utility for data backup from Windows OS to the QNAP NAS.)
- Install QGet: The setup program of the QGet download utility (for Windows OS.)
- User Manual and Application Notes: Software user manuals, and hardware manual of the Turbo NAS.

## 2.4 Connecting to NAS Shared Folders

After hardware and software installation, it is time to connect to the shared folders on the NAS. Refer to the links below for the connection setup:

- [Connecting to NAS shared folders in Windows](#)<sup>[25]</sup>
- [Connecting to NAS shared folders in Mac or Linux](#)<sup>[26]</sup>



### 2.4.1 Windows

For Windows operating systems, there are two methods to connect to shared folders of the NAS:

#### **Method 1: Connect to the shared folders of the NAS by using the QNAP Qfinder**

1. Launch the QNAP Qfinder. Select the NAS detected and then click "Tool" > "Map Network Drive".
2. Select a shared folder on the NAS to be mapped as a network drive and click "Map Network Drive".
3. Enter the username and password to connect to the NAS and click "OK".
4. Select a drive in the OS to map the folder chosen in Step 2 and click "Finish".
5. The mapped folder will appear when opening the File Explorer in Windows.

**Note:** Alternatively, you can use the Storage Plug & Connect Wizard to connect NAS shared folders. The steps:

1. Launch the QNAP Qfinder;
2. Select "Storage Plug & Connect" under "Connect";
3. Check "Login with username and password" and enter username and password;
4. Click a NAS shared folder; and
5. Click "Map the Network Drive".

#### **Method 2: Connect to the shared folders of the NAS by using My Network Places or Run**

1. Open My Network Places and find the workgroup of the NAS. If the NAS cannot be found, browse the whole network to search for the NAS. Double click the name of the NAS for connection, or use the Run function in Windows. Enter \\NAS\_name or \\NAS\_IP.
2. Enter the default administrator name and password (default administrator name: admin; default password: admin).
3. Upload files to the shared folders.

## 2.4.2 Mac or Linux

### Mac Users

There are two methods to connect shared folders on a NAS:

#### Method 1: Using QNAP Qfinder

1. Launch the QNAP Qfinder, select the NAS you would like to connect to, and go to "Connect" > "Open in File Explorer".
2. Enter your login ID and password.
3. Select the folder you want to mount and click "OK".
4. The folder is mounted.

#### Method 2: Connecting to Server

1. Choose "Go" > "Connect to Server".
2. Enter the NAS IP address.
3. Enter your login ID and password.
4. Select the folder you want to mount and click "OK".
5. The folder is mounted.

### Linux Users

On Linux, run the following command:

```
mount -t nfs <NAS IP>:/<Shared Folder Name> <Directory to Mount>
```

For example, if the IP address of the NAS is 192.168.0.1, to connect to the shared folder "public" under the /mnt/pub directory, use the following command:

```
mount -t nfs 192.168.0.1:/public /mnt/pub
```

Log into the NAS with the specified user ID, use the mounted directory to connect to the shared folders.

**Note:** You must login as the "root" user to initiate the above command.

## 2.5 Connecting to NAS by Web Browser

To connect to the NAS by a web browser, follow the steps below:

1. Enter `http://NAS IP:8080` in the web browser. Or, use the QNAP Qfinder to find the NAS, double click the NAS name, and the NAS login page will open.

**Note:** The default NAS IP is 169.254.100.100:8080. If the NAS has been configured to use DHCP, you can use the QNAP Qfinder to check the IP address of the NAS. Make sure the NAS and the computer that runs the QNAP Qfinder are connected to the same subnet. If the NAS cannot be found, connect the NAS to the computer directly and run the QNAP Qfinder again.

2. Enter the administrator name and password. Turn on the option "Secure login" (Secure Sockets Layer login) to allow secure connection to the NAS. If a user without administration right login the NAS, the user can only change the login password (default administrator name: admin; default password: admin).

**Note:** If the NAS is behind an NAT gateway, to connect to the NAS by secure login on the Internet, the port 443 must be opened on the NAT router and forwarded to the LAN IP of the NAS.

3. The NAS Desktop will show up.

## 2.6 Migrating from Old NAS

Users can migrate their QNAP NAS to another Turbo NAS model with all the data and configuration retained by simply installing all the hard drives of the original (source) NAS on the new (destination) NAS according to its original hard drive order and restart the NAS.

Due to different hardware design, the NAS will automatically check if a firmware update is required before system migration. After the migration has finished, all the settings and data will be kept and applied to the new NAS. However, the system settings of the source NAS cannot be imported to the destination NAS via "System Administration" > "Backup/Restore Settings". Configure the NAS again if the settings were lost.

Before directly migrating to the destination NAS, please make sure both the source and destination NAS models are powered off first. The NAS models which support system migration are listed below.

Source NAS		Destination NAS		Firmware Upgrade Required
Model	Firmware Version	Model	Firmware Version	
TS-x10, TS-x12, TS-x19, TS-x20, TS-x21, HS-210	3.8 4.0.x 4.1.x	TS-x10, TS-x12, TS-x19, TS-x20, TS-x21, HS-210	3.8.x and older 4.0.2	No
		TS-x39, TS-509, TS-809, SS-x39, TS-x59, TS-x59U, TS-x69, TS-x69U, TS-x70, TS-x70U, TS-x79, TS-x79U		
		TS-x31, HS-251, TS-x51, TS-x53, SS-x53	4.0.5 4.1.x	
		TVS-x63, TS-x69, TS-x70, TVS-x71, TS-x79, TS-x80, TVS-x80		

TS-x39, TS-509, TS-809, SS-x39, TS-x59, TS-x59U	3.8 4.0.x 4.1.x	TS-x10, TS-x12, TS-x19, TS-x20, TS-x21, HS-210	3.8.x and older 4.0.2	Yes
		TS-x39, TS-509, TS-809, SS-x39, TS-x59, TS-x59U, TS-x69, TS-x69U, TS-x70, TS-x70U, TS-x79, TS-x79U		No
		TS-x31, HS-251, TS-x51, TS-x53, SS-x53	4.0.5 4.1.x	
		TVS-x63, TS-x69, TS-x70, TS-x79, TS-x80, TVS-x80	4.0.x 4.1.x	
TS-x31, HS-251, TS-x51, TS-x53, SS-x53, TS-x53S Pro	4.1.x	TS-x31, HS-251, TS-x51, TS-x53, SS-x53	4.0.5	No
		TVS-x63, TS-x69, TS-x70, TS-x79, TS-x80, TVS-x80	4.1.x	
TS-x69, TS-x69U, TS-x70, TS-x70U, TS-x79, TS-x79U, TS-x80, TS-x80U	3.8.x and older 4.0.2	TS-x10, TS-x12, TS- x19, TS-x20, TS- x21, HS-210	3.8.x and older 4.0.2	No
		TS-x39, TS-509, TS-809, SS-x39, TS-x59, TS-x59U, TS-x69, TS-x69U, TS-x70, TS-x70U, TS-x79, TS-x79U		
		TS-x31, HS-251, TS- x51, TS-x53, SS-x53	4.0.5 4.1.x	

		TS-x69, TS-x70, TS-x79, TS-x80, TS-x80U	4.0.5	
	4.0.5 4.1.x	TVS-x63, TS-x69, TS-x69U, TS-x70, TS-x70U, TS-x79, TS-x79U, TS-x80, TS-x80U, TVS-ECx80	4.0.5 4.1.x	
		HS-251, TS-x51, TS-x53, SS-x53	4.1.2	
TS-x31+	4.1.1	TVS-x71, TVS-x63, TS-x53, TS-x51, x31 +	4.1.1	No
	4.1.2 4.1.3	TS-x80, TVS-x80, TVS-x71U, TVS-x71, TVS-x63, TS-x53, TS-x51, TS-x31+	4.1.2 4.1.3	No
HS-251, TS-x51	4.1.1	TVS-x71, TVS-x63, TS-x53	4.1.1	No
	4.1.2 4.1.3	TS-x80, TVS-x80, TVS-x71U, TVS-x71, TVS-x63, TS-x53, TS-x51	4.1.2 4.1.3	No
TS-x53U, TS-x53 Pro, TS-x53S Pro	4.1.1	TVS-x71, TVS-x63, TS-x51	4.1.1	No
	4.1.2 4.1.3	TS-x80, TVS-x80, TS-x71U, TVS-x71, TVS-x63, TS-x53, TS-x51	4.1.2 4.1.3	No
TVS-x63	4.1.2 4.1.3	TS-x80, TVS-x80, TVS-x71U, TVS-x71, TVS-x63, TS-x53, TS-x51	4.1.2 4.1.3	No

TVS-x71	4.1.1	TVS-x63	4.1.1	No
	4.1.2 4.1.3	TS-x80, TVS-x80, TS-x71U, TVS-x71, TVS-x63, TS-x53, TS-x51	4.1.2 4.1.3	No
TVS-x71U	4.1.1	TS-x80, TVS-x80, TVS-x71U, TVS-x71, TVS-x63, TS-x69, TS-x79, TS-x70	4.1.1	No
	4.1.2 4.1.3	TS-x80, TVS-x80, TVS-x71U, TVS-x71, TVS-x63, TS-x53, TS-x51	4.1.2 4.1.3	No

NAS models that do not support direct migration are listed in the below table. For these NAS models, please first initialize the destination NAS and copy your data from the source NAS to the destination NAS (please refer to the chapter on RTRR or Rsync<sup>[218]</sup> for details on data backup and replication.)

Source NAS		Destination NAS	
Model	Firmware Version	Model	Firmware Version
TS-x31, HS-251, TS-x51, TS-x53, SS-x53	4.1.x	TS-x10, TS-x12, TS-x19, TS-x20, TS-x21, HS-210, TS-x39, TS-509, TS-809, SS-x39, TS-x59, TS-x59U, TS-x69, TS-x69U, TS-x70, TS-x70U, TS-x79, TS-x79U	3.8.x and older 4.0.2

TS-x69, TS-x69U, TS-x70, TS-x70U, TS-x79, TS-x79U	4.0.5 4.1.x	TS-x10, TS-x12, TS-x19, TS-x20, TS-x21, HS-210, TS-x39, TS-509, TS-809, SS-x39, TS-x59, TS-x59U, TS-x69, TS-x69U, TS-x70, TS-x70U, TS-x79, TS-x79U	3.8.x and older 4.0.2
		TS-x31, HS-251, TS-x51, TS-x53, SS-x53	4.0.5 4.1.1 and older

**Note:**

- The destination NAS should contain enough drive bays to house the hard drives of the source NAS.
- Users are encouraged to use only HDDs that are compatible with the QNAP NAS before system migration, or data may be inaccessible. For the compatibility list, please refer to <http://www.qnap.com/compatibility>.
- SS-x39 and SS-469 Pro series support only 2.5-inch hard disk drives.
- A NAS with encrypted disk volume cannot be migrated to a NAS which does not support file system encryption. File system encryption is not supported by TS-110, TS-119, TS-210, HS-210, TS-219, TS-219P, TS-x20, TS-x21, TS-410, TS-419P, TS-410U, TS-419U, TS-119P+, TS-219P+, TS-419P+, TS-112, TS-212, TS-412, TS-419U+, TS-412U, TS-420U and TS-421U.
- The Multimedia Station, Download Station, iTunes Server, and DLNA Media Server features will be removed after migrating the non-TS-x79 models to the TS-x70U/TS-x79 models. The shared folders Multimedia/Qmultimedia, Download/Qdownload and all the downloaded files will be kept.
- The registered myQNAPcloud name on the source NAS will not be moved to the destination NAS after system migration. To use the same myQNAPcloud name on the destination NAS, change the myQNAPcloud name on the source NAS before system migration and register the same name on the destination NAS after the process. Please contact the QNAP technical support department if you need to keep myQNAPcloud name after system migration.



Destination NAS	Disk volume supported for system migration
1-bay NAS	1-drive single disk volume
2-bay NAS	1 to 2-drive single disk volume, JBOD, RAID 0, 2-drive RAID 1.
4-bay NAS	1 to 4-drive single disk volume, JBOD, RAID 0, 2-drive RAID 1, 3 to 4-drive RAID 5, 4-drive RAID 6, 4-drive RAID 10.
5-bay NAS	1 to 5-drive single disk volume, JBOD, RAID 0, 2-drive RAID 1, 3 to 5-drive RAID 5, 4 to 5-drive RAID 6, 4-drive RAID 10.
6-bay NAS	1 to 6-drive single disk volume, JBOD, RAID 0, 2-drive RAID 1, 3 to 6-drive RAID 5, 4 to 6-drive RAID 6, 4-drive or 6-drive RAID 10.
8-bay NAS	1 to 8-drive single disk volume, JBOD, RAID 0, 2-drive RAID 1, 3 to 8-drive RAID 5, 4 to 8-drive RAID 6, 4-drive, 6-drive, or 8-drive RAID 10.

### Migrating your NAS

Follow the steps below to perform system migration:

1. Turn off the source NAS and unplug the hard drives.
2. Remove the hard drives from the old trays and install them to the hard drive trays of the new NAS.
3. Plug the hard drives to the destination NAS (new model). Make sure the hard drives are installed in the original order.
4. Follow the instructions of the Quick Installation Guide (QIG) to connect the power supply and network cable(s) of the new NAS.

5. Turn on the new NAS. Login the web administration interface as an administrator (default login: admin; password: admin).
6. If you are informed to update the firmware of the new NAS, follow the instructions to download and install the firmware.
7. Click "Start Migrating". The NAS will restart after system migration. All the data and settings will be retained.

**Caution:** To avoid system damage or serious injuries, **the system migration procedure should be performed by an authorized server manager or IT administrator.**

Some system settings will be removed after system migration due to a different system design. Configure the following settings again on the new NAS:

- Windows AD
- Some apps need to be reinstalled.

### 3. QTS Basics and Desktop

QTS is a user friendly Turbo NAS operating system designed to enhance every aspect of your NAS experiences. With basic computer skills such as drag-and-drop or point and click, you can complete most of the NAS operations. It is that simple! Check the following links to learn more about this operating system:

- [Introducing QTS](#)<sup>[36]</sup>
- [Using QTS Desktop](#)<sup>[38]</sup>

### 3.1 Introducing QTS

Built on a Linux foundation, QTS Turbo NAS operating system is shaped from the optimized kernel to deliver high-performance services satisfying your needs in file storage, management, backup, multimedia applications, and surveillance, and more. The intuitive, multi-window and multi-tasking QTS GUI make it incredibly easy to manage your Turbo NAS, utilize its rich home applications, enjoy multimedia collections with more fun, and install a rich set of applications in the App Center on demand to expand your Turbo NAS experience. Moreover, QTS adds value to business applications with its abundant features, including file sharing, iSCSI and virtualization, backup, privilege settings, and so on, effectively increasing business efficiency. Coupled with various utilities and smart mobile apps, QTS is the ultimate platform for building a personal or private cloud, synchronizing data and sharing files.



\*Click the figure above to check for more details.

## **Turbo NAS for Home - Easily enriching home entertainment and content sharing**

Tons of photos, music, videos and documents are often scattered across multiple computers in modern homes. QNAP Turbo NAS lineup of home network storage servers feature plenty of handy applications to let you smartly connect and manage these assets and enjoy a truly digital life in a well-secured home network. No boundaries for multimedia sharing at home, and no boundaries for sharing content with family, and friends. Learn more about the exciting features that QNAP Turbo NAS offers to you:

- Intuitive GUI with Multi-Windows, Multi-Tasking , Multi-Application, Multi-Device access support
- Cross platform data storage, backup and sharing center
- Revolutionary music, photo and home video center
- Personal cloud storage
- Free and large capacity for Dropbox-style data sync
- Over 90 Install-on-demand applications via the App Center
- Energy-efficient & eco-friendly

## **Turbo NAS for Business - Optimizing business IT infrastructure with ease and efficiency**

IT efficiency, coupled with low total cost of ownership (TCO) is an essential factor for business competitiveness. QNAP Turbo NAS features high performance, business critical applications, and affordability; helping businesses achieve seamless file sharing, easy integration into existing networks, flexible virtualized IT environments, and many other advanced capabilities for keeping businesses running at maximum efficiency. Learn more about the compelling features that QNAP Turbo NAS offers to businesses:

- Large data storage, backup and file sharing center
- Supports both scale-up and scale-out solution for large storage capacity demand
- Advanced storage management with dynamic thin-provisioning, SSD caching and JBOD expansion functions
- Trustworthy data security and data encryption
- The reliable IP SAN storage (iSCSI) as primary and secondary storage for virtualization environment
- Private cloud storage
- Free and large capacity for Dropbox-style data sync
- Over 90 Install-on-demand applications via the App Center
- Development Center for 3rd party partners to build apps on the Turbo NAS

## 3.2 Using QTS Desktop

After you finish the basic NAS setup and login to the NAS, the following desktop will appear. Each main desktop feature is introduced in the following sections.



NO	Name	Description
1	Main Menu	Show the Main Menu. It includes three parts: 1) QNAP applications (APPLICATIONS): Applications developed by QNAP to enhance your NAS experience; 2) System features and settings (SYSTEMS): Key system features designed to manage or optimize your NAS; and 3) Third party applications: Applications designed and submitted by independent developers and approved by QNAP. Please note that the default Internet browser, instead of a window on the NAS Desktop, will be launched once you click a third party application. Click the icon from the menu to launch the selected application.
2	Show Desktop	Minimize or restore all open windows and show the desktop.

3	Background Task	Review and control all tasks running in the background (such as HDD SMART scanning, antivirus scanning, file backup or multimedia conversion.)
4	External Device	List all external storage devices and USB printers that are connected to the NAS via its USB or SATA ports. Click a device listed to open the File Station for that device. Click the "External Device" header to open the External Device page for relevant settings and operations (for details on the File Station, please refer to the chapter on File Station.) Click the eject icon (up-arrow icon) to eject the external device.
5	Notification and Alert	Check for recent system error and warning notifications. Click "Clear All" to clear all entries on the list. To review all historical event notifications, click the "Event Notifications" header to open the System Logs. For details on System Logs, please refer to the chapter on System Logs <sup>[127]</sup> .
6	Admin Control	<p>Customize your user specific settings, change your user password, restart/shut down the NAS or log out your user account.</p> <ul style="list-style-type: none"> <li>• Options: <ul style="list-style-type: none"> <li>○ Profile: Specify your user email address and change your profile picture.</li> <li>○ Wallpaper: Change the default wallpaper or upload your own wallpaper.</li> <li>○ Change Password: Change your login password.</li> <li>○ Miscellaneous: <ul style="list-style-type: none"> <li>▪ Warn me when leaving QTS: Check this option, and users will be prompted for confirmation each time they leave the QTS Desktop (such as clicking the browser back button or close the browser). It is advised to check this option.</li> <li>▪ Reopen windows when logging back into QTS: Check this option, and all the current desktop settings (such as the "windows opened before your logout") will be kept after you login the NAS the next time.</li> </ul> </li> </ul> </li> </ul>

		<ul style="list-style-type: none"> <li>▪ Show the desktop switching button: Check this option to hide the next desktop button (No. 12) and only display them when you move your mouse cursor close to the buttons.</li> <li>▪ Show the "QNAP Utility" tab: Check this option to show the "QNAP Mobile App", "QNAP Utility" and "Feedback" tabs (No. 14 ~ 16)</li> <li>▪ Show the Dashboard button: If you would like to hide the Dashboard button (NO. 13), uncheck this option.</li> <li>▪ Show the NAS time on the desktop: If you prefer not to show the NAS time at bottom left side of the desktop, uncheck this option.</li> <li>▪ Keep Main Menu open after selection: Keep the Main Menu pinned/unpinned on the desktop.</li> </ul> <ul style="list-style-type: none"> <li>• Change Password: Change your login password.</li> <li>• Sleep: Put your NAS into sleep mode. There are three ways to wake up the NAS: 1) Press the power button (until you hear a beep); 2) Use the Wake-on-LAN (WOL) feature with QNAP Qfinder or Qmanager. Note that to use the WOL feature, it must first be enabled in "Control Panel" &gt; "Power" &gt; "Wake-on-LAN (WOL)". For details, please refer to <a href="#">here</a><sup>[102]</sup>; 3) Press the power button on a RM-IR002 or MCE remote control. <ul style="list-style-type: none"> <li>○ <b>Note: This feature is only available on certain models.</b></li> </ul> </li> <li>• Restart: Restart your NAS.</li> <li>• Shutdown: Shut down your NAS. <ul style="list-style-type: none"> <li>○ <b>Note: To power off a NAS, you can also:</b> <ul style="list-style-type: none"> <li>▪ <b>Press and hold the power button on your NAS for 1.5 seconds.</b></li> <li>▪ <b>Run Qfinder and click "Tools" &gt; "Shut down Server".</b></li> </ul> </li> </ul> </li> <li>• Logout: Log yourself out.</li> <li>• About: Check for the NAS model, firmware version, HDDs already installed and available (empty) bays.</li> </ul>
7	Search	Enter a feature specific keyword in the search bar to search for the desired function and its corresponding online help. Click the result in the search bar to launch the function or open its online QTS help.



8	Online Resource	Display a list of online references, including the Quick Start Guide, QTS Help, Tutorials, QNAP Wiki and QNAP Forum, and customer support such as Customer Service (live support) and Feedback (feature request / bug report) are available here.
9	Language	Choose your preferred language for the UI.
10	Desktop Preference	<p>Choose the application icon displaying style and select your preferred application opening mode on the desktop. Application icons can be switched between small thumbnails and detailed thumbnails and applications can be opened in the tab mode or the window mode.</p> <p>For the tab mode, the window will be opened to fit the entire NAS Desktop and only one application window can be displayed at a time, while in the window mode, the application window can be resized and reshaped to a desirable style. Please note that if you log into the NAS using a mobile device, only the tab mode is available.</p>
11	Desktop Area	Remove or arrange all applications on the desktop, or drag one application icon over the top of another to put them in the same folder.
12	Next Desktop/ Last Desktop	Switch between desktops.
13	Dashboard	Check important NAS statistics, including system and HDD health, resource, storage usage, online user, scheduled task, online users, etc. Click the header within each widget to open its respective page.
14	QNAP Mobile App	Check and download the latest and available QNAP mobile applications.
15	QNAP Utility	Check and download the latest and available NAS utilities.
16	Feedback	File a feature request and bug report.

17	myQNAPCloud	Go to the myQNAPCloud <sup>232</sup> website.
----	-------------	---

**Tip:**

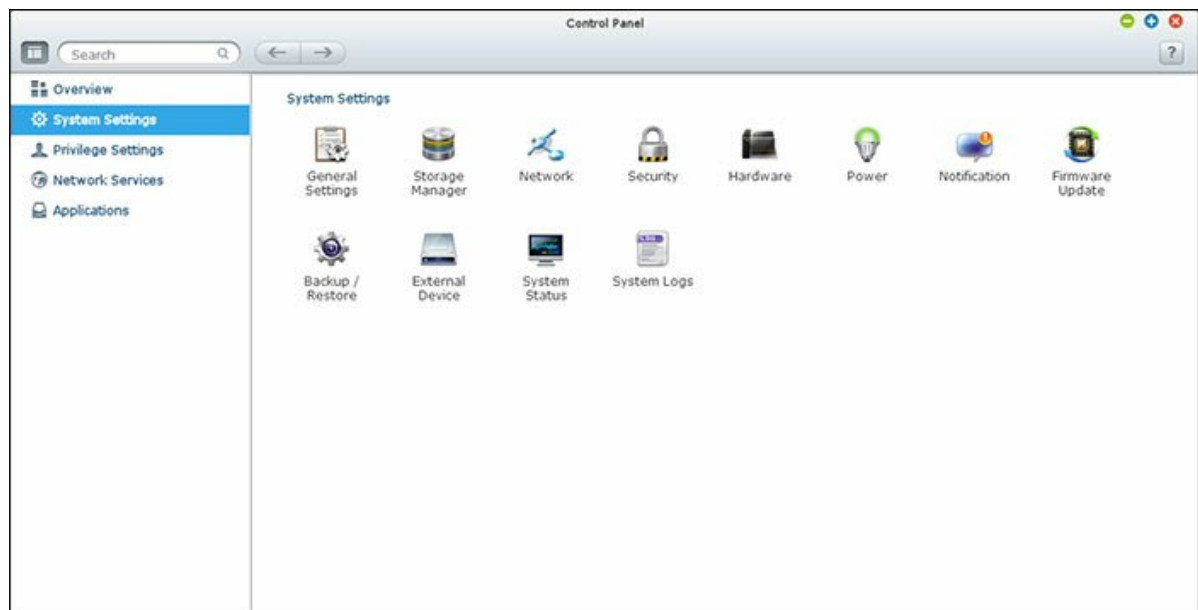
- All widgets within the Dashboard can be dragged onto the desktop for monitoring specific details.
- The Dashboard will be presented differently on different screen resolutions.
- The color of the Dashboard button will change based on the status of system health for quick recognition.

**Note:**

- The recommended screen resolution for QTS 4.x is 1024x768.
- The sleep function will automatically be disabled if the Turbo NAS has QNAP expansion enclosure(s) connected to it.

## 4. System Settings

Go to "Control Panel" > "System Settings" to set up your Turbo NAS system.



For details on the settings, refer to the following links:

- [General Settings](#)<sup>[44]</sup>
- [Storage Manager](#)<sup>[47]</sup>
- [Network](#)<sup>[85]</sup>
- [Security](#)<sup>[96]</sup>
- [Hardware](#)<sup>[98]</sup>
- [Power](#)<sup>[101]</sup>
- [Notification](#)<sup>[104]</sup>
- [Firmware Update](#)<sup>[106]</sup>
- [Backup/Restore](#)<sup>[108]</sup>
- [External Device](#)<sup>[110]</sup>
- [System Status](#)<sup>[121]</sup>
- [System Logs](#)<sup>[121]</sup>

## 4.1 General Settings

Go to "Control Panel" > "System Settings" > "General Settings" to configure basic settings of the NAS.

System Administration | Time | Daylight Saving Time | Codepage | Password Strength | Login Screen

Server name:

You can change the default port number (HTTP) for Web Administration.

System port:

☐ Disable and hide the home/multimedia features such as Photo Station, Music Station, Video Station, Download Station, DJ Station, Surveillance Station, Multimedia Station, Digital TV Station, iTunes server, and DLNA media server

☒ Enable secure connection (SSL)

Port number:

☐ Force secure connection (SSL) only

Note: After enabling the "Force secure connection (SSL) only" option, the Web Administration can only be connected via https.

### System Administration

- **Basic Settings:** Enter the name of the NAS. The NAS name supports maximum 14 characters and can be a combination of the alphabets (a-z, A-Z), numbers (0-9), and dash (-). Space ( ), period (.), or pure number are not allowed. Enter a port number for the system management. The default port is 8080. The services which use this port include: System Management, Photo Station, Music Station, Multimedia Station, File Station and Download Station. If you are not sure about this setting, use the default port number.
- **Enable Secure Connection (SSL):** To allow the users to connect the NAS by HTTPS, turn on secure connection (SSL) and enter the port number. If the option "Force secure connection (SSL) only" is turned on, the users can only connect to the web administration page by HTTPS connection.
- **Disable and hide the home/multimedia features such as Multimedia Station, Photo Station, Music Station, Surveillance Station, Download Station, iTunes server, and DLNA media server:** The multimedia features, including the Multimedia Station, Photo Station, Music Station, Video Station (both 2.0 and 1.0.5), Surveillance Station, Download Station, DJ Station, iTunes server, Media Library and

DLNA media server, may be hidden or disabled by default on the following NAS models: x70U, x79 Pro, x79U. To enable the multimedia features for those models, please uncheck this option.

## Time

- **Basic time settings:** Adjust the date, time, and time zone according to the location of the NAS. If the settings are incorrect, the following problems may occur:
  - When using a web browser to connect to the NAS or save a file, the display time of the action will be incorrect.
  - The time of the event log displayed will be inconsistent with the actual time when an action occurs.
- **Manual Setting:** To synchronize the time of the NAS with the computer time, click "Update now" next to this option.
- **Synchronize with an Internet time server automatically:** Turn on this option to synchronize the date and time of the NAS automatically with an NTP (Network Time Protocol) server. Enter the IP address or domain name of the NTP server, for example, time.nist.gov, time.windows.com. Then enter the time interval for synchronization. This option can be used only when the NAS is connected to the Internet.

**Note:** The first time synchronization may take several minutes to complete.

## Daylight Saving Time

If your region adopts daylight saving time (DST), turn on the option "Adjust system clock automatically for daylight saving time". Click "Apply". The latest DST schedule of the time zone specified in the "Time" section will be shown. The system time will be adjusted automatically according to the DST. Note that if your region does not adopt DST, the options on this page will not be available. To enter the daylight saving time table manually, select the option "Enable customized daylight saving time table". Click "Add Daylight Saving Time Data" and enter the daylight saving time schedule. Then click "Apply" to save the settings.

## Codepage

Select the language the NAS uses to display the files and directories.

**Note:** All the files and directories on the NAS will be created using Unicode encoding. If the FTP clients or the PC OS does not support Unicode, select the language which is the same as the OS language in order to view the files and directories on the NAS properly.

## Password Strength

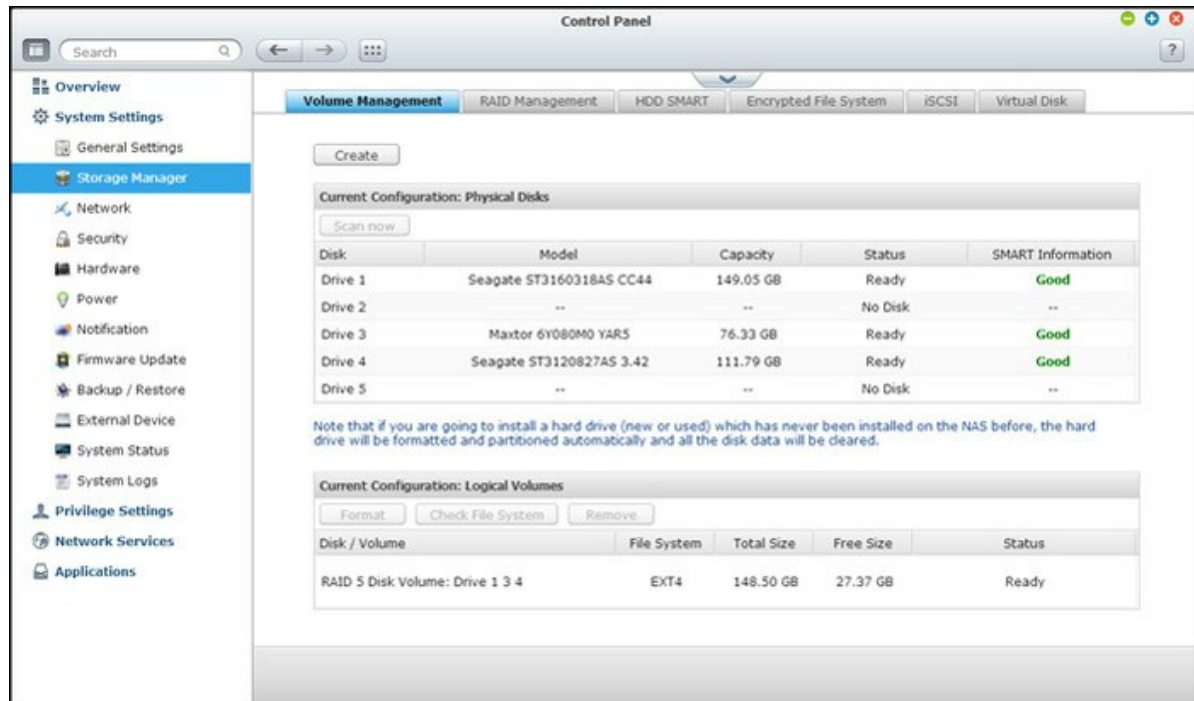
Specify the password rules. After applying the setting, the NAS will automatically check the validity of the password.

## Login Screen

Set the login screen style. First click the desired template, check "show firmware version" to show the firmware version on the login page and then, click "Preview" to preview the chosen template or "Apply" to apply the chosen login screen. For the photo wall style login screen, please type your personal message and choose to randomly select 100 photos stored on the NAS or display 100 photos that were shared recently. Click "Change Picture" to set a picture for your profile photo on the photo wall. Click "Preview" to preview the photo wall login screen or "Apply" to apply the settings. To change the pictures shown on the photo wall, please check the section on Sharing Albums <sup>262</sup>.

## 4.2 Storage Manager

Manage volumes and RAID systems, monitor the health of hard drives, encrypt and decrypt file systems, and configure iSCSI systems and virtual disks with Storage Manager.



For storage management features, refer to the following links:

- [Volume Management](#)<sup>[48]</sup>
- [RAID Management](#)<sup>[50]</sup>
- [Hard Disk S.M.A.R.T](#)<sup>[63]</sup>
- [Encrypted File System](#)<sup>[64]</sup>
- [iSCSI](#)<sup>[68]</sup>
- [Virtual Disk](#)<sup>[83]</sup>

### 4.2.1 Volume Management

This page shows the model, size, and current status of the hard drives on the NAS. You can format and check the hard drives, and scan the bad blocks on the hard drives. When the hard drives have been formatted, the NAS will create the following default share folders:

- **Public:** The default shared folder for file sharing by everyone.
- **Qdownload/Download:** The shared folder for Download Station.
- **Qmultimedia/Multimedia:** The shared folder for Multimedia Station.
- **Qusb/Usb:** The shared folder for data copy function using the USB ports.
- **Qweb/Web:** The shared folder for Web Server.
- **Qrecordings/Recordings:** The shared folder for Surveillance Station.

#### Note:

- The default shared folders of the NAS are created on the first disk volume and the directory cannot be changed.
- Depending on the NAS model, some of the shared folders above may not be created by default on the NAS.
- For disk volumes larger than 2TB, it is recommended to format them to the EXT4 file system.

### Overview on RAID Systems

- **Single Disk Volume:** Each hard drive is used as a standalone disk. If a hard drive is damaged, all the data will be lost.
- **JBOD (Just a bunch of disks):** JBOD is a collection of hard drives that does not offer any RAID protection. The data are written to the physical disks sequentially. The total storage capacity is equal to the sum of the capacity of all member hard drives.
- **RAID 0 Striping Disk Volume:** RAID 0 (striping disk) combines 2 or more hard drives into one larger volume. The data is written to the hard drive without any parity information and no redundancy is offered. The total storage capacity of a RAID 0 disk volume is equal to the sum of the capacity of all member hard drives.
- **RAID 1 Mirroring Disk Volume:** RAID 1 duplicates the data between two hard drives to provide disk mirroring. To create a RAID 1 array, a minimum of 2 hard drives are required. The storage capacity of a RAID 1 disk volume is equal to the



size of the smallest hard drive.

- **RAID 5 Disk Volume:** The data are striped across all the hard drives in a RAID 5 array. The parity information is distributed and stored across each hard drive. If a member hard drive fails, the array enters degraded mode. After installing a new hard drive to replace the failed one, the data can be rebuilt from other member drives that contain the parity information. To create a RAID 5 disk volume, a minimum of 3 hard drives are required. The storage capacity of a RAID 5 array is equal to  $(N-1) * (\text{size of smallest hard drive})$ . N is the number of hard drives in the array.
- **RAID 6 Disk Volume:** The data are striped across all the hard drives in a RAID 6 array. RAID 6 differs from RAID 5 that a second set of parity information is stored across the member drives in the array. It tolerates failure of two hard drives. To create a RAID 6 disk volume, a minimum of 4 hard drives are required. The storage capacity of a RAID 6 array is equal to  $(N-2) * (\text{size of smallest hard drive})$ . N is the number of hard drives in the array.
- **RAID 10 Disk Volume:** RAID 10 combines four or more disks in a way that protects data against loss of non-adjacent disks. It provides security by mirroring all data on a secondary set of disks while using striping across each set of disks to speed up data transfers. RAID 10 requires an even number of hard drives (minimum 4 hard drives). The storage capacity of RAID 10 disk volume is equal to  $(\text{size of the smallest capacity disk in the array}) * N/2$ . N is the number of hard drives in the volume.

## Disk Configuration and NAS Models

For disk configuration and applied NAS models, please refer to the table below:

Disk Configuration	Applied NAS Models
Single disk volume	All models
RAID 1, JBOD (just a bunch of disks)	2-drive models or above
RAID 5, RAID 6, RAID 5+hot spare	4-drive models or above
RAID 6+hot spare	5-drive models or above
RAID 10	4-drive models or above
RAID 10+hot spare	5-drive models or above

### 4.2.2 RAID Management

You can perform online RAID capacity expansion (RAID 1, 5, 6, 10) and online RAID level migration (single disk, RAID 1, 5, 10), add a hard drive member to a RAID 5, 6, or 10 configuration, configure a spare hard drive (RAID 5, 6, 10) with the data retained, enable Bitmap, recover a RAID configuration, and set a global spare on this page.



To expand the storage capacity of a RAID 10 volume, you can perform online RAID capacity expansion or add an even number of hard disk drives to the volume.

**Note:** Online RAID capacity expansion, online RAID level migration, and RAID recovery are not supported by one-bay NAS models, TS-210, and TS-212.

### Expanding Capacity (Online RAID Capacity Expansion)

#### Scenario

You bought three 250GB hard drives for initial setup of a TS-509 Pro NAS and configured RAID 5 disk configuration with the three hard drives.

A half year later, the data size of the department has largely increased to 1.5TB. In other words, the storage capacity of the NAS is running out of use. At the same time, the price of 1TB hard drives has dropped to a large extent.

#### Operation procedure

In "Storage Manager" > "RAID Management", select the disk volume for expansion and click "Action" > "Expand Capacity".

Click "Change" for the first hard drive to be replaced. Follow the instructions to proceed.

1. When the description displays "Please remove this drive", remove the hard drive from the NAS. Wait for the NAS to beep twice after removing the hard drive.
2. When the description displays "Please insert the new drive", plug in the new hard drive to the drive slot.
3. After plugging in the hard drive, wait for the NAS to beep. The system will start

- rebuilding.
4. After rebuilding has completed, repeat the steps above to replace other hard drives.
  5. After changing the hard drives and disk rebuilding has completed, click "Expand Capacity" to execute RAID capacity expansion.
  6. Click "OK" to proceed.
  7. The NAS beeps and starts to expand the capacity.

**Tip:** After replacing the hard drive, the description field shows "You can replace this drive". This means you can replace the hard drive to a larger one or skip this step if the hard drives have been replaced already.

**Caution:** When the hard drive synchronization is in process, **do NOT turn off the NAS or plug in or unplug the hard disk drives.**

The process may take from hours to tens of hours to finish depending on the drive size. Please wait patiently for the process to finish. Do NOT turn off the power of the NAS.

After RAID capacity expansion has finished, the new capacity is shown and the status is "Ready". You can start to use the NAS. (In the example you have 1.8TB logical volume.)

**Tip:** If the description still shows "You can replace this hard drive" and the status of the drive volume says "Ready", it means the RAID volume is still expandable.

**Note:**

- If you have a hot spare drive set up in a RAID configuration, please be sure to manually remove that drive before expanding a RAID Volume or adding a drive to that volume.
- Starting QTS 4.1.1, the maximum volume capacity supported for online RAID capacity expansion (ARM based NAS models (Non Intel-based NAS) only) is 16TB. For previous versions, the maximum volume capacity supported is 8TB.

## Online RAID Level Migration

During the initial setup of the TS-509 Pro, you bought a 250GB hard drive and configured it as single disk. The TS-509 Pro is used as a file server for data sharing among the departments. After a half year, more and more important data are saved on the TS-509

Pro. There is a rising concern for hard drive damage and data loss. Therefore, you planned to upgrade the disk configuration to RAID 5. You can install one hard drive for setting up the TS-509 Pro and upgrade the RAID level of the NAS with online RAID level migration in the future. The migration process can be done without turning off the NAS. All the data will be retained.

You can do the following with online RAID level migration:

- Migrate the system from single disk to RAID 1, RAID 5, RAID 6 or RAID 10
- Migrate the system from RAID 1 to RAID 5, RAID 6 or RAID 10
- Migrate the system from RAID 5 with 3 hard drives to RAID 6

You need to:

- Prepare a hard drive of the same or larger capacity as an existing drive in the RAID configuration.
- Execute RAID level migration (migrate the system from single disk mode to RAID 5 with 4 hard drives.)

1. Go to "Storage Manager" > "Volume Management". The current disk volume configuration displayed on the page is single disk (the capacity is 250GB).
2. Plug in the new 250GB hard drives to drive slots 2 and 3 of NAS. The NAS will detect the new hard drives. The status of the new hard drives is "Unmounted".
3. Go to "Storage Manager" > "RAID Management", click "Action" > "Migrate".
4. Select one or more available drives and the migration method. The drive capacity after migration is shown. Click "Migrate".
5. Note that all the data on the selected hard drive will be cleared. Click "OK" to confirm.
6. When migration is in process, the required time and total drive capacity after migration are shown in the description field.
7. The NAS will enter "Read only" mode when migration is in process during 11%–49% to assure the data of the RAID configuration will be consistent after RAID migration completes.
8. After migration completes, the new drive configuration (RAID 5) is shown and the status is Ready. You can start to use the new drive configuration.

The process may take from hours to tens of hours to finish depending on the hard drive size. You can connect to the web page of the NAS to check the status later.

### **Online RAID Capacity Expansion**

## Scenario

You had a tight schedule to set up a file server and an FTP server. However, you had only one 250GB hard drive. Therefore, you set up the TS-509 Pro with the single disk configuration. The original plan was to set up a 3TB RAID 5 network data center with the TS-509 Pro. You now plan to upgrade the disk configuration of the TS-509 Pro to RAID 5 and expand the total storage capacity to 3TB with all the original data retained after the hard drives are purchased. Execute online RAID level migration to migrate the system from single disk to RAID 5. The total storage capacity will be 750GB, RAID 5 (with one 250GB hard drive and three 1TB hard drives, the disk usage will be 250GB\*4 for RAID 5). You can refer to the previous step for the operation procedure.

Execute online RAID capacity expansion to replace the 250GB hard drive with a new 1TB hard drive, and then expand the logical volume from 750GB to 3TB of RAID 5. You can refer to the previous step for the operation procedure.

## Adding Hard Drives

Follow the steps below to add a hard drive member to a RAID 5 or RAID 6 disk configuration.

1. Make sure the status of the RAID 5 or RAID 6 configuration is "Ready".
2. Install a hard drive on the NAS. If you have a hard drive which has already been formatted as single disk volume on the NAS, you can add this hard drive to the RAID 5 or RAID 6 configuration. You are recommended to use hard disk drives of the same storage capacity for the RAID configuration.
3. Select the RAID 5 or RAID 6 configuration on the "RAID Management" page and click "Add Hard Drive".
4. Select the new hard drive member. The total drive capacity after adding the drive will be shown. Click "Add Hard Drive."
5. All the data on the new hard drive member will be deleted during this process. The data on the original RAID 5 or RAID 6 configuration will be retained. Click "OK". The NAS will beep twice.

To add hard drives member to a RAID 10 disk volume, repeat the above steps. Note that you need to add an even number of hard disk drives to a RAID 10 volume. The storage capacity of the RAID 10 volume will increase upon successful configuration.

This process may take a few hours to tens of hours to complete depending on the

number and the size of the hard drive. Please wait patiently for the process to finish. Do NOT turn off the NAS during this process. You can use a RAID configuration of larger capacity after the process.

## Configuring Spare Drives

You can add a spare drive to or remove a spare drive from a RAID 5, 6, or 10 configuration.

Follow the steps below to use this feature.

1. Make sure the status of the RAID 5, 6, 10 configuration is "Ready".
2. Install a hard drive on the NAS. If you have a hard drive which has already been formatted as single disk volume on the NAS, you can configure this hard drive as the spare drive. You are recommended to use hard disk drives of the same storage capacity for the RAID configuration.
3. Select the RAID volume and click "Configure Spare Drive."
4. To add a spare drive to the selected configuration, select the hard drive and click "Configure Spare Drive." To remove a spare drive, unselect the spare drive and click "Configure Spare Drive."
5. All the data on the selected hard drive will be deleted. Click "OK" to proceed.

The original data on the RAID 5, 6, or 10 disk volume will be retained. After the configuration completes, the status of the disk volume will become "Ready".

**Note:** A hot spare drive must be removed from the disk volume before executing the following action:

- Online RAID capacity expansion
- Online RAID level migration
- Adding a hard drive member to a RAID 5, RAID 6 or RAID 10 volume

## Bitmap

Bitmap improves the time for RAID rebuilding after an unexpected error, or removing or re-adding a member hard drive of the RAID configuration. If an array has a bitmap, the member hard drive can be removed and re-added and only blocks changes since the removal (as recorded in the bitmap) will be re-synchronized. To use this feature, select a RAID volume and click "Action" > "Enable Bitmap".

**Note:** Bitmap support is only available for RAID 1, 5, 6, and 10.

## RAID Recovery

RAID Recovery: When the NAS is configured as RAID 1, RAID 5, or RAID 6 and any number of hard drives is unplugged from the NAS accidentally, you can plug in the same hard drives into the same drive slots and click "Recover" to recover the volume status from "Not active" to "Degraded mode".

If the disk volume is configured as RAID 0 or JBOD and one or more of the hard drive members are disconnected or unplugged, you can plug in the same hard drives into the same drive slots and use this function to recover the volume status from "Not active" to "Normal". The disk volume can be used normally after successful recovery.

Disk volume	Supports RAID recovery	Maximum number of disk removal allowed
Single	No	-
JBOD	Yes	1 or more
RAID 0	Yes	1 or more
RAID 1	Yes	1 or 2
RAID 5	Yes	2 or more
RAID 6	Yes	3 or more
RAID 10	No	-

### Note:

- After recovering a RAID 1, RAID 5 or RAID 6 disk volume from not active to degraded mode by the RAID recovery, you can read or write the volume normally. The volume status will be recovered to normal after synchronization.
- If the disconnected drive member is damaged, the RAID recovery function will not work.

	Standard RAID 5	QNAP RAID 5	Standard RAID 6	QNAP RAID 6
Degraded mode	N-1	N-1	N-1 & N-2	N-1 & N-2
Read Only Protection (for immediate data backup & hard drive replacement)	N/A	N-1, bad blocks found in the surviving hard drives of the array.	N/A	N-2, bad blocks found in the surviving hard drives of the array.
RAID Recovery (RAID Status: Not Active)	N/A	If re-plugging in all original hard drive to the NAS and they can be spun up, identified, accessed, and the hard drive superblock is not damaged.	N/A	If re-plugging in all original hard drives to the NAS and they can be spun up, identified, accessed, and the hard drive superblock is not damaged).
RAID Crash	N-2	N-2 failed hard drives and any of the remaining hard drives cannot be spun up/identified/ accessed.	N-3	N-3 and any of the remaining hard drives cannot be spun up/identified/ accessed.

N = Number of hard disk drives in the array

### Setting/Canceling Global Spare

A global spare drive replaces a failed hard drive in any RAID 1, 5, 6, 10 disk volumes on the NAS automatically. When the same global spare drive is shared by multiple RAID volumes on the NAS, the spare drive will replace the first failed drive in a RAID volume.

To set a disk drive as a global spare drive, select the single disk volume and click



"Action" > "Set Global Spare". **All the disk data will be cleared on the hard drive.**

**Note:** The capacity of the global spare drive must be equal to or larger than that of a member drive of a RAID disk volume.

To cancel a global spare drive, select the drive and click "Action" > "Cancel Spare Drive".

**Further information about RAID management of the NAS:**

The NAS supports the following actions according to the number of hard disk drives and disk configurations supported. Please refer to the following table for the details.

Original Disk Configuration * No. of Hard Disk Drives	No. of New Hard Disk Drives	Action	New Disk Configuration * No. of Hard Disk Drives
RAID 5 * 3	1	Add hard drive member	RAID 5 * 4
RAID 5 * 3	2	Add hard drive member	RAID 5 * 5
RAID 5 * 3	3	Add hard drive member	RAID 5 * 6
RAID 5 * 3	4	Add hard drive member	RAID 5 * 7
RAID 5 * 3	5	Add hard drive member	RAID 5 * 8
RAID 5 * 4	1	Add hard drive member	RAID 5 * 5
RAID 5 * 4	2	Add hard drive member	RAID 5 * 6
RAID 5 * 4	3	Add hard drive member	RAID 5 * 7
RAID 5 * 4	4	Add hard drive member	RAID 5 * 8

RAID 5 * 5	1	Add hard drive member	RAID 5 * 6
RAID 5 * 5	2	Add hard drive member	RAID 5 * 7
RAID 5 * 5	3	Add hard drive member	RAID 5 * 8
RAID 5 * 6	1	Add hard drive member	RAID 5 * 7
RAID 5 * 6	2	Add hard drive member	RAID 5 * 8
RAID 5 * 7	1	Add hard drive member	RAID 5 * 8
RAID 6 * 4	1	Add hard drive member	RAID 6 * 5
RAID 6 * 4	2	Add hard drive member	RAID 6 * 6
RAID 6 * 4	3	Add hard drive member	RAID 6 * 7
RAID 6 * 4	4	Add hard drive member	RAID 6 * 8
RAID 6 * 5	1	Add hard drive member	RAID 6 * 6
RAID 6 * 5	2	Add hard drive member	RAID 6 * 7
RAID 6 * 5	3	Add hard drive member	RAID 6 * 8
RAID 6 * 6	1	Add hard drive member	RAID 6 * 7
RAID 6 * 6	2	Add hard drive member	RAID 6 * 8

RAID 6 * 7	1	Add hard drive member	RAID 6 * 8
RAID 10 * 4	2	Add hard drive member	RAID 10 * 6
RAID 10 * 4	4	Add hard drive member	RAID 10 * 8
RAID 10 * 6	2	Add hard drive member	RAID 10 * 8
RAID 1 * 2	1	Online RAID capacity expansion	RAID 1 * 2
RAID 5 * 3	1	Online RAID capacity expansion	RAID 5 * 3
RAID 5 * 4	1	Online RAID capacity expansion	RAID 5 * 4
RAID 5 * 5	1	Online RAID capacity expansion	RAID 5 * 5
RAID 5 * 6	1	Online RAID capacity expansion	RAID 5 * 6
RAID 5 * 7	1	Online RAID capacity expansion	RAID 5 * 7
RAID 5 * 8	1	Online RAID capacity expansion	RAID 5 * 8
RAID 6 * 4	1	Online RAID capacity expansion	RAID 6 * 4
RAID 6 * 5	1	Online RAID capacity expansion	RAID 6 * 5
RAID 6 * 6	1	Online RAID capacity expansion	RAID 6 * 6
RAID 6 * 7	1	Online RAID capacity expansion	RAID 6 * 7

RAID 6 * 8	1	Online RAID capacity expansion	RAID 6 * 8
RAID 10 * 4	1	Online RAID capacity expansion	RAID 10 * 4
RAID 10 * 6	1	Online RAID capacity expansion	RAID 10 * 6
RAID 10 * 8	1	Online RAID capacity expansion	RAID 10 * 8
Single * 1	1	Online RAID level migration	RAID 1 * 2
Single * 1	2	Online RAID level migration	RAID 5 * 3
Single * 1	3	Online RAID level migration	RAID 5 * 4
Single * 1	4	Online RAID level migration	RAID 5 * 5
Single * 1	5	Online RAID level migration	RAID 5 * 6
Single * 1	6	Online RAID level migration	RAID 5 * 7
Single * 1	7	Online RAID level migration	RAID 5 * 8
Single * 1	3	Online RAID level migration	RAID 6 * 4
Single * 1	4	Online RAID level migration	RAID 6 * 5
Single * 1	5	Online RAID level migration	RAID 6 * 6
Single * 1	6	Online RAID level migration	RAID 6 * 7

Single * 1	7	Online RAID level migration	RAID 6 * 8
Single * 1	3	Online RAID level migration	RAID 10 * 4
Single * 1	5	Online RAID level migration	RAID 10 * 6
Single * 1	7	Online RAID level migration	RAID 10 * 8
RAID 1 * 2	1	Online RAID level migration	RAID 5 * 3
RAID 1 * 2	2	Online RAID level migration	RAID 5 * 4
RAID 1 * 2	3	Online RAID level migration	RAID 5 * 5
RAID 1 * 2	4	Online RAID level migration	RAID 5 * 6
RAID 1 * 2	5	Online RAID level migration	RAID 5 * 7
RAID 1 * 2	6	Online RAID level migration	RAID 5 * 8
RAID 1 * 2	2	Online RAID level migration	RAID 6 * 4
RAID 1 * 2	3	Online RAID level migration	RAID 6 * 5
RAID 1 * 2	4	Online RAID level migration	RAID 6 * 6
RAID 1 * 2	5	Online RAID level migration	RAID 6 * 7
RAID 1 * 2	6	Online RAID level migration	RAID 6 * 8

RAID 1 * 2	2	Online RAID level migration	RAID 10 * 4
RAID 1 * 2	4	Online RAID level migration	RAID 10 * 6
RAID 1 * 2	6	Online RAID level migration	RAID 10 * 8
RAID 5 * 3	1	Online RAID level migration	RAID 6 * 4
RAID 5 * 3	2	Online RAID level migration	RAID 6 * 5
RAID 5 * 3	3	Online RAID level migration	RAID 6 * 6
RAID 5 * 3	4	Online RAID level migration	RAID 6 * 7
RAID 5 * 3	5	Online RAID level migration	RAID 6 * 8

### 4.2.3 Hard Disk S.M.A.R.T

Monitor the hard disk drives (HDD) health, temperature, and the usage status by HDD S.M.A.R.T. (Self-Monitoring Analysis and Reporting Technology).

The following information of each hard drive on the NAS is available.

Field	Description
Summary	Display the hard drive S.M.A.R.T. summary and the latest test result.
Hard disk information	Display the hard drive details, for example, model, serial number, HDD capacity.
SMART information	Display the hard drive S.M.A.R.T. information. Any items that the values are lower than the threshold are regarded as abnormal.
Test	Perform quick or complete hard drive S.M.A.R.T. test.
Settings	Configure temperature alarm. When the hard drive temperature is over the preset values, the NAS records the error logs. You can also set the quick and complete test schedule. The latest test result is shown on the Summary page.

#### **4.2.4 Encrypted File System**

You can manage the encrypted disk volumes on the NAS on this page. Each encrypted disk volume is locked by a particular key. The encrypted volume can be unlocked by the following methods:

- **Encryption Password:** Enter the encryption password to unlock the disk volume. The default password is "admin". The password must be 8-16 characters long. Symbols (! @ # \$ % ^ & \* ( ) \_ + = ?) are supported.
- **Encryption Key File:** Upload the encryption file to the NAS to unlock the disk volume. The key can be downloaded from "Encryption Key Management" page after the disk volume has been unlocked successfully.

The data encryption functions may not be available in accordance to the legislative restrictions of some countries (ex. Russia, Belarus, Ukraine, Kazakhstan and Uzbekistan.)

#### **Data Encryption on QNAP Turbo NAS**

The disk volumes on the NAS can be encrypted with 256-bit AES encryption for data breach protection. The encrypted disk volumes can only be mounted for normal read/write access with the authorized password. The encryption feature protects the confidential data from unauthorized access even if the hard drives or the entire NAS were stolen.

#### **About AES encryption:**

*In cryptography, the Advanced Encryption Standard (AES) is an encryption standard adopted by the U.S. government. The standard comprises three block ciphers, AES-128, AES-192 and AES-256 [...]. Each AES cipher has a 128-bit block size, with key sizes of 128, 192 and 256 bits, respectively. The AES ciphers have been analyzed extensively and are now used worldwide. (Source: [http://en.wikipedia.org/wiki/Advanced\\_Encryption\\_Standard](http://en.wikipedia.org/wiki/Advanced_Encryption_Standard))*

The AES volume-based encryption is applicable only to specific QNAP NAS models. Please refer to the comparison table at: [http://www.qnap.com/images/products/comparison/Comparison\\_NAS.html](http://www.qnap.com/images/products/comparison/Comparison_NAS.html)

#### **Before you Start**

Please beware of the following before using the data encryption feature of the NAS.

- The encryption feature of the NAS is volume-based. A volume can be a single disk, a



JBOD configuration, or a RAID array.

- Select whether or not to encrypt a disk volume before it is created on the NAS. In other words, you will not be able to encrypt a volume after it has been created unless the disk volume is initialized. Note that initializing a disk volume will clear all the disk data.
- The encryption on the disk volume cannot be removed without initialization. To remove the encryption on the disk volume, you have to initialize the disk volume and all the data will be cleared.
- Keep the encryption password or key safe. If you forgot the password or lost the encryption key, the data cannot be accessed anymore.
- Before you start, read the instructions carefully and strictly adhere to the instructions.

## **Creating New Encrypted Disk Volumes**

If the NAS has been installed, to create a new encrypted disk volume by installing new hard drives on the NAS, follow the steps below:

1. Install the new hard drive(s) on the NAS.
2. Login the NAS as an administrator. Go to Storage Manager" > "Volume Management".
3. Click "Create".
4. Select the disk volume you want to configure according to the number of new hard drives installed.
5. Check the drive for the intended volume.
6. Select "Yes" for the "Encryption" option and enter the encryption settings. Then click "Create" to create the new encrypted volume.

Note that all the data on the selected drives will be DELETED! Please back up the data before creating the encrypted volume.

You have created an encrypted disk volume on the NAS.

## **Encryption Verification**

To verify the disk volume is encrypted, login the NAS as an administrator. Go to "Storage Manager" > "Volume Management". You will be able to see the encrypted disk volume, with a lock icon in the Status column. The lock will be open if the encrypted volume has been unlocked. A disk volume without the lock icon in the Status column is not

encrypted.

## **Behavior of Encrypted Volumes upon System Reboot**

In this example, we have two encrypted disk volumes on the NAS.

- The first volume (Single Disk Drive 1) has been created with the option "Save Encryption Key" disabled.
- The second volume (Single Disk Drive 4) has been created with the option "Save Encryption Key" enabled.

After restarting the NAS, check the volume status. The first drive has been unlocked and mounted but the second drive is locked. Since the encryption key is not saved on the second disk volume, you have to manually enter the encryption password to unlock it.

- Saving the key on the NAS will protect you only if your hard drives are stolen. However, there is a risk of data breach if the entire NAS is stolen as the data is accessible after restarting the NAS.
- If you select not to save the encryption key on the NAS, your NAS will be protected against data breach even if the entire NAS were stolen. The disadvantage is that you have to unlock the disk volume manually on each system restart.

## **Encryption Key Management**

To manage the encryption key settings, login the NAS as an administrator and go to "Storage Manager" > "Encrypted File System".

There are four options to manage the encryption key:

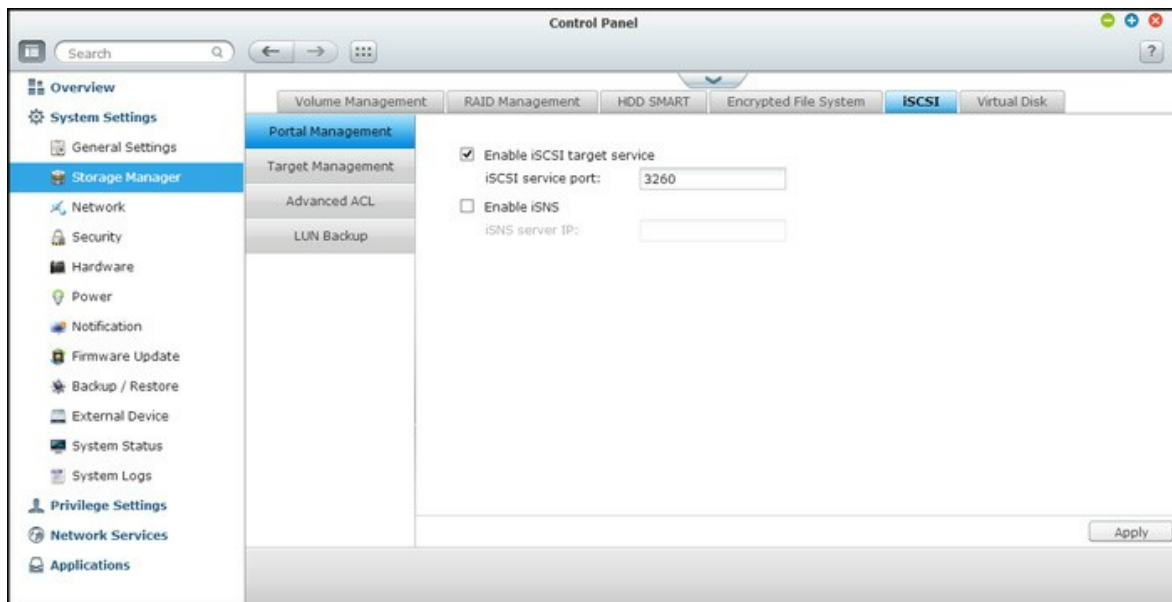
- Change the encryption key: Input your old encryption password and input the new password. (Note that after the password is changed, any previously exported keys will not be working anymore. You have to download the new encryption key if necessary, see below).
- Download Encryption Key File: Input the encryption password to download the encryption key file. Downloading the encryption key file will allow you to save the encryption key in a file. The file is also encrypted and can be used to unlock a volume, without knowing the real password (see "unlock a disk volume manually" below). Please save the encryption key file in a secure place!
- Remove Saved Key: Remove saved keys with this option.
- Save Encryption Key: Save the encryption key on the NAS for automatic unlocking and mounting the encrypted disk volume when the NAS restarts.

## **Unlocking Disk Volumes Manually**

To unlock a volume, login the NAS as an administrator. Go to "Storage Manager" > "Encrypted File System". You will be able to see your encrypted volumes and their status: locked or unlocked. To unlock your volume, first click "Unlock this device". Choose to either input the encryption password, or use the encryption key file that has been exported previously. If the encryption password or the key file is correct, the volume will be unlocked and become available.

#### 4.2.5 iSCSI

Go to "Control Panel" > "System Settings" > "General Settings" to manage the iSCSI target service, create iSCSI target lists and the advanced ACL and back up LUNs.



For setup on relevant features, refer to the following links:

- [Portal Management](#)<sup>[69]</sup>
- [Target Management](#)<sup>[72]</sup>
- [Advanced ACL](#)<sup>[79]</sup>
- [LUN Backup](#)<sup>[80]</sup>

#### 4.2.5.1 Portal Management

The NAS supports built-in iSCSI (Internet Small Computer System Interface) service for server clustering and virtualized environments.

#### Manual iSCSI Configuration

The NAS supports built-in iSCSI service. To use this function, follow the steps below:

1. Install an iSCSI initiator on the computer (Windows PC, Mac, or Linux).
2. Enable iSCSI Target Service on the NAS and create an iSCSI target.
3. Run the iSCSI initiator and connect to the iSCSI target (NAS).
4. After successful logon, format the iSCSI target (disk volume). You can start to use the disk volume on the NAS as a virtual drive on the computer.

In between the relationship of your computer and the storage device, the computer is called an initiator because it initiates the connection to the device, which is called a target.

**Note:** It is suggested NOT to connect to the same iSCSI target with two different clients (iSCSI initiators) at the same time, because this may lead to data damage or disk damage.

#### iSCSI Quick Configuration Wizard

A maximum of 256 iSCSI targets and LUNs can be created. For example, if you create 100 targets on the NAS, the maximum number of LUNs you can create is 156. Multiple LUNs can be created for each target. However, the maximum number of concurrent connections to the iSCSI targets supported by the NAS varies depending on the network infrastructure and the application performance. Too many concurrent connections may slow down the performance of the NAS.

Follow the steps below to configure the iSCSI target service on the NAS.

1. Under the "Portal Management" tab enable iSCSI target service. Apply the settings.
2. Go to the "Target Management" tab and create iSCSI targets on the NAS. If you have not created any iSCSI targets, the Quick Installation Wizard will automatically be launched and prompt users to create iSCSI targets and LUNs (Logical unit number). Click "OK".

3. Select to create an iSCSI target with a mapped LUN, an iSCSI target only, or an iSCSI LUN only. Click "Next."
4. Create iSCSI target with a mapped LUN.
5. Click "Next."
6. Enter the target name and target alias. You may check the options "Data Digest" and/or "Header Digest" (optional). These are the parameters that the iSCSI initiator will be verified when it attempts to connect to the iSCSI target.
7. Enter the CHAP authentication settings. If you enter the username and password settings under "Use CHAP authentication" only, only the iSCSI target authenticates the initiator, i.e. the initiators have to enter the username and password settings here to access the target.

Mutual CHAP: Enable this option for two-way authentication between the iSCSI target and the initiator. The target authenticates the initiator using the first set of username and password. The initiator authenticates the target using the "Mutual CHAP" settings.

Field	Username limitation	Password limitation
Use CHAP authentication	<ul style="list-style-type: none"> <li>The only valid characters are 0-9, a-z, A-Z</li> <li>Maximum length: 256 characters</li> </ul>	<ul style="list-style-type: none"> <li>The only valid characters are 0-9, a-z, A-Z</li> <li>Maximum length: 12-16 characters</li> </ul>
Mutual CHAP	<ul style="list-style-type: none"> <li>The only valid characters are 0-9, a-z, A-Z, : (colon), . (dot), and - (dash)</li> <li>Maximum length: 12-16 characters</li> </ul>	<ul style="list-style-type: none"> <li>The only valid characters are 0-9, a-z, A-Z, : (colon), . (dot), and - (dash)</li> <li>Maximum length: 12-16 characters</li> </ul>

## Creating iSCSI LUNs

An iSCSI LUN is a logical volume mapped to the iSCSI target. Select one of the following modes to allocate the disk space to the LUN:

- Thin Provisioning: Allocate the disk space in a flexible manner. You can allocate the disk space to the target anytime regardless of the current storage capacity available on the NAS. Over-allocation is allowed as the storage capacity of the NAS can be expanded by online RAID capacity expansion.

- Instant Allocation: Allocate the disk space to the LUN instantly. This option guarantees the disk space assigned to the LUN but may take more time to create the LUN.
1. Enter the name of the LUN and specify the LUN location (disk volume on the NAS). Enter the capacity for the LUN. Click "Next".
  2. Confirm the settings and click "Next".
  3. When the target and the LUN have been created, click "Finish".
  4. The target and LUN are shown on the list under the "Target Management" tab.

#### 4.2.5.2 Target Management

##### Creating iSCSI Targets

**Note:** The description below applies to non Intel-based NAS models running firmware version **3.3.0 or later** and Intel-based NAS models running firmware version **3.2.0 or later** only.










You can create multiple LUNs for an iSCSI target. Follow the steps below to create more LUNs for an iSCSI target.

1. Click "Quick Configuration Wizard" under "Target Management".
2. Select "iSCSI LUN only" and click "Next".
3. Select the allocation method. Enter the name of the LUN, select the LUN directory, and specify the capacity for the LUN. Click "Next."
4. Select the target to map the LUN to (optional step).
5. Confirm the settings and click "Next."
6. When the LUN has been created, click "Finish" to exit the wizard.
7. The LUNs created can be mapped to and unmapped from the iSCSI target anytime.

You can also unmap the LUN from a target and map it to another target.

Item	Status	Description
iSCSI target	Ready	The iSCSI target is ready but no initiator has connected to it yet.
	Connected	The iSCSI target has been connected by an initiator.
	Disconnected	The iSCSI target has been disconnected.
	Offline	The iSCSI target has been deactivated and cannot be connected by the initiator.
LUN	Enabled	The LUN is active for connection and is visible to authenticated initiators.
	Disabled	The LUN is inactive and is invisible to the initiators.



Button	Name	Description
	Deactivate	Deactivate a ready or connected target. Note that the connection from the initiators will be removed.
	Activate	Activate an offline target.
	Modify	Modify the target settings: target alias, CHAP information, and checksum settings. Modify the LUN settings: LUN allocation, name, disk volume directory, etc.
	Delete	Delete an iSCSI target. All the connections will be removed.
	Disable	Disable an LUN. All the connections will be removed.
	Enable	Enable an LUN.
	Unmap	Unmap the LUN from the target. Note that you must disable the LUN first before unmapping the LUN. When you click this button, the LUN will be moved to "Un-Mapped iSCSI LUN List".
	Map	Map the LUN to an iSCSI target. This option is only available on the "Un-Mapped iSCSI LUN List".
	View	View the connection status of an iSCSI target.

## Switching LUN Mapping

**Note:** The description below applies to non Intel-based NAS models running firmware version **3.3.0 or later** and Intel-based NAS models running firmware version **3.2.0 or later** only.

Follow the steps below to switch the mapping of an iSCSI LUN.

1. Select an iSCSI LUN to unmap from an iSCSI target and click (Disable).
2. Next, click "Unmap" to unmap the LUN. The LUN will appear on the Un-Mapped iSCSI LUN List. Click "Map" to map the LUN to another target.
3. Select the target to map the LUN to and click "Apply"
4. The LUN is mapped to the target.

After creating the iSCSI targets and LUN on the NAS, you can use the iSCSI initiator installed on your computer (Windows PC, Mac, or Linux) to connect to the iSCSI targets and LUN and use the disk volumes as the virtual drives on your computer.

### iSCSI LUN Capacity Expansion

The NAS supports expanding the capacity of an iSCSI LUN. To do so, follow the steps below.

1. Locate an iSCSI LUN on the iSCSI target list in "iSCSI" > "Target Management". Click "Modify".
2. Specify the capacity of the LUN. Note that the LUN capacity can be increased many times up to the maximum limit but cannot be decreased.
3. Click "Apply" to save the settings.

#### Note:

- An iSCSI LUN must be mapped to an iSCSI target before increasing the capacity.
- For the type of LUN allocation, the maximum LUN capacity for thin provisioning is 32TB, while for instant allocation, the maximum LUN capacity is free space available on the disk volume.

### Optimizing iSCSI Performance

In the environments that require high performance storage, such as virtualization, users are recommended to do the following to optimize the iSCSI and NAS hard disks performance:

- **Use instant allocation:** When creating an iSCSI LUN, select "Instant Allocation" to achieve slightly higher iSCSI performance. However, the benefits of thin provisioning will be lost.
- **Create multiple LUNs:** Create multiple LUNs according to the processor number of the NAS. The information can be checked in "System Status" > "Resource Monitor." If the NAS has four processors, it is advised to create four or more LUNs to optimize the iSCSI performance.
- **Use different LUNs for heavy load applications:** Spread the applications such as database and virtual machines that need high Read/Write performance on different LUNs. For example, if there are two virtual machines which read and write data intensively on the LUNs, it is recommended to create two LUNs on the NAS so that the VM workloads can be efficiently distributed.

Before you start to use the iSCSI target service, make sure you have created an iSCSI target with a LUN on the NAS and installed the correct iSCSI initiator for your OS.

### **iSCSI initiator on Windows:**

Microsoft iSCSI Software Initiator v2.07 is an official application for Windows OS 2003, XP, and 2000 to allow users to implement an external iSCSI storage array over the network. If you are using Windows Vista or Windows Server 2008, Microsoft iSCSI Software Initiator is included. For more information and the download location, visit: <http://www.microsoft.com/downloads/details.aspx?familyid=12cb3c1a-15d6-4585-b385-befd1319f825&displaylang=en>

### **Using iSCSI initiator:**

Start iSCSI initiator from "Control Panel" > "Administrative Tools". Under the "Discovery" tab click "Add Portal". Enter the NAS IP and the port number for the iSCSI service. The available iSCSI targets and their status will then be shown under the "Targets" tab. Select the target you wish to connect then click "Connect". You may click "Advanced" to specify the logon information if you have configured the authentication otherwise simply click "OK" to continue. Upon successful logon, the status of the target now shows "Connected".

After the target has been connected Windows will detect its presence and treat it as if a new hard disk drive has been added which needs to be initialized and formatted before we can use it. Right click "My Computer" > "Manage" to open the "Computer Management" window then go to "Disk Management" and a window should pop up automatically asking whether you want to initialize the newly found hard drive. Click "OK" then format this drive as normally you would when adding a new disk. After disk initialization and formatting, the new drive is attached to your PC. You can now use this iSCSI target as a regular disk partition.

This section shows you how to use Xtend SAN iSCSI Initiator on Mac OS to add the iSCSI target (QNAP NAS) as an extra partition. Before you start to use the iSCSI target service, make sure you have created an iSCSI target with a LUN on the NAS and installed the correct iSCSI initiator for your OS.

#### **About Xtend SAN iSCSI initiator:**

ATTO's Xtend SAN iSCSI Initiator for Mac OS X allows Mac users to utilize and benefit from iSCSI. It is compatible with Mac OS X 10.4.x to 10.6.x. For more information, please visit:

<http://www.attotech.com/products/product.php?sku=INIT-MAC0-001>

#### **Using Xtend SAN iSCSI initiator:**

Follow the steps below:

1. After installing Xtend SAN iSCSI initiator, you can find it in "Applications".
2. Click the "Discover Targets" tab, you can either choose "Discover by DNS/IP" or "Discover by iSNS" according to the network topology. In this example, we will use the IP address to discover the iSCSI targets.
3. Follow the screen instructions and enter the server address, iSCSI target port number (default: 3260), and CHAP information (if applicable). Click "Finish" to retrieve the target list after all the data have been entered correctly.
4. All the available iSCSI targets on the NAS will be shown. Select the target you would like to connect and click "Add".

You can configure the connection properties of the selected iSCSI target in the "Setup" tab. Click the "Status" tab, select the target to connect. Then click "Login" to proceed. The first time you logon to the iSCSI target, a popup message will be shown to remind you the disk is not initialized. Click "Initialize..." to format the disk. You can also open the "Disk Utilities" application to do the initialization. You can now use the iSCSI target as an external drive on your Mac.

This section shows you how to use Linux Open-iSCSI Initiator on Ubuntu to add the iSCSI target (QNAP NAS) as an extra partition. Before you start to use the iSCSI target service, make sure you have created an iSCSI target with a LUN on the NAS and installed the correct iSCSI initiator for your OS.

### **About Linux Open-iSCSI Initiator:**

The Linux Open-iSCSI Initiator is a built-in package in Ubuntu 8.04 LTS (or later). You can connect to an iSCSI volume at a shell prompt with just a few commands. More information about Ubuntu is available at <http://www.ubuntu.com> and for information and download location of Open-iSCSI, please visit: <http://www.open-iscsi.org>

**Note:** Snapshot LUNs are not supported by the Linux Open-iSCSI Initiator.

### **Using Linux Open-iSCSI Initiator:**

Install the open-iscsi package. The package is also known as the Linux Open-iSCSI Initiator.

```
# sudo apt-get install open-iscsi
```

Now follow the steps below to connect to an iSCSI target (QNAP NAS) with Linux Open-iSCSI Initiator.

You may need to modify the iscsid.conf for CHAP logon information, such as node.session.auth.username & node.session.auth.password.

```
# vi /etc/iscsi/iscsid.conf
```

Save and close the file, then restart the open-iscsi service.

```
# /etc/init.d/open-iscsi restart
```

Discover the iSCSI targets on a specific host (the QNAP NAS in this example), for example, 10.8.12.31 with default port 3260.

```
# iscsiadm -m discovery -t sendtargets -p 10.8.12.31:3260
```

Check the available iSCSI node(s) to connect.

```
# iscsiadm -m node
```

\*\* You can delete the node(s) you do not want to connect to when the service is on with the following command:

```
# iscsiadm -m node --op delete --targetname THE_TARGET_IQN
```

Restart open-iscsi to login all the available nodes.

```
# /etc/init.d/open-iscsi restart
```

You should be able to see the login message as below:

Login session [iface: default, target: iqn.2004-04.com:NAS:iSCSI.ForUbuntu.B9281B,  
portal: 10.8.12.31,3260] [ OK ]

Check the device status with dmesg.

```
# dmesg | tail
```

Enter the following command to create a partition, /dev/sdb is the device name.

```
# fdisk /dev/sdb
```

Format the partition.

```
# mkfs.ext3 /dev/sdb1
```

Mount the file system.

```
# mkdir /mnt/iscsi
```

```
# mount /dev/sdb1 /mnt/iscsi/
```

You can test the I/O speed using the following command.

```
# hdparm -tT /dev/sdb1
```

Below are some "iscsiadm" related commands.

Discover the targets on the host:

```
# iscsiadm -m discovery --type sendtargets --portal HOST_IP
```

Login a target:

```
# iscsiadm -m node --targetname THE_TARGET_IQN --login
```

Logout a target:

```
# iscsiadm -m node --targetname THE_TARGET_IQN --logout
```

Delete a Target:

```
# iscsiadm -m node --op delete --targetname THE_TARGET_IQN
```

#### 4.2.5.3 Advanced ACL

**Note:** The description below applies to non Intel-based NAS models running firmware version **3.3.0 or later** and Intel-based NAS models running firmware version **3.2.0 or later** only.

You can create LUN masking policy to configure the permission of the iSCSI initiators which attempt to access the LUN mapped to the iSCSI targets on the NAS. To use this feature, click "Add a Policy" under "Advanced ACL".

Enter the policy name, the initiator IQN, and assign the access right for each LUN created on the NAS.

- Read-only: The connected initiator can only read the data from the LUN.
- Read/Write: The connected initiator has read and write access right to the LUN.
- Deny Access: The LUN is invisible to the connected initiator.

If no LUN masking policy is specified for a connected iSCSI initiator, the default policy will be applied. The system default policy allows read and write access from all the connected iSCSI initiators. You can click "Edit" to edit the default policy.

**Note:** Make sure you have created at least one LUN on the NAS before editing the default LUN policy.

#### **Hint: How do I find the initiator IQN?**

Start Microsoft iSCSI initiator and click "General". You can then find the IQN of the initiator.





#### 4.2.5.4 LUN Backup

The NAS supports backing up iSCSI LUNs to different storage locations (Windows, Linux, or local shared folders), restoring the LUNs to the NAS, or creating a LUN snapshot and mapping it to an iSCSI target.

#### Backing up iSCSI LUNs

Before backing up an iSCSI LUN, make sure at least one iSCSI LUN has been created on the NAS. To create iSCSI targets and LUN, go to "Storage Manager" > "iSCSI" > "Target Management".

1. Go to "Storage Manager" > "iSCSI" > "LUN Backup". Click "Create a new job".
2. Select "Back up an iSCSI LUN" and click "Next".
3. Select the source LUN for backup. If an online LUN is selected, the NAS will create a point-in-time snapshot for the LUN automatically.
4. Specify the destination where the LUN will be backed up to. The NAS supports LUN backup to a Linux share (NFS), a Windows share (CIFS/SMB), and a local folder on the NAS. Click "Test" to test the connection to the specified path. Then click "Next".
5. Enter a name of the backup LUN image or use the one generated by the NAS. Select the subfolder where the image file will be stored. Select to use compression or not and click "Next". (Use Compression: When this option is enabled, more CPU resources of the NAS will be consumed but the size of the backup LUN can be reduced. The backup time may vary depending on the size of the iSCSI LUN.)
6. Specify the backup schedule, choose the backup period (Now, Hourly, Daily, Weekly, or Monthly) and click "Next".
7. The settings will be shown. Enter a name for the job or use the one generated by the NAS. Click "Next."
8. Click "Finish" to exit.
9. The backup job is shown on the list.

Button	Name	Description
	Start	Start the job immediately.
	Stop	Stop the running job.
	Edit	Edit the job settings.
	View	View the job status and logs.




#### Restoring iSCSI LUNs



To restore an iSCSI LUN to the NAS, follow the steps below:

1. Go to "Storage Manager" > "iSCSI" > "LUN Backup". Click "Create a job".
2. Select "Restore an iSCSI LUN" and click "Next."
3. Specify the protocol, IP address/host name, and folder/path of the restore source.  
Click "Test" to test the connection. Then click "Next".
4. Browse and select the LUN image file and click "Next."
5. Select the destination and click "Next".
6. The settings will be shown. Enter a name for the job or use the one generated by the NAS. Click "Next".
7. Click "Finish" to exit.

The restore job will be executed immediately.

Button	Name	Description
	Stop	Stop the running job.
	Edit	Edit the job settings.
	View	View the job status and logs.

**Note:** For Step 5 above:

- Overwrite existing LUN: Restore the iSCSI LUN and overwrite the existing LUN on the NAS. All the data on the original LUN will be overwritten.
- Create a new LUN: Restore the iSCSI LUN to the NAS as a new LUN. Enter the name and select the location of the new LUN. Make sure you have created at least one LUN on the NAS before editing the default LUN policy.

## Creating iSCSI LUN Snapshots

Before creating an iSCSI LUN snapshot, make sure at least one iSCSI LUN and one iSCSI target has been created on the NAS. To create iSCSI targets and LUN, go to "Storage Manager" > "iSCSI" > "Target Management".

To create an iSCSI LUN snapshot, follow the steps below:

1. Go to "Storage Manager" > "iSCSI" > "LUN Backup". Click "Create a job".
2. Select "Create a LUN Snapshot" and click "Next".
3. Select an iSCSI LUN on the NAS. Only one snapshot can be created for each iSCSI

- LUN. Click "Next".
4. Enter a name for the LUN snapshot or use the one generated by the NAS. Select an iSCSI target where the LUN snapshot is mapped to. Click "Next". The LUN snapshot must be mapped to another iSCSI target different from the original one.
  5. Specify the snapshot schedule and the snapshot duration. The snapshot will be removed automatically when the snapshot duration is reached.
  6. The settings will be shown. Enter a name for the job or use the one generated by the NAS. Click "Next".
  7. Click "Finish" to exit.
  8. The snapshot will be created immediately. The status and duration will be shown on the list.
  9. Go to "iSCSI" > "Target Management", the snapshot LUN will be shown in the iSCSI Target List. Use iSCSI initiator software to connect to the iSCSI target and access the point-in-time data on the snapshot LUN. For the information of connecting to the iSCSI targets on QNAP NAS, please refer to [http://www.qnap.com/pro\\_application.asp?ap\\_id=135](http://www.qnap.com/pro_application.asp?ap_id=135).

**Note:** The source LUN and snapshot LUN cannot be mounted on the same NAS on certain operating systems such as Windows 7 and Windows 2008 R2. Please mount the LUN to different NAS servers in such case.

### Managing LUN Backup/Restore/Snapshot by Command Line

QNAP NAS users can execute or stop the iSCSI LUN backup, restore, or snapshot jobs on the NAS by command line. Follow the instructions below to use this feature.

**Note:** The following instructions should only be operated by IT administrators who are familiar with command line.

1. First make sure the iSCSI LUN backup, restore, or snapshot jobs have been created on the NAS in "Storage Manager" > "iSCSI" > "LUN Backup".
2. Connect to the NAS by an SSH utility such as Pietty.
3. Login the NAS as an administrator.
4. Input the command "lunbackup". The command usage description will be shown.
5. Use the lunbackup command to start or stop an iSCSI LUN backup, restore, or snapshot job on the NAS.

#### 4.2.6 Virtual Disk



You can use this function to add the iSCSI targets of other QNAP NAS or storage servers to the NAS as the virtual disks for storage capacity expansion. The NAS supports maximum 8 virtual disks.




**Note:**

- The maximum size of a virtual disk the NAS supports is 16TB.
- When the virtual disk (iSCSI target) was disconnected, the virtual disk will disappear on the NAS interface and the NAS will try to connect to the target in two minutes. If the target cannot be connected after two minutes, the status of the virtual disk will become "Disconnected".

To add a virtual disk to the NAS, make sure an iSCSI target has been created and follow the steps below:

1. Click "Add Virtual Disk".
2. Enter the target server IP and port number (default: 3260). Click "Get Remote Disk". Select a target from the target list. If authentication is required, enter the username and the password. You may select the options "Data Digest" and/or "Header Digest" (optional). These are the parameters that the iSCSI initiator will be verified when it attempts to connect to the iSCSI target. Then, click "Next".
3. Enter a name for the virtual disk. If the target is mapped with multiple LUNs, select a LUN from the list. Make sure only this NAS can connect to the LUN. The NAS supports mounting EXT3, EXT4, FAT32, NTFS, HFS+ file systems. If the file system of the LUN is "Unknown", select "Format virtual disk now" and the file system. You can format the virtual disk as EXT3, EXT4, FAT 32, NTFS, or HFS+. By selecting "Format virtual disk now", the data on the LUN will be removed.
4. Click "Finish" to exit the wizard.
5. The storage capacity of your NAS has been expanded by the virtual disk. You can go to "Privilege Settings" > "Share Folders" to create new shared folders on the virtual disk.

Ico n	Name	Description
	Edit	To edit a virtual disk name or the authentication information of an iSCSI target.
	Connect	To connect to an iSCSI target.

	Disconnect	To disconnect an iSCSI target.
	Format	To format a virtual disk as EXT3, EXT 4, FAT 32, NTFS, or HFS+ file system.
	Delete	To delete a virtual disk or an iSCSI target.

### 4.3 Network

Go to "Control Panel" > "System Settings" > "Network" to configure the network settings of your NAS.

Edit	Link	Interface	DHCP	IP Address	Subnet Mask	Gateway	MAC address
		Ethernet1	Yes	172.17.20.50	255.255.254.0	172.17.20.1	00:08:9B:...
		Ethernet2	Yes	0.0.0.0	0.0.0.0	0.0.0.0	00:08:9B:...

**DNS Server**  
☒ Obtain DNS server address automatically: ⓘ  
☐ Use the following DNS server address:  
Primary DNS server: 0 . 0 . 0 . 0  
Secondary DNS server: 0 . 0 . 0 . 0

**Default Gateway**  
Use the settings from: Ethernet 1

Apply

Apply All

#### TCP/IP

##### (i) IP Address

Configure the TCP/IP settings, DNS Server and default Gateway of the NAS on this page.

Click the "Edit" button next to an interface under "Edit" to edit the network settings (including "Network Parameters", "Advanced Options", and "DHCP Server".) For the NAS with two LAN ports, users can connect both network interfaces to two different switches and configure the TCP/IP settings. The NAS will acquire two IP addresses which allow access from two different subnets. This is known as multi-IP settings\*. When using the Finder to detect the NAS IP, the IP of the Ethernet 1 will be shown in LAN 1 only and the IP of the Ethernet 2 will be shown in LAN 2 only. To use the port trunking mode for dual LAN connection, see section (iii).

\* TS-110, TS-119, TS-210, TS-219, TS-219P, TS-119P+, TS-219P+, TS-112, and TS-212 provide one Giga LAN port only therefore do not support dual LAN configuration or port trunking.

##### Network Parameters

Under the "Network Parameters" tab on the TCP/IP Property page, configure the following

settings:

- **Network Speed:** Select the network transfer rate according to the network environment to which the NAS is connected. Select auto negotiation and the NAS will adjust the transfer rate automatically.
- **Obtain the IP address settings automatically via DHCP:** If the network supports DHCP, select this option and the NAS will obtain the IP address and network settings automatically.
- **Use static IP address:** To use a static IP address for network connection, enter the IP address, subnet mask, and default gateway.
- **Jumbo Frame:** "Jumbo Frames" refer to the Ethernet frames that are larger than 1500 bytes. It is designed to enhance Ethernet networking throughput and reduce the CPU utilization of large file transfers by enabling more efficient larger payloads per packet. Maximum Transmission Unit (MTU) refers to the size (in bytes) of the largest packet that a given layer of a communications protocol can transmit. The NAS uses standard Ethernet frames (1500 bytes) by default. If the network appliances support Jumbo Frame setting, select the appropriate MTU value for the network environment. The NAS supports 4074, 7418, and 9000 bytes for MTU.

**Note:**

- The Jumbo Frame setting is valid in Gigabit network environment only. All the network appliances connected must enable Jumbo Frame and use the same MTU value.
- Jumbo frames are supported only by certain Turbo NAS models. Please refer to the software specification page on the QNAP website for further details.

### Advanced Options

A Virtual LAN (VLAN) is a group of hosts which communicate as if they were attached to the same broadcast domain even if they were located in different physical locations. The NAS can be joined to a VLAN and configured as a backup storage of other devices on the same VLAN.

To join the NAS to a VLAN, select "Enable VLAN" and enter the VLAN ID (a value between 0 and 4094). Please keep the VLAN ID safe and make sure the client devices are able to join the VLAN. If you forgot the VLAN ID and were not able to connect to the NAS, you would need to press the reset button of the NAS to reset the network settings. Once the NAS is reset, the VLAN feature will be disabled. If the NAS supports two Gigabit LAN ports and only one network interface is configured to enable VLAN, you

may also connect to the NAS via the other network interface.

**Note:** The VLAN feature is supported by Intel-based NAS models only. Please visit <http://www.qnap.com> for details.

## DHCP Server

A DHCP (Dynamic Host Configuration Protocol) server assigns IP addresses to the clients on a network. Select "Enable DHCP Server" to set the NAS a DHCP server if there is none on the local network where the NAS locates.

### Note:

- Do not enable DHCP server if there is one the local network to avoid IP address conflicts or network access errors.
  - The DHCP server option is available to Ethernet 1 only when both LAN ports of a dual LAN NAS are connected to the network and configured as standalone IP settings.
- 
- **Start IP, End IP, Lease Time:** Set the range of IP addresses allocated by the NAS to the DHCP clients and the lease time. The lease time refers to the time that an IP address is leased to the clients. During that time, the IP will be reserved to the assigned client. When the lease time expires, the IP can be assigned to another client.
  - **WINS Server (optional):** WINS (Windows Internet Naming Service) resolves Windows network computer names (NetBIOS names) to IP addresses, allowing Windows computers on a network to easily find and communicate with each other. Enter the IP address of the WINS server on the network if available.
  - **DNS Suffix (optional):** The DNS suffix is used for resolution of unqualified or incomplete host names.
  - **TFTP Server & Boot File (optional):** The NAS supports PXE booting of network devices. Enter the IP address of the TFTP server and the boot file (including directory on the TFTP server and file name). For remote booting of the devices, enter the public IP address of the TFTP server.

## (ii) DNS Server

A DNS (Domain Name Service) server translates between a domain name (such as google.com) and an IP address (74.125.31.105). Configure the NAS to obtain a DNS server address automatically or specify the IP address of a DNS server.

- Primary DNS Server: Enter the IP address of the primary DNS server.
- Secondary DNS Server: Enter the IP address of the secondary DNS server.

**Note:**

- Please contact the ISP or network administrator for the IP address of the primary and the secondary DNS servers. When the NAS plays the role as a terminal and needs to perform independent connection, for example, BT download, enter at least one DNS server IP for proper URL connection. Otherwise, the function may not work properly.
- If you select to obtain the IP address by DHCP, there is no need to configure the primary and the secondary DNS servers. In this case, enter "0.0.0.0".

### **(iii) Default Gateway**

Select the gateway settings to use if both LAN ports have been connected to the network (dual LAN NAS models only).

### **(iv) Port Trunking**

The NAS supports port trunking which combines two Ethernet interfaces into one to increase the bandwidth and offers load balancing and fault tolerance (also known as failover). Load balancing is a feature which distributes the workload evenly across two Ethernet interfaces for higher redundancy. Failover is the capability to switch over to a standby network interface (also known as the slave interface) when the primary network interface (also known as the master interface) does not correspond correctly to maintain high availability.

To use port trunking on the NAS, make sure at least two LAN ports of the NAS have been connected to the same switch and the settings described in sections (i) and (ii) have been configured.

Follow the steps below to configure port trunking on the NAS:

1. Click "Port Trunking".
2. Select the network interfaces for a trunking group (Ethernet 1+2, Ethernet 3+4, Ethernet 5+6, or Ethernet 7+8). Choose a port trunking mode from the drop-down menu. The default option is Active Backup (Failover).
3. Select a port trunking group to use. Click "Apply".
4. Click "here" to connect to the login page.
5. Go to "Control Panel" > "System Settings" > "Network" > "TCP/IP".
6. Click the "Edit" button under "Edit" to edit the network settings.



**Note:**

- Make sure the Ethernet interfaces are connected to the correct switch and the switch has been configured to support the port trunking mode selected on the NAS.
- Port Trunking is available for NAS models with two or more LAN ports only.

The port trunking options available on the NAS:

Field	Description	Switch Required
Balance-rr (Round-Robin)	Round-Robin mode is good for general purpose load balancing between two Ethernet interfaces. This mode transmits packets in sequential order from the first available slave through the last. Balance-rr provides load balancing and fault tolerance.	Supports static trunking. Make sure static trunking is enabled on the switch.
Active Backup	Active Backup uses only one Ethernet interface. It switches to the second Ethernet interface if the first Ethernet interface does not work properly. Only one interface in the bond is active. The bond's MAC address is only visible externally on one port (network adapter) to avoid confusing the switch. Active Backup mode provides fault tolerance.	General switches
Balance XOR	Balance XOR balances traffic by splitting up outgoing packets between the Ethernet interfaces, using the same one for each specific destination when possible. It transmits based on the selected transmit hash policy. The default policy is a simple slave count operating on Layer 2 where the source MAC address is coupled with destination MAC address. Alternate transmit policies may be selected via the xmit_hash_policy option. Balance XOR mode provides load balancing and fault tolerance.	Supports static trunking. Make sure static trunking is enabled on the switch.

Broadcast	Broadcast sends traffic on both network interfaces. This mode provides fault tolerance.	Supports static trunking. Make sure static trunking is enabled on the switch.
IEEE 802.3ad (Dynamic Link Aggregation)	Dynamic Link Aggregation uses a complex algorithm to aggregate adapters by speed and duplex settings. It utilizes all slaves in the active aggregator according to the 802.3ad specification. Dynamic Link Aggregation mode provides load balancing and fault tolerance but requires a switch that supports IEEE 802.3ad with LACP mode properly configured.	Supports 802.3ad LACP
Balance-tlb (Adaptive Transmit Load Balancing)	Balance-tlb uses channel bonding that does not require any special switch. The outgoing traffic is distributed according to the current load on each Ethernet interface (computed relative to the speed). Incoming traffic is received by the current Ethernet interface. If the receiving Ethernet interface fails, the other slave takes over the MAC address of the failed receiving slave. Balance-tlb mode provides load balancing and fault tolerance.	General switches
Balance-alb (Adaptive Load Balancing)	Balance-alb is similar to balance-tlb but also attempts to redistribute incoming (receive load balancing) for IPV4 traffic. This setup does not require any special switch support or configuration. The receive load balancing is achieved by ARP negotiation sent by the local system on their way out and overwrites the source hardware address with the unique hardware address of one of the Ethernet interfaces in the bond such that different peers use different hardware address for the server. This mode provides load balancing and	General switches

	fault tolerance.	
--	------------------	--

## Wi-Fi



To connect the NAS to a Wi-Fi network, plug in a wireless dongle into a USB port of the NAS. The NAS will detect a list of wireless access points. You can connect the NAS to the Wi-Fi network in two ways.




### Note:

- The wireless connection performance depends on many factors such as the adapter model, the USB adapter's performance, and the network environment. For higher connection performance, you are recommended to use wired connection.
- The system supports only one USB Wi-Fi dongle at a time.
- For a list of compatible USB Wi-Fi dongles, please go to <http://www.qnap.com/compatibility> and select "USB Wi-Fi".
- This feature is not supported for TS-269H.

### Method 1: Connecting to an existing Wi-Fi network:

A list of Wi-Fi access points with signal strength are displayed on the "Wi-Fi Network Connection" panel.

Icon / Option	Name	Description
Rescan	Rescan	To search for the Wi-Fi networks in range.
	Secured network	This icon shows that the Wi-Fi network requires a network key; enter the key to connect to the network.
	Connect	To connect to Wi-Fi network. If a security key is required, you will be prompted to enter the key.

	Edit	To edit the connection information. You may also select to connect to the Wi-Fi network automatically when it is in range.
	Disconnect	To disconnect from the Wi-Fi network.
	Remove	To delete the Wi-Fi network profile from the panel.
Show all	Show all	Select this option to display all the available Wi-Fi networks. Unselect this option to show only the configured network profiles.

Click "Rescan" to search for available Wi-Fi networks in range. Select a Wi-Fi network to connect to and click the "Connect" button. Enter the security key if it is a security-key enabled network. Click "Next" and the NAS will attempt to connect to the wireless network. You can view the status of the configured network profiles.

Message	Description
Connected	The NAS is currently connected to the Wi-Fi network.
Connecting	The NAS is trying to connect to the Wi-Fi network.
Out of range or hidden SSID	The wireless signal is not available or the SSID is not broadcast.
Failed to get IP	The NAS is connected to the Wi-Fi network but could not get an IP address from the DHCP server. Please check the router settings.
Association failed	The NAS cannot connect to the Wi-Fi network. Please check the router settings.
Incorrect key	The security key entered is incorrect.
Auto connect	Automatically connect to the Wi-Fi network if it is in range. The auto connection function is not supported if the SSID of the Wi-Fi network is not broadcast.

### Method 2: Manually connecting to a Wi-Fi network:

To manually connect to a Wi-Fi network that does not broadcast its SSID (network name), click "Connect to a Wi-Fi network".

You can choose to connect to an ad hoc network in which you can connect to any wireless devices without the need for an access point. To set up, follow the steps below:

1. Enter the network name (SSID) of the wireless network and select the security type.
  - No authentication (Open): No security key required.
  - WEP: Enter up to 4 WEP keys and choose 1 key to be used for authentication.
  - WPA-Personal: Choose either the AES or TKIP encryption type and enter the encryption key.
  - WPA2-Personal: Enter a security key.
2. Type in the security key.
3. Click "Finish" after the NAS has added the Wi-Fi network.
4. To edit the IP address settings, click the "Edit" button. You can select to obtain the IP address automatically by DHCP or configure a fixed IP address.

If the Wi-Fi connection is the only connection between the NAS and the router/AP, you must select "WLAN1" as the default gateway in "Network" > "TCP/IP" page. Otherwise, the NAS will not be able to connect to the Internet or communicate with another network.

**Note:**

- The WEP key must be exactly 5 or 13 ASCII characters; or exactly 10 or 26 hexadecimal characters (0-9 and A-F).
- If you have trouble connecting to an encrypted wireless network, check the wireless router/AP settings and change the transfer rate from "N-only" mode to "B/G/N mixed" or similar settings.
- Users of Windows 7 with WPA2 encryption cannot establish ad-hoc connection with the NAS. Please change to use WEP encryption on Windows 7.
- A fixed IP address is required for the wireless interface in order to establish an ad-hoc connection.

## IPv6

The NAS supports IPv6 connectivity with "stateless" address configurations and RADVD (Router Advertisement Daemon) for IPv6, RFC 2461 to allow the hosts on the same subnet to acquire IPv6 addresses from the NAS automatically. The NAS services which

support IPv6 include:

- CIFS/SMB
- AFP
- NFS
- FTP
- iSCSI
- Web Server
- QTS Desktop
- RTRR
- SSH
- Qsync for Windows
- Netbak Replicator

To use this function, select the option "Enable IPv6" and click "Apply". The NAS will restart. After the system restarts, login the IPv6 page again. The settings of the IPv6 interface will be shown. Click the "Edit" button to edit the settings:

- **IPv6 Auto Configuration:** If an IPv6 enabled router is available on the network, select this option to allow the NAS to acquire the IPv6 address and the configurations automatically.
- **Use static IP address:** To use a static IP address, enter the IP address (e.g. 2001:bc95:1234:5678), prefix length (e.g. 64), and the gateway address for the NAS. You may contact your ISP for the information of the prefix and the prefix length.
  - **Enable Router Advertisement Daemon (radvd):** To configure the NAS as an IPv6 host and distribute IPv6 addresses to the local clients which support IPv6, enable this option and enter the prefix and prefix length.
- **IPv6 DNS server:** Enter the preferred DNS server in the upper field and the alternate DNS server in the lower field. Contact the ISP or network administrator for the information. If IPv6 auto configuration is selected, leave the fields as "::".

## Service Binding

The NAS services run on all available network interfaces by default. To bind the services to one or more specific network interfaces (wired or wireless), enable service binding. The available network interfaces on the NAS will be shown. All the NAS services run on all network interfaces by default. Select at least one network interface that each service should be bound to. Then click "Apply". The users will only be able to connect to the services via the specified network interface(s). If the settings cannot be applied, click

"Refresh" to list the current network interfaces on the NAS and configure service binding again.

**Note:**

- The service binding feature is only available for the NAS with more than one network interfaces (wired and wireless).
- After applying the service binding settings, the connection of the currently online users will be kept even if they were not connecting to the services via the specified network interface(s). The specified network interface(s) will be used for the next connected session.

## Proxy

Enter the proxy server settings to allow the NAS to access the Internet through a proxy server for live update of the firmware, virus definition update, and App add-ons download.

## DDNS Service

To allow remote access to the NAS using a domain name instead of a dynamic IP address, enable the DDNS service.

The NAS supports the DDNS providers: <http://www.dyndns.com>, <http://update.ods.org>, <http://www.dhs.org>, <http://www.dyns.cx>, <http://www.3322.org>, <http://www.no-ip.com>, Selfhost.de.

**Note:** Some DDNS services listed above are not free.

**Additional Reference:**

- How to set up proxy server on QNAP Turbo NAS for optimized website access.
- Set up DDNS Service for Remote Internet Access to QNAP NAS.

## 4.4 Security

Go to "Control Panel" > "System Settings" > "Security" to configure the relevant security settings of your NAS.

The screenshot shows the "Security Level" configuration window. It has three tabs: "Security Level" (selected), "Network Access Protection", and "Certificate & Private Key". Under "Security Level", there are three radio buttons: "Allow all connections", "Deny connections from the list" (selected), and "Allow connections from the list only". Below these is a text input field with the placeholder text "Enter the IP address or network from which the connections to this server will be allowed or rejected." To the right of the input field are "Add" and "Remove" buttons. Below the input field is a table with three columns: "Genre", "IP Address or Network Domain", and "Time Left for IP Blocking". The table is currently empty. At the bottom left of the window is an "Apply" button, and at the bottom center is an "Apply All" button.

### Security Level

Specify the IP address or the network domain from which the connections to the NAS are allowed or denied. When the connection of a host server is denied, all the protocols of that server are not allowed to connect to the NAS. After changing the settings, click "Apply" to save the changes. The network services will be restarted and current connections to the NAS will be terminated.

### Network Access Protection

The network access protection enhances system security and prevents unwanted intrusion. You can block an IP for a certain period of time or forever if the IP fails to login the NAS from a particular connection method.

### Certificate & Private Key

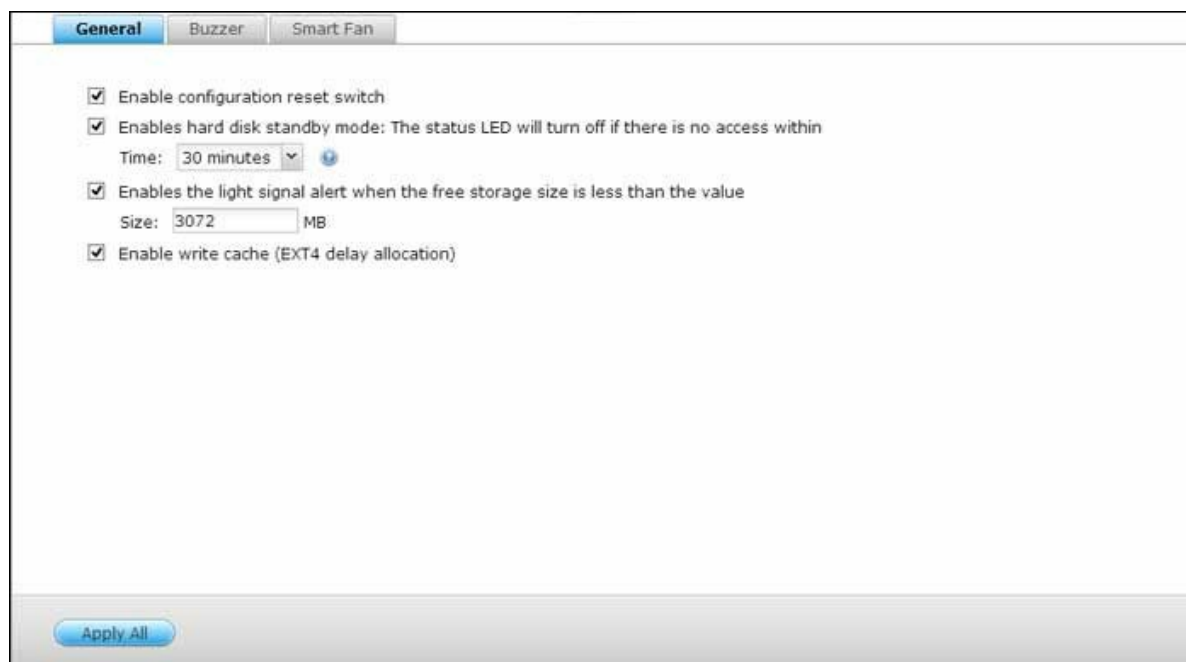


The Secure Socket Layer (SSL) is a protocol for encrypted communication between the web servers and the web browsers for secure data transfer. You can upload a secure certificate issued by a trusted provider. After uploading a secure certificate, users can connect to the administration interface of the NAS by SSL connection and there will not be any alert or error message. The NAS supports X.509 certificate and private key only.

- Download Certificate: To download the secure certificate which is currently in use.
- Download Private Key: To download the private key which is currently in use.
- Restore Default Certificate & Private Key: To restore the secure certificate and private key to system default. The secure certificate and private key in use will be overwritten.

## 4.5 Hardware

Go to "Control Panel" > "System Settings" > "Hardware" to configure the hardware functions of the NAS.



### General

- **Enable configuration reset switch:** When this function is turned on, you can press the reset button for 3 seconds to reset the administrator password and the system settings to default (the disk data will be retained,) or 10 seconds for advanced system reset.
  - **Basic system reset:** You will hear a beep sound after pressing and holding the reset button. The following settings will be reset to default:
    - System administration password: admin.
    - TCP/IP configuration: Obtain IP address settings automatically via DHCP.
    - TCP/IP configuration: Disable Jumbo Frame.
    - TCP/IP configuration: If port trunking is enabled (dual LAN models only), the port trunking mode will be reset to "Active Backup (Failover)".
    - System port: 8080 (system service port).
    - Security level: Low (Allow all connections).
    - LCD panel password: (blank); This feature is only provided by the NAS models with LCD panels. Please visit <http://www.qnap.com> for details.
    - VLAN will be disabled.
    - Service binding: All NAS services run on all available network interfaces.

- **Advanced system reset:** You will hear two beeps after continuously pressing the reset button. The NAS will reset all the system settings to default as it does by the web-based system reset in "Administration" > "Restore to Factory Default" except all the data are reserved. The settings such as the users, user groups, and the shared folders previously created will be cleared. To retrieve the old data after advanced system reset, create the same shared folders on the NAS and the data will be accessible again.
- **Enable hard disk standby mode:** This option allows the hard drives on the NAS to enter standby mode if there is no disk access within the specified period.
- **Enable light signal alert when the free size of SATA disk is less than the value:** The status LED flashes red and green when this option is turned on and the free space of the SATA hard drive is less than the value.
- **Enable write cache (EXT4 only):** If the disk volume of the NAS is formatted as EXT4, turn on this option for higher write performance. Note that an unexpected system shutdown may lead to incomplete data transfer when data write is in process. This option will be turned off when any of the following services is enabled: Download Station, MySQL service, user quota, and Surveillance Station. You are recommended to turn this option off if the NAS is set as a shared storage in a virtualized or clustered environment.
- **Enable warning alert for redundant power supply on the web-based interface:** If two power supply units (PSU) are installed on the NAS and connected to the power sockets, both PSU will supply the power to the NAS (applied to 1U and 2U models). Turn on the redundant power supply mode in "System Settings" > "Hardware" to receive warning alert for the redundant power supply. The NAS will sound and record the error messages in "System Logs" when the PSU is plugged out or does not correspond correctly. If only one PSU is installed on the NAS, do NOT enable this option. Note that this function is disabled by default.

## Buzzer

**Enable alarm buzzer:** Turn on this option to allow the alarm buzzer to beep when certain system operations (startup, shutdown, or firmware upgrade) are executed or system events (error or warning) occur.

## Write Cache

Better write performance can be obtained when this option is enabled. Please note that an unexpected system shutdown might cause incomplete data transfer when data write

is in progress. This option will be disabled when the Download Station or MySQL service is enabled.

## Smart Fan

Smart Fan Configuration:

- **Enable smart fan (recommended):** Select to use the default smart fan settings or define the settings manually. When the system default settings are selected, the fan rotation speed will be automatically adjusted when the NAS temperature, CPU temperature, and hard drive temperature meet the criteria. It is recommended to enable this option.
- **Set fan rotation speed manually:** By manually setting the fan rotation speed, the fan rotates at the defined speed continuously.

**Note:** The Turbo NAS shuts down automatically for hardware protection after temperature thresholds (e.g. system temperature or CPU temperature) are reached. The threshold values vary depending on Turbo NAS models.

## 4.6 Power

You can restart or shut down the NAS, specify the behavior of the NAS after a power recovery, and set the schedule for automatic system power on/off/restart on this page.

The screenshot shows the 'EuP Mode Configuration' web page. It features four tabs: 'EuP Mode Configuration', 'Wake-on-LAN (WOL)', 'Power Recovery', and 'Power Schedule'. The 'EuP Mode Configuration' tab is selected. Inside this tab, there are two radio buttons: 'Enable' and 'Disable'. The 'Disable' radio button is selected. Below the radio buttons, there is a note that reads: 'Note: When EuP is disabled, the power consumption of the server is slightly higher than 1W when the server is powered off.' There is an 'Apply' button below the note. At the bottom of the page, there is an 'Apply All' button.

### EuP Mode Configuration

EuP (also Energy-using Products) is a European Union (EU) directive designed to improve the energy efficiency of electrical devices, reduce use of hazardous substances, increase ease of product recycling, and improve environment-friendliness of the product.

When EuP is enabled, the following settings will be affected so that the NAS maintains low power consumption (less than 1W) when the NAS is powered off:

- Wake on LAN: Disabled.
- AC power resumption: The NAS will remain off after the power restores from an outage.
- Scheduled power on, off, restart settings: Disabled.

When EuP is disabled, the power consumption of the NAS is slightly higher than 1W when the NAS is powered off. EuP is disabled by default so that you can use the functions Wake on LAN, AC power resumption, and power schedule settings properly.

This feature is only supported by certain NAS models, please visit <http://www.qnap.com> for details.

## Wake-on-LAN (WOL)

Turn on this option to allow the users to power on the NAS remotely by Wake on LAN. Note that if the power connection is physically removed (in other words, the power cable is unplugged) when the NAS is turned off, Wake on LAN will not function whether or not the power supply is reconnected afterwards. To wake up the NAS when it is in sleep mode or powered down, please press the power button on the NAS or use the WOL feature in Qfinder or Qmanager. Please note that this wake-up function on the NAS is only available after the WOL option is enabled on the NAS ("Control Panel" > "System Settings" > "General Settings" > "Power" > "Wake-on-LAN (WOL)").

- For Qfinder, select a NAS and click "Tools" > "Remote Wake Up (Wake on LAN)".
- For Qmanager, click ">" next to the NAS to be selected on the login page, scroll down to the bottom of the screen and click "Wake on LAN (WOL)".

This feature is only supported by certain NAS models, please visit <http://www.qnap.com> for details.

## Power Recovery

Configure the NAS to resume to the previous power-on or power-off status, turn on, or remain off when the AC power resumes after a power outage.

**Note:** Only X86 based NAS models can be turned on automatically after power recovery. To set it up for X86 based NAS models, please select the option "Turn on the server automatically" in "Control Panel" > "System Settings" > "Power" > "Power Recovery".

## Power Schedule

Specify the schedule for automatic system power on, power off, restart, or sleep mode. Weekdays stand for Monday to Friday; weekend stands for Saturday and Sunday. Up to 15 schedules can be set.

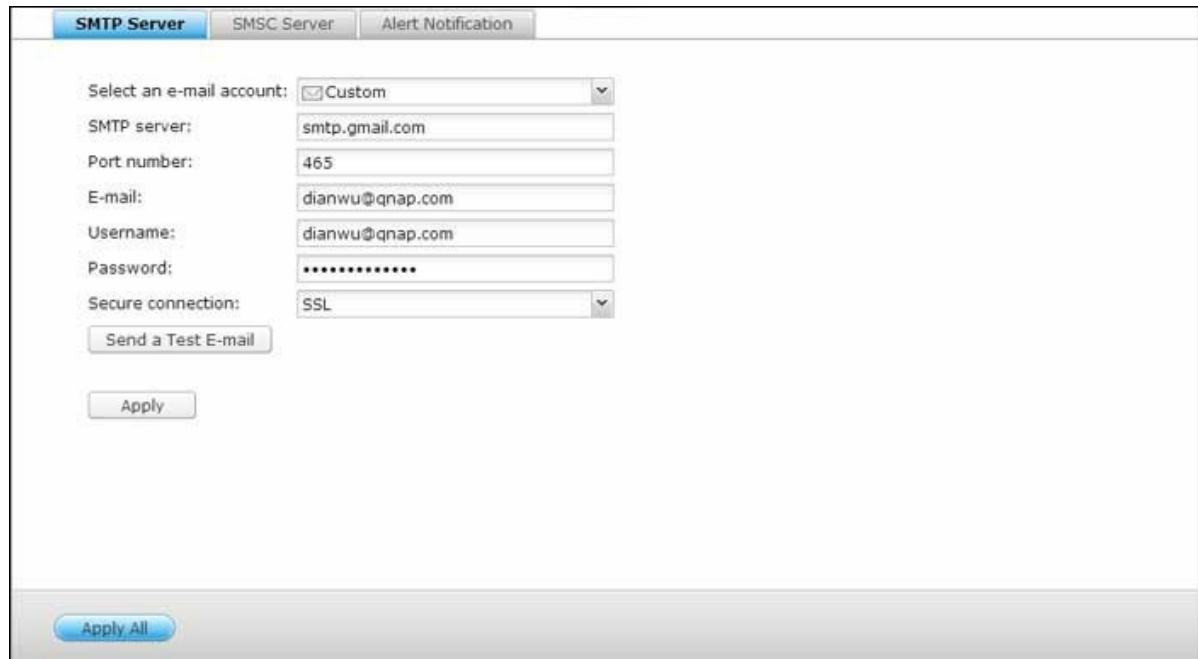
Turn on the option "Postpone the sleep/restart/shutdown schedule when replication job is in process" to allow the scheduled system restart or shutdown to be carried out after a running replication job completes. Otherwise, the NAS will ignore the running replication job and execute scheduled system restart or shutdown.

**Note:**

- The system cannot be shut down or restarted in sleep mode.
- If there are other QNAP storage expansion enclosures connected to the NAS, the sleep mode will be disabled automatically and system will not go into sleep mode.

## 4.7 Notification

Go to "Control Panel" > "System Settings" > "Notification" to configure the notification functions of the NAS.



The screenshot shows the "SMTP Server" configuration tab within the "Notification" settings. The interface includes the following fields and controls:

- Select an e-mail account:** A dropdown menu with "Custom" selected.
- SMTP server:** A text field containing "smtp.gmail.com".
- Port number:** A text field containing "465".
- E-mail:** A text field containing "dianwu@qnap.com".
- Username:** A text field containing "dianwu@qnap.com".
- Password:** A text field with masked characters (dots).
- Secure connection:** A dropdown menu with "SSL" selected.
- Buttons:** "Send a Test E-mail" and "Apply" are located below the fields. An "Apply All" button is at the bottom left of the panel.

### SMTP Server

The NAS supports email alert to inform the administrator of system errors and warning. To receive the alert by email, configure the SMTP server.

- Select an email account: specify the type of email account you would like to use for email alerts.
- SMTP Server: Enter the SMTP server name, for example, smtp.gmail.com.
- Port Number: Enter the port number for the SMTP server. The default port number is 25.
- Email: Enter email address of the alert recipient.
- Username and Password: Enter the login information of the email account.
- Secure connection: Choose SSL or TLS to ensure a secure connection between the NAS and SMTP server, or None based on your needs. It is advised to turn this function on if the SMTP server supports it.

### SMSC Server

Configure the SMSC server settings to send SMS messages to the specified phone number(s) from the NAS. The default SMS service provider is Clickatell. You can add your own SMS service provider by selecting "Add SMS Provider" from the drop-down menu.



When "Add SMS service provider" is selected, enter the name of the SMS provider and the URL template text.

**Note:** The URL template text must follow the standard of the SMS service provider to receive the SMS alert properly.

## Alert Notification

Select the type of instant alerts the NAS will send to the designated users when system events (warning/error) occur.

- **Alert Notification:** Specify what actions to take when a system event occurs.
- **E-mail Notification Settings:** Specify the email addresses (maximum 2) to receive instant system alert from the NAS.
- **SMS Notification Settings:** Specify the cell phone numbers (maximum 2) to receive instant system alert from the NAS.

## 4.8 Firmware Update

Go to "Control Panel" > "System Settings" > "Firmware Update" to update the firmware version of your NAS.



The screenshot shows the 'Firmware Update' tab in the QNAP web administration interface. It displays system information: Model TS-121, Current firmware version 4.1.1, Date 2014/06/17, and System up time of 34 days, 11 hours, and 40 minutes. There is a 'Check for Update' button and a status message indicating the last check was on 2014/08/31 at 09:54:29. A checkbox is checked for 'Automatically check if a newer version is available when logging into the NAS web administration interface.' Below this, there is a link to the 'QNAP Download Center' and an 'Apply' button.

### Live Update

Select "Automatically check if a newer version is available when logging into the NAS web administration interface" to allow the NAS to automatically check if a new firmware version is available for download from the Internet. If a new firmware is found, you will be notified after logging in the NAS as an administrator. Click "Check for Update" to check if any firmware update is available. Note that the NAS must be connected to the Internet for these features to work.

### Firmware Update

Before updating the system firmware, make sure the product model and firmware version are correct. Follow the steps below to update firmware:

1. Download the release notes of the firmware from the QNAP website <http://www.qnap.com>. Read the release notes carefully to make sure it is required to update the firmware.
2. Download the NAS firmware and unzip the IMG file to the computer.
3. Before updating the system firmware, back up all the disk data on the NAS to avoid any potential data loss during the system update.

4. Click "Browse" to select the correct firmware image for the system update. Click "Update System" to update the firmware.

The system update may take tens of seconds to several minutes to complete depending on the network connection status. Please wait patiently. The NAS will inform you when the system update has completed.

**Note:** If the system is running properly, you do not need to update the firmware.

### **Update Firmware by QNAP Qfinder**

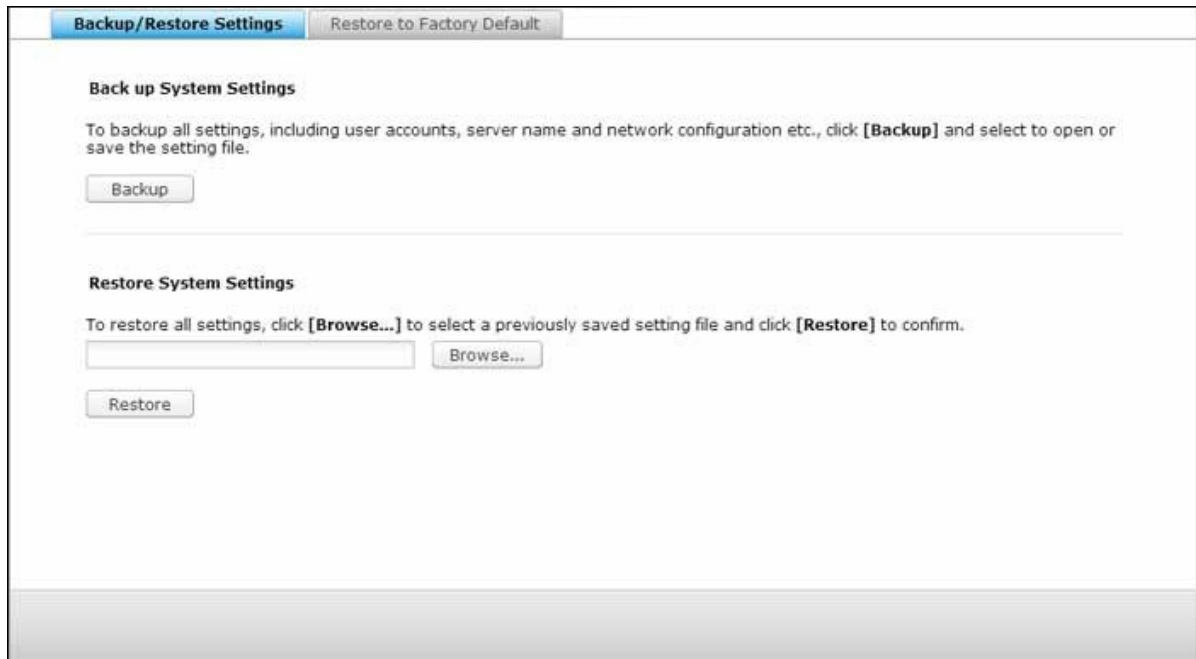
The NAS firmware can be updated by the QNAP Qfinder. Follow the steps below:

1. Select a NAS model and choose "Update Firmware" from the "Tools" menu.
2. Login the NAS as an administrator.
3. Browse and select the firmware for the NAS. Click "Start" to update the system.

**Note:** The NAS servers of the same model on the same LAN can be updated by the Finder at the same time. Administrator access is required for system update.

## 4.9 Backup/Restore

Go to "Control Panel" > "System Settings" > "Backup/Restore" to back up, restore your NAS or restore your NAS to factory default.



### Backup/Restore Settings

- **Back up System Settings:** To back up all the settings, including the user accounts, server name, network configuration and so on, click "Backup" and select to open or save the setting file.
- **Restore System Settings:** To restore all the settings, click "Browse" to select a previously saved setting file and click "Restore".

### Restore to Factory Default

- **Restore Factory Defaults & Format all Volumes:** Restore system settings to default and **format all disk volumes**.
- **Reset Settings:** Restore system settings to default without erasing user data.
- **Reinitialize NAS:** **Erase all data** and reinitialize the NAS.

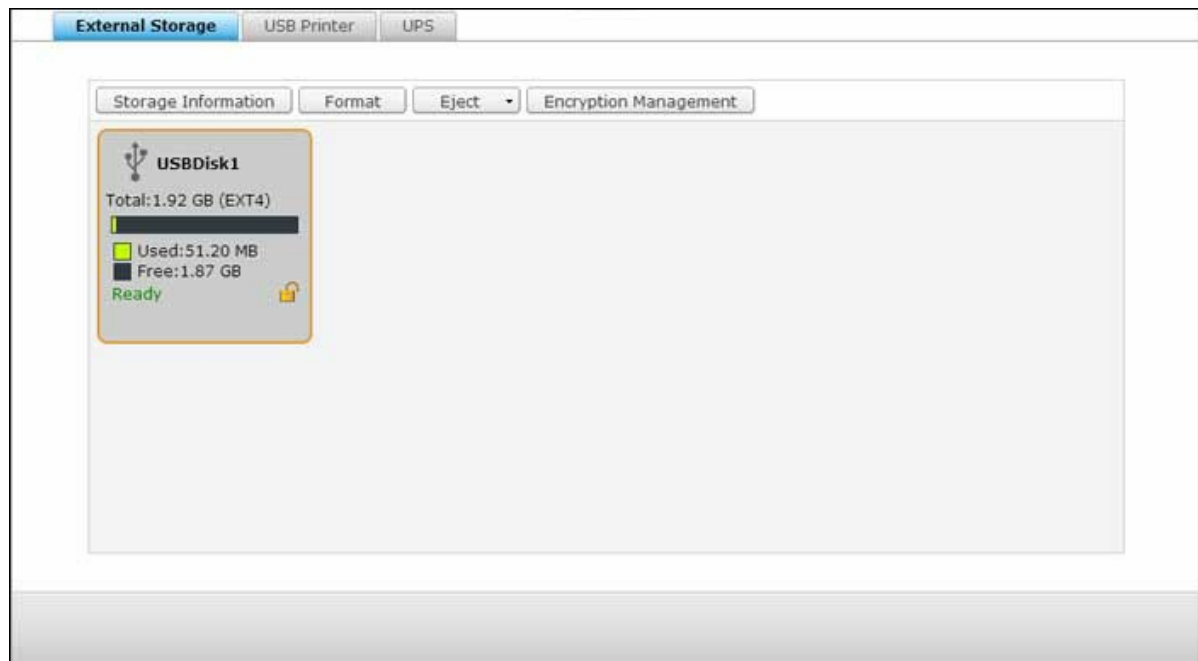
**Caution:** The administrator password and system settings will be reset to default if you press and hold the reset button on the back of the NAS for 3 seconds (but user data on the disk will still be retained.) However, if you press and hold the Reset button for 10 seconds, all settings such as users, user groups, and the shared

folders previously created will be cleared (but user data on the disk will still be retained.)

**Note:** For the above **Reset Settings** and **Reset Factory Default & Format Volume** buttons, only one of them is available on the page (depending on the NAS model.)

## 4.10 External Device

Go to "Control Panel" > "System Settings" > "External Storage" and configure external storage devices, USB printers and UPS systems.



For details on the features, refer to the following links:

- [External Storage](#)<sup>[11]</sup>
- [USB Printer](#)<sup>[14]</sup>
- [UPS](#)<sup>[22]</sup>

#### **4.10.1 External Storage**

The NAS supports external USB and eSATA storage devices for backup and data storage. Connect the external storage device to a USB or an eSATA interface of the NAS, when the device is successfully detected, the details will be shown on this page.

##### **Storage Information**

Select a storage device and click "Storage Information" to check for its details. The number of USB and eSATA interfaces supported varies by models. Please refer to <http://www.qnap.com> for details. It may take tens of seconds for the NAS server to detect the external USB or eSATA device successfully. Please wait patiently.

##### **Format**

The external storage device can be formatted as EXT3, EXT4, FAT32, NTFS, or HFS+ (Mac only) file system. Click "Format" and select the option from the drop-down menu.

**Note:** Starting QTS 4.1, labeling is supported for external USB devices. To edit the label of an external USB drive, please first format it as EX3 and EX4 and click "Storage Information" to edit its label. The label changed will become the shared folder name of this external USB device in the File Station (in the File Station, an USB external device will appear as a shared folder.) Note that this feature is only supported by the x69, x70 and x79 NAS models.

The NAS supports external drive encryption. To encrypt an external storage device, click "Encryption". Select the encryption method: AES 128-, 192- or 256-bit and enter the password (8-16 characters). Select "Save encryption key" to save the password in a hidden location on a hard drive of the NAS. The NAS will unlock the encrypted external storage device automatically every time the device is connected. Click Format to proceed. Click "OK" and all the data will be cleared. The device will be "Ready" after disk initialization.

**Note:** For disk volumes larger than 2TB, it is recommended to format them to the EXT4, NTFS, or HFS+ file system.

##### **Eject**

"Eject" offers two different options. "Disconnect disk partition" allows you to remove a single disk partition or a disk drive in a multi-drive enclosure. "Remove device" allows you to disconnect external storage devices without the risk of losing any data when the device is removed. First choose a device to eject, click "Eject" and then to disconnect the disk partition or remove the device.

**Note:** To avoid potential data loss, please always use the hardware removal function in the operating system before removing your external storage device (for a Windows PC, please use the "Safely Remove Hardware" function; for a Mac, please use the "Eject" icon; for QTS, please use the "Eject" button.)

## Encryption Management

If an external storage device is encrypted by the NAS, the button "Encryption Management" will appear. Click this button to manage the encryption password/key, or lock or unlock the device.

### Locking the device

1. To lock an encrypted external storage device, click "Encryption Management".
2. Select "Lock this device" and click "Next".
3. Click "Next" to lock the device.

**Note:** The external storage device cannot be locked if a real-time or scheduled backup job is running on the device. To disable the backup job, go to "Control Panel" > "Applications" > "Backup Station" > "External Drive".

### Unlocking the device

1. To unlock an encrypted external storage device, click "Encryption Management".
2. Select "Unlock this device". Click "Next".
3. Enter the encryption password or upload the key file. Select "Save encryption key" to save the password in a hidden location on a hard drive of the NAS. The NAS will unlock the encrypted external storage device automatically every time the device is connected. Click "Next".

### Managing the encryption key

1. To change an encryption password or download an encryption key file, click "Encryption Management".



2. Select "Manage encryption key". Click "Next".
3. Select to change the encryption password or download the encryption key file to the local PC. Click "Next".

## Data Sharing

Disk usage settings for 1-drive models. Select one of the following settings for an external storage device connected to a 1-drive NAS:

- Data sharing: Use the external drive for storage expansion of the NAS.
- Q-RAID 1: Configure the external drive and a local hard drive on the NAS as Q-RAID 1.
  1. Q-RAID 1 enables one-way data synchronization from the NAS to the external storage device but does not offer any RAID redundancy. **Note that the external drive will be formatted when Q-RAID 1 is executed.**

After Q-RAID 1 has been executed once, the NAS data will be automatically copied to the external storage device whenever it is connected to the NAS.

### Note:

- Only one external hard disk can be set as Q-RAID 1 at one time.
- The maximum capacity supported for Q-RAID 1 is 2TB.
- It is recommended to use an external storage device of the same capacity as the internal hard drive of the NAS. If the storage capacity of the external storage device is too small to synchronize with the internal hard drive, the device can only be used for data sharing.
- The HD Station will reboot when external devices are unmounted.

#### **4.10.2 USB Printer**

The NAS supports network printing sharing service over local network and the Internet in Windows, Mac, and Linux (Ubuntu) environments. Up to 3 USB printers are supported.

To share a USB printer by NAS, connect the printer to a USB port of the NAS. The printer will be detected automatically and the printer's information will be shown.

##### **Printer Info**

click a connected USB printer and then "Printer Info" to review printer details.

##### **Note:**

- Please connect a USB printer to the NAS after the software configuration is completed.
- The NAS does not support multifunction printer.
- The file name display on the printer job table is only available for printer jobs sent via IPP (Internet Printing Protocol) connection.
- For the information of the supported USB printer models, please visit <http://www.qnap.com>

##### **Printer Log**

click a connected USB printer and then "Printer Log" to view its print job history. You can pause or cancel ongoing or pending jobs, resume paused jobs, or delete completed or pending jobs here. To clear the history, click "Clear".

**Note:** Do NOT restart the NAS or update the system firmware when printing is in process or there are queued jobs. Otherwise all the queued jobs will be cancelled and removed.

##### **Clean Up Spool Space**

Click "Clean Up Spool Space" to clean up the data saved in the printer spool.

##### **Settings**

click "Settings" to configure basic settings of the printer.

- **Stop printer sharing and clear print spool:** Select this option to temporarily disable the selected printer for print sharing. All the data in the printer spool will also be cleared.
- **Bonjour printer support:** Select this option to broadcast printing service to Mac users via Bonjour. Enter a service name, which allows the printer to be found by Bonjour. The name can only contain "a-z", "A-Z", "0-9", dot (.), comma (,) and dash (-).

#### **Maximum Printer Jobs and Blacklist**

- **Maximum printer jobs per printer:** Specify the maximum number of printer jobs for a printer. A printer supports maximum 1,000 printer jobs. The oldest printer job will be overwritten by the newest one if the printer has reached the maximum number of printer jobs.
- **Enter IP addresses or domain names to allow or deny printing access:** To allow or deny particular IP addresses or domain names to use the printing service of the NAS, select "Allow printing" or "Deny printing" and enter the IP address(es) or domain name(s). An asterisk (\*) denotes all connections. To allow all users to use the printer, select "No limit". Click "Apply" to save the settings.

**Note:** This feature only works for printing service configured via IPP and Bonjour, but not Samba.

#### **4.10.2.1 Windows 7**

The following description applies to Windows 7.

Follow the steps below to set up your printer connection:

1. Go to Devices and Printers.
2. Click "Add a printer".
3. In the Add printer wizard, click "Add a network, wireless or Bluetooth printer".
4. While Windows is searching for available network printers, click "The printer that I want isn't listed".
5. Click "Select a shared printer by name", and then enter the address of the network printer. The address is in the following format – `http://NAS_IP:631/printers/ServernamePR`, where the NAS\_IP can also be a domain name address if you want to print remotely. For example, <http://10.8.13.59:631/printers/NASPR3>
6. The wizard will prompt you for the correct printer driver. You may also download the latest printer driver from the manufacturer's website if it is not built-into Windows operating system.
7. After installing the correct printer driver, the wizard shows the address and driver of the new network printer.
8. You may also set the network printer as the default printer or print a test page. Click "Finish" to exit the wizard.
9. The new network printer is now available for printing.

#### **4.10.2.2 Windows XP**

Follow the steps below to set up your printer connection:

##### **Method 1**

1. Enter \\NAS IP in Windows Explorer.
2. A printer icon is shown as a shared folder on the server. Double click the icon.
3. Install the printer driver.
4. When finished, you can start to use the network printer service of the NAS.

##### **Method 2**

The following configuration method has been verified on Windows XP only:

1. Open "Printers and Faxes".
2. Delete the existing network printer (if any).
3. Right click the blank area in the Printers and Faxes window. Select "Server Properties".
4. Click the "Ports" tab and delete the ports configured for the previous network printer (if any).
5. Restart your PC.
6. Open Printers and Faxes.
7. Click "Add a printer" and click "Next".
8. Select "Local printer attached to this computer". Click "Next".
9. Click "Create a new port" and select "Local Port" from the drop-down menu. Click "Next".
10. Enter the port name. The format is \\NAS IP\NAS namepr, for example, NAS IP= 192.168.1.1, NAS name= myNAS, the link is \\192.168.1.1\myNASpr.
11. Install the printer driver.
12. Print a test page.

#### **4.10.2.3 Mac OS 10.6**

If you are using Mac OS 10.6, follow the steps below to configure the printer function of the NAS:

1. First make sure the Bonjour printer support is enabled on the NAS in "External Device" > "USB Printer" > "Settings". You may change the Service Name to better represent the printer.
2. On your Mac, go to "System Preferences", and then click "Print & Fax".
3. In the Print & Fax window, click + to add a printer.
4. The USB network printer will be listed via Bonjour. Select the default printer driver or you may download and install the latest one from the printer manufacturer's website. Click "Add" to add this printer.
5. Additional options may be available for your printer. Click "Continue".
6. The new network printer is now available for printing.

#### **4.10.2.4 Mac OS 10.5**

If you are using Mac OS X 10.5, follow the steps below to configure the printer function of the NAS.

Make sure your printer is connected to the NAS and the printer information is displayed correctly on the "USB Printer" page.

1. Go to "Network Services" > "Win/Mac/MFS" > "Microsoft Networking". Enter a workgroup name for the NAS. You will need this information later.
2. Go to "Print & Fax" on your Mac.
3. Click + to add a printer.
4. Select the NAS workgroup and find the printer name.
5. Enter the username and password to login the printer server on the NAS.
6. Select the printer driver.
7. After installing the printer driver correctly, you can start to use the printer.

#### **4.10.2.5 Mac OS 10.4**

If you are using Mac OS 10.4, follow the steps below to configure the printer function of the NAS:

1. On the toolbar, click "Go/Utilities".
2. Click "Printer Setup Utility".
3. Click "Add".
4. Press and hold the "alt" key on the keyboard and click "More Printers" concurrently.
5. In the pop up window, select "Advanced" and "Windows Printer with SAMBA", enter the printer name and the printer URI (the format is smb://NAS IP/printer name. The printer name is found on the "Device Configuration" > "USB Printer page"), select "Generic" for Printer Model and click "Add".
6. The printer appears on the printer list. It is ready to use.

#### **Note:**

- For "Advanced" in Step 5 above, you must hold and press the "alt" key and click "More Printers" at the same time to view the Advanced printer settings. Otherwise, this option does not appear.
- The network printer service of the NAS supports Postscript printer on Mac OS only.



#### **4.10.2.6 Linux (Ubuntu 10.10)**

If you are using Linux (Ubuntu 10.10), follow the steps below to configure the printer function of the NAS:

1. Click the "System" tab, choose "Administration". Then select "Printing".
2. Click "Add" to add a printer.
3. Click "Network Printer", and then select "Internet Printing Protocol (ipp)". Enter the NAS IP address in "Host". "/printers" is already present. Enter the printer name after "printers/" in the field "Queue".
4. Before you continue, you may click "Verify" to test the printer connection.
5. The operating system starts to search for the possible driver list.
6. Select the printer driver from the built-in database, or search online.
7. Choose the correct printer model and driver. Depending on the printer, some additional printer options may be available in the next step.
8. You can rename this printer or enter additional information. Click "Apply" to exit and finish.
9. The network printer is now available for printing.

### **4.10.3 UPS**

By enabling the UPS (Uninterruptible Power Supply) support, you can protect your NAS from abnormal system shutdown caused by power disruption. In the event of a power failure the NAS will shut down automatically or enter auto-protection mode by probing the power status of the connected UPS unit. To protect your data, in the event of power interruption (such as power outage,) the NAS will automatically turn off itself or enter auto-protection mode (depending on your setting) 30 seconds after the remaining UPS battery charge drops below 15%.

#### **Standalone Mode – USB**

To operate under USB standalone mode, follow the steps below:

1. Plug in the USB cable on the UPS to the NAS.
2. Select the option "Enable UPS Support".
3. Choose between whether the NAS will shut down or enter auto-protection mode after AC power fails. Specify the time in minutes that the NAS should wait before executing the option you have selected. After the NAS enters auto-protection mode, the NAS resumes the previous operation status when the power restores.
4. Click "Apply All" to confirm.

#### **Standalone Mode – SNMP**

To operate under SNMP standalone mode, follow the steps below:

1. Make sure the NAS is connected to the same physical network as the SNMP-based UPS.
2. Select the option "Enable UPS Support".
3. Select "APC UPS with SNMP management" from the "Protocol" drop down menu.
4. Enter the IP address of the SNMP-based UPS.
5. Choose between whether the NAS will shut down or enter auto-protection mode after AC power fails. Specify the time in minutes that the NAS should wait before executing the option you have selected. After the NAS enters auto-protection mode, the NAS resumes the previous operation status when the power restores.
6. Click "Apply All" to confirm.

#### **Network Master Mode**

A network UPS master is responsible for communicating with network UPS slaves on the same physical network about critical power status. To set up your NAS with UPS as

network master mode, plug in the USB cable on the UPS to the NAS and follow the steps below:

1. Make sure the NAS (the "UPS master") is connected to the same physical network as the network UPS slaves.
2. Select the option "Enable UPS Support".
3. Click "Enable network UPS Support". This option appears only when your NAS is connected to the UPS by a USB cable.
4. Choose between whether the NAS will shut down or enter auto-protection mode after AC power fails. Specify the time in minutes that the NAS should wait before executing the option you have selected. After the NAS enters auto-protection mode, the NAS resumes the previous operation status when the power restores.
5. Enter the "IP address" of other network UPS slaves to be notified in the event of power failure.
6. Click "Apply All" to confirm and continue the setup for the NAS systems which operate in network slave mode below.

### **Network Slave Mode**

A network UPS slave communicates with network UPS master to receive the UPS status. To set up your NAS with UPS as network slave mode, follow the steps below:

1. Make sure the NAS is connected to the same physical network as the network UPS master.
2. Select the option "Enable UPS Support".
3. Select "Network UPS slave" from the "Protocol" drop down menu.
4. Enter the IP address of the network UPS server.
5. Choose between whether the NAS will shut down or enter auto-protection mode after AC power fails. Specify the time in minutes that the NAS should wait before executing the option you have selected. After the NAS enters auto-protection mode, the NAS resumes the previous operation status when the power restores.
6. Click "Apply All" to confirm.

**Note:** To allow the UPS device to send SNMP alerts to the QNAP NAS in case of power loss, you may have to enter the IP address of the NAS in the configuration page of the UPS device.

### **Behavior of the UPS Feature of the NAS**

In case of power loss and power recovery, the events will be logged in the "System Event Logs".

During a power loss, the NAS will wait for the specified time you enter in the "UPS Settings" before powering off or entering auto-protection mode.

If the power restores before the end of the waiting time, the NAS will remain in operation and cancel its power-off or auto-protection action.

Once the power restores:

- If the NAS is in auto-protection mode, it will resume to normal operation.
- If the NAS is powered off, it will remain off.

#### **Difference between auto-protection mode and power-off mode**

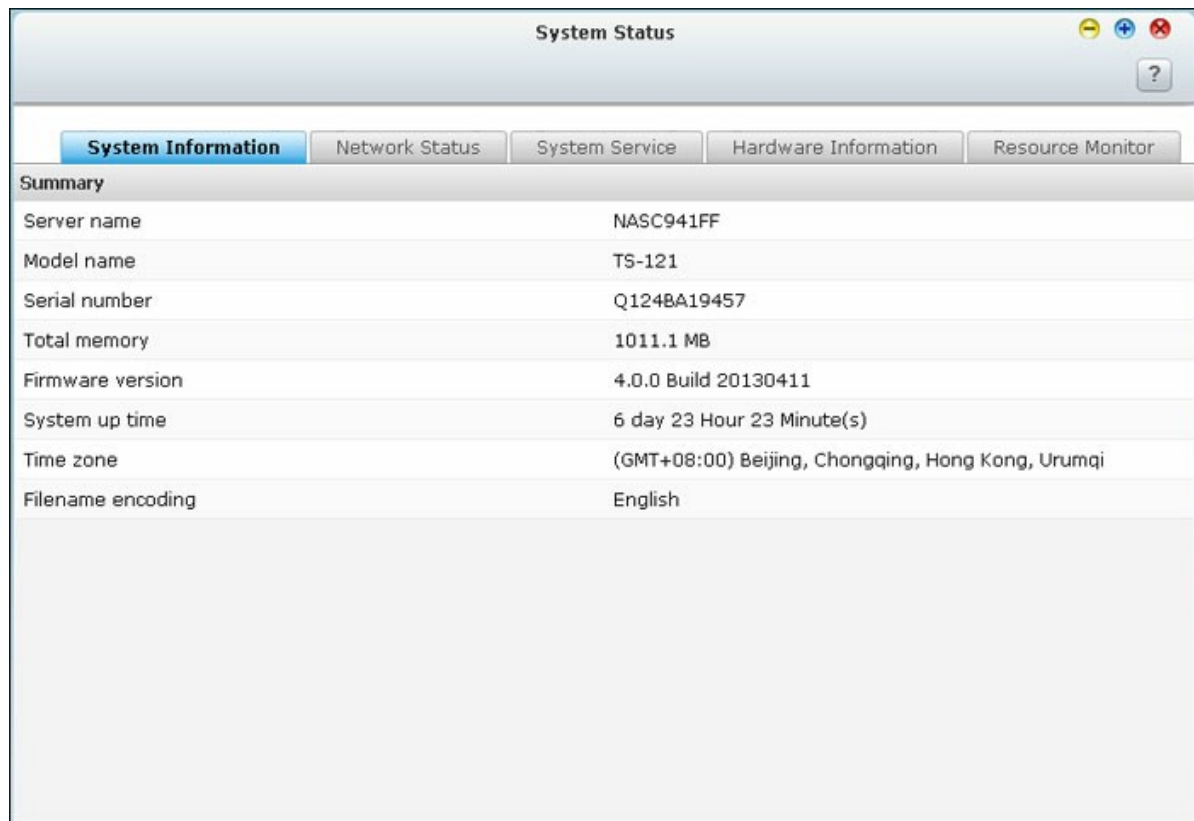
<b>Mode</b>	<b>Advantage</b>	<b>Disadvantage</b>
Auto-protection mode	The NAS resumes after power recovery.	If the power outage lasts until the UPS is turned off, the NAS may suffer from abnormal shutdown.
Power-off mode	The NAS will be shut down properly.	The NAS will remain off after the power recovery. Manual power on of the NAS is required.

If the power restores after the NAS has been shut down and before the UPS device is powered off, you may power on the NAS by Wake on LAN\* (if your NAS and UPS device both support Wake on LAN and Wake on LAN is enabled on the NAS). If the power restores after both the NAS and the UPS have been shut down, the NAS will react according to the settings in "System Settings" > "Power Recovery".

\*This feature is not supported by TS-110, TS-119, TS-210, TS-219, TS-219P, TS-410, TS-419P, TS-410U, TS-419U, TS-112, TS-212, TS-412, TS-412U. Please visit <http://www.qnap.com> for details.

## 4.11 System Status

Go to "Control Panel" > "System Settings" > "System Status" to check on the status of your NAS.



### System Information

View the summary of system information such as the server name, memory, firmware and system up time on this page.

### Network Status

View the current network settings and statistics on this page and they are displayed based on network interfaces. Click the up arrow at top right to collapse the interface page and down arrow to expand the page.

### System Service

View the current settings of system services provided by the NAS on this page.

### Hardware Information

View basic hardware information of the NAS on this page.

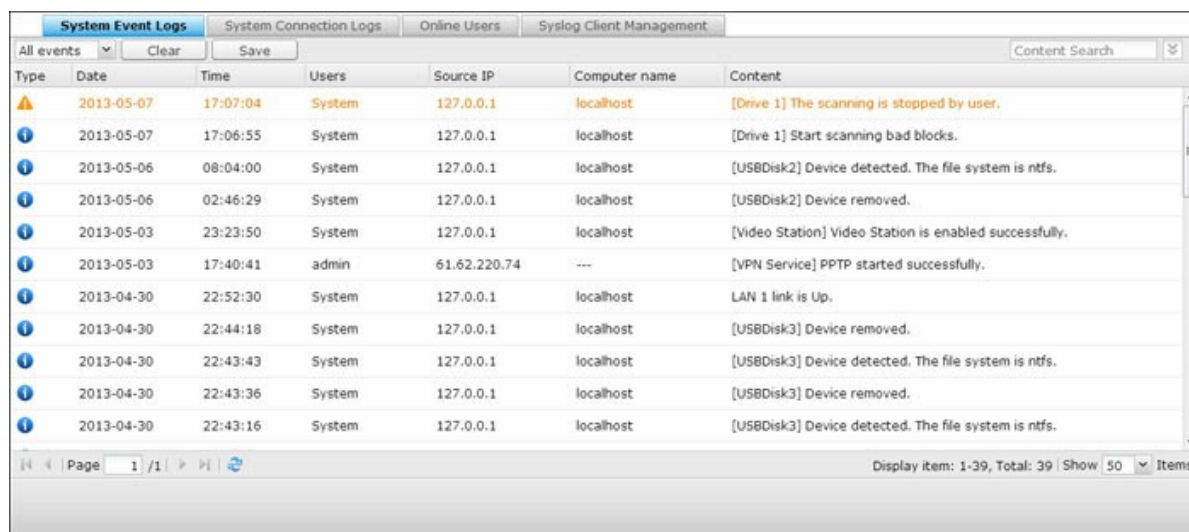
### **Resource Monitor**

You can view the CPU usage, disk usage, and bandwidth transfer statistics of the NAS on this page.

- CPU Usage: This tab shows the CPU usage of the NAS.
- Memory Usage: This tab shows the memory usage of the NAS by real-time dynamic graph.
- Disk Usage: This tab shows the disk space usage of each disk volume and its shared folders.
- Bandwidth Usage: This tab provides information about bandwidth transfer of each available LAN port of the NAS.
- Process: This tab shows information about the processes running on the NAS.
- Disk Performance: This tab shows IOPS and latency of the selected volume.

## 4.12 System Logs

Go to "Control Panel" > "System Settings" > "System Logs" to configure the logs settings of your NAS.



The screenshot shows the 'System Event Logs' tab in a web interface. It features a table with columns: Type, Date, Time, Users, Source IP, Computer name, and Content. The table contains 13 log entries. The first entry is a warning icon indicating that scanning on Drive 1 was stopped by the user. Subsequent entries include information about scanning bad blocks, USB device detection and removal, Video Station enabling, VPN service starting, LAN link status, and further USB device events. The interface includes a 'Content Search' bar, 'Clear' and 'Save' buttons, and a pagination footer showing 'Page 1 / 1' and 'Display item: 1-39, Total: 39'.

Type	Date	Time	Users	Source IP	Computer name	Content
Warning	2013-05-07	17:07:04	System	127.0.0.1	localhost	[Drive 1] The scanning is stopped by user.
Information	2013-05-07	17:06:55	System	127.0.0.1	localhost	[Drive 1] Start scanning bad blocks.
Information	2013-05-06	08:04:00	System	127.0.0.1	localhost	[USBDisk2] Device detected. The file system is ntfs.
Information	2013-05-06	02:46:29	System	127.0.0.1	localhost	[USBDisk2] Device removed.
Information	2013-05-03	23:23:50	System	127.0.0.1	localhost	[Video Station] Video Station is enabled successfully.
Information	2013-05-03	17:40:41	admin	61.62.220.74	---	[VPN Service] PPTP started successfully.
Information	2013-04-30	22:52:30	System	127.0.0.1	localhost	LAN 1 link is Up.
Information	2013-04-30	22:44:18	System	127.0.0.1	localhost	[USBDisk3] Device removed.
Information	2013-04-30	22:43:43	System	127.0.0.1	localhost	[USBDisk3] Device detected. The file system is ntfs.
Information	2013-04-30	22:43:36	System	127.0.0.1	localhost	[USBDisk3] Device removed.
Information	2013-04-30	22:43:16	System	127.0.0.1	localhost	[USBDisk3] Device detected. The file system is ntfs.

### System Event Logs

The NAS can store 10,000 recent event logs, including warning, error, and information messages. If the NAS does not function correctly, refer to the event logs for troubleshooting.

**Tip:** Right click a log to delete the record. To clear all logs, click "Clear All".

### System Connection Logs

The NAS supports recording HTTP, FTP, Telnet, SSH, AFP, SAMBA, and iSCSI connections. Click "Options" to select the connection type to be logged. The file transfer performance can be slightly affected when this feature is turned on.

**Tip:** Right click a log and select to delete the record or block the IP and select how long the IP should be blocked. To clear all the logs, click "Clear All".

**Start Logging:** Turn on this option to archive the connection logs. The NAS generates a CSV file automatically and saves it to a specified folder when the number of logs reaches the upper limit. The file-level access logs are available on this page. The NAS will record the logs when users access, create, delete, move, or rename any files or folders via the

connection type specified in "Options". To disable this feature, click "Stop logging".

## Online Users

The information of the on-line users connecting to the NAS by networking services is shown on this page.

**Tip:** Right click a log to disconnect the IP connection and block the IP.

## Syslog Client Management

Syslog is a standard for forwarding the log messages on an IP network. Turn on this option to save the event logs and connection logs to a remote Syslog server. When converting the connection logs into a CSV file, the connection type and action will be number coded. Please refer to the table below for the code meaning.

Connection type codes	Action codes
0 - UNKNOWN	0 - UNKNOWN
1 - SAMBA	1 - DEL
2 - FTP	2 - READ
3 - HTTP	3 - WRITE
4 - NFS	4 - OPEN
5 - AFP	5 - MKDIR
6 - TELNET	6 - NFSMOUNT_SUCC
7 - SSH	7 - NFSMOUNT_FAIL
8 - ISCSI	8 - RENAME
	9 - LOGIN_FAIL
	10 - LOGIN_SUCC
	11 - LOGOUT
	12 - NFSUMOUNT
	13 - COPY
	14 - MOVE
	15 - ADD

## Advanced Log Search

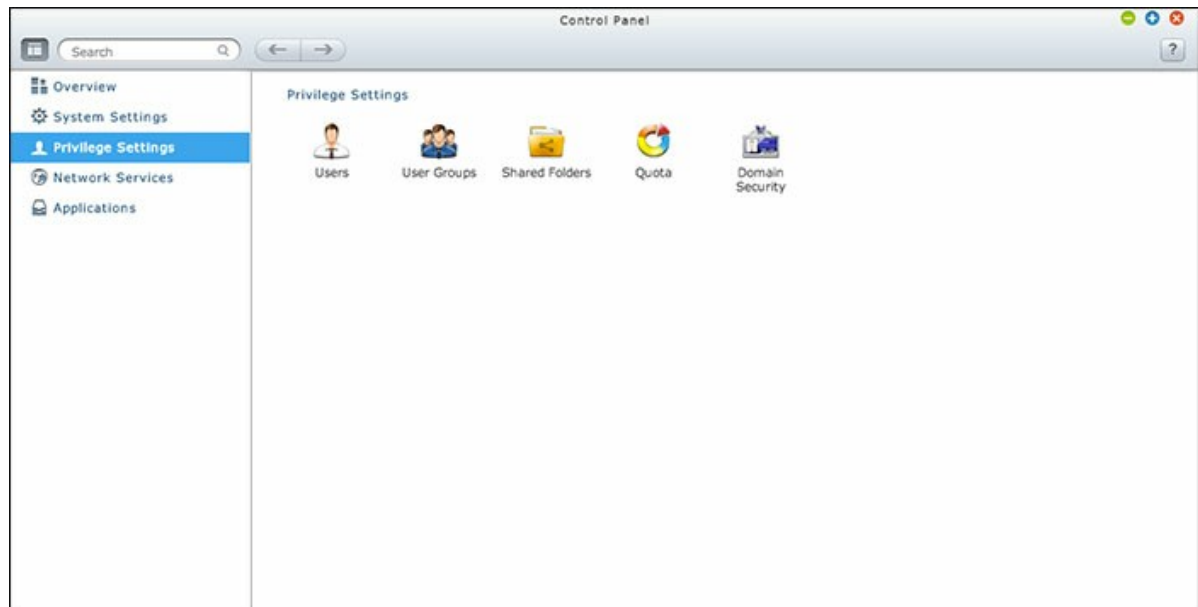
Advanced log search is provided to search for system event logs, system connection logs and online users based on user preferences. First, specify the log type, users,



computer name, date range and source IP and click "Search" to search for the desired logs or reset to list all logs. Please note that for online users, only the source IP and Computer name can be specified.

## 5. Privilege Settings

Go to "Control Panel" > "Privilege Systems" to configure privilege settings, disk quotas and domain security on the NAS.



For setup details, refer to the following links:

- [Users](#)<sup>[131]</sup>
- [User Groups](#)<sup>[135]</sup>
- [Share Folders](#)<sup>[136]</sup>
- [Quota](#)<sup>[145]</sup>
- [Domain Security](#)<sup>[146]</sup>

## 5.1 Users

The NAS has created the following users by default:

- **admin:** The administrator "admin" has full access to system administration and all shared folders. It cannot be deleted.
- **guest:** This is a built-in user and will not be displayed on the "User Management" page. A guest does not belong to any user group. The login password is "guest".
- **anonymous:** This is a built-in user and will not be shown on the "User Management" page. When you connect to the server by FTP, you can use this name to login.

The number of users you can create on the NAS varies according to the NAS models. If your NAS models are not listed, please visit <http://www.qnap.com> for details.

Maximum number of users	NAS models
1,024	TS-110, TS-210
2,048	TS-112, TS-119, TS-119P+, TS-212, TS-219P+, TS-410, TS-239 Pro II+, TS-259 Pro+
4,096	TS-412, TS-419P+, TS-410U, TS-419U, TS-412U, TS-419U+, SS-439 Pro, SS-839 Pro, TS-439 Pro II+, TS-459U-RP/SP, TS-459U-RP+/SP+, TS-459 Pro+, TS-459 Pro II, TS-559 Pro+, TS-559 Pro II, TS-659 Pro+, TS-659 Pro II, TS-859 Pro+, TS-859U-RP, TS-859U-RP+, TS-809 Pro, TS-809U-RP, TS-879 Pro, TS-1079 Pro, TS-879U-RP, TS-EC879U-RP, TS-1279U-RP, TS-EC1279U-RP, TS-269 Pro, TS-269L, TS-469 Pro, TS-469L, TS-569 Pro, TS-569L, TS-669 Pro, TS-669L, TS-869 Pro, TS-869L, TS-251, TS-451, TS-651, TS-851, TS-253 Pro, TS-453 Pro, TS-653 Pro, TS-853 Pro, SS-453 Pro, SS-853 Pro.

The following information is required to create a new user:

- **Username:** The username is case-insensitive and supports multi-byte characters, such as Chinese, Japanese, Korean, and Russian. The maximum length is 32 characters. The invalid characters are: " / \ [ ] : ; | = , + \* ? < > ` ' "
- **Password:** The password is case-sensitive. It is recommended to use a password of at least 6 characters.

## Creating a User

To create a user on the NAS, follow the steps below:

1. Go to "Control Panel" > "Privilege Settings" > "Users".
2. Click "Create" > "Create a User".
3. Follow the instructions of the wizard to complete the details.

## Creating Multiple Users

To create multiple users on the NAS, follow the steps below:

1. Go to "Control Panel" > "Privilege Settings" > "Users".
2. Click "Create" > "Create Multiple Users".
3. Click "Next".
4. Enter the name prefix, e.g. test. Enter the start number for the username, e.g. 0001 and the number of users to be created, e.g. 10. The NAS creates ten users named test0001, test0002, test0003...test0010. The password entered here is the same for all the new users.
5. Select to create a private shard folder for each user or not. The shared folder will be named after the username. If a shared folder of the same name has already existed, the NAS will not create the folder.
6. Specify the folder settings.
7. You can view the new users created in the last step. Click "Finish" to exit the wizard.
8. Check that the users have been created.
9. Check that the shared folders have been created for the users.

## Importing/Exporting Users

You can import users to or export users from the NAS with this function.

### Exporting users

Follow the steps below to export users from the NAS:

1. Go to "Control Panel" > "Privilege Settings" > "Users".
2. Click "Create" > "Import/Export Users".
3. Select the option "Export user and user group settings".
4. Click "Next" to download and save the account setting file (\*.bin). The file can be imported to another NAS for account setup.

### Importing users

Before you import users to the NAS, make sure you have backed up the original users settings by exporting the users. Follow the steps below to import users to the NAS:

1. Go to "Control Panel" > "Privilege Settings" > "Users".
2. Click "Create" > "Import/Export Users".
3. Select "Import user and user group settings". Select the option "Overwrite duplicate users" to overwrite existing users on the NAS. Click "Browse" and select the file (\*.txt, \*.csv, \*.bin) which contains the users information and click "Next" to import the users.
4. Click "Finish" after the users have been created.
5. The imported user accounts will be shown.

**Note:**

- The password rules (if applicable) will not be applied when importing the users.
- The quota settings can be exported only when the quota function is enabled in "Privilege Settings" > "Quota".

The NAS supports importing user accounts from TXT, CSV or BIN files. To create a list of user accounts with these file types, follow the steps below.

**TXT**

1. Open a new file with a text editor.
2. Enter a user's information in the following order and separate them by ",": Username, Password, Quota (MB), Group Name
3. Go to the next line and repeat the previous step to create another user account. Each line indicates one user's information.
4. Save the file in UTF-8 encoding if it contains double-byte characters.

Note that if the quota is left empty, the user will have no limit in using the disk space of the NAS.

**CSV (Excel)**

1. Open a new file with Excel.
2. Enter a user's information in the same row in the following order:
  - Column A: Username
  - Column B: Password
  - Column C: Quota (MB)
  - Column D: Group name

3. Go to the next row and repeat the previous step to create another user account.  
Each row indicates one user's information. Save the file in CSV format.
4. Open the CSV file with Notepad and save it in UTF-8 encoding if it contains double-byte characters.

### **BIN (Exported from the NAS)**

The BIN file is exported from a QNAP NAS. It contains information including username, password, quota, and user group. The quota setting can be exported only when the quota function is enabled in "Privilege Settings" > "Quota".

### **Home Folders**

Enable Home Folders to create a personal folder to each local and domain user on the NAS. Users can access their folders "home" via Microsoft networking, FTP, AFP, and File Station. All the home folders are located in the shared folder "Homes", which can only be accessed by "admin" by default.

To use this feature, click "Home Folders". Select "Enable home folder for all users" and the disk volume where the home folders will be created in. Click "Apply".

## 5.2 User Groups

A user group is a collection of users with the same access right to the files or folders. The NAS has created the following user groups by default:

- administrators: All the members in this group have the administration right of the NAS. This group cannot be deleted.
- everyone: All the registered users belong to everyone group. This group cannot be deleted.































The number of user groups you can create on the NAS varies according to the NAS models. If your NAS models are not listed, please visit <http://www.qnap.com> for details.

Maximum number of user groups	NAS models
128	TS-110, TS-210
256	TS-112, TS-119, TS-119P+, TS-212, TS-219P+, TS-410, TS-239 Pro II+, TS-259 Pro+
512	TS-412, TS-419P+, TS-410U, TS-419U, TS-412U, TS-419U+, SS-439 Pro, SS-839 Pro, TS-439 Pro II+, TS-459U-RP/SP, TS-459U-RP+/SP+, TS-459 Pro+, TS-459 Pro II, TS-559 Pro+, TS-559 Pro II, TS-659 Pro+, TS-659 Pro II, TS-859 Pro+, TS-859U-RP, TS-859U-RP+, TS-809 Pro, TS-809U-RP, TS-879 Pro, TS-1079 Pro, TS-879U-RP, TS-EC879U-RP, TS-1279U-RP, TS-EC1279U-RP, TS-269 Pro, TS-269L, TS-469 Pro, TS-469L, TS-569 Pro, TS-569L, TS-669 Pro, TS-669L, TS-869 Pro, TS-869L, TS-251, TS-451, TS-651, TS-851, TS-253 Pro, TS-453 Pro, TS-653 Pro, TS-853 Pro, SS-453 Pro, SS-853 Pro.

A group name must not exceed 256 characters. It is case-insensitive and supports double-byte characters, such as Chinese, Japanese, and Korean, except the following ones: " / \ [ ] : ; | = , + \* ? < > ` '

## 5.3 Shared Folders

Go to "Control Panel" > "Privilege Settings" > "Shared Folders" to configure shared folders of your NAS.

Shared Folder							
Create		Remove		Restore Default Shared Folders			
Folder Name	Size	Folders	Files	Hidden	Volume	Action	
Download	5.04 GB	19	666	No	RAID 5 Disk Volume: Drive 1 3 4	  	
Multimedia	73.11 GB	180	18993	No	RAID 5 Disk Volume: Drive 1 3 4	  	
Public	27.95 GB	1737	7790	No	RAID 5 Disk Volume: Drive 1 3 4	  	
Recordings	620.13 MB	8	24	No	RAID 5 Disk Volume: Drive 1 3 4	  	
USBDisk1	8 KB	1	0	No	USB Disk 1	  	
Usb	6.11 GB	51	642	No	RAID 5 Disk Volume: Drive 1 3 4	  	
V II	16 KB	3	0	No	RAID 5 Disk Volume: Drive 1 3 4	  	
V IV	4 KB	0	0	No	RAID 5 Disk Volume: Drive 1 3 4	  	
V V	8 KB	1	0	No	RAID 5 Disk Volume: Drive 1 3 4	  	
VIII	4 KB	0	0	No	RAID 5 Disk Volume: Drive 1 3 4	  	

Page 1 / 2 | Display item: 1-10, Total: 13 | Show 10 Items

### Shared Folders

You can create multiple shared folders on the NAS and specify the access rights of the users and user groups to the shares. The number of shared folders you can create on the NAS varies according to the NAS models. If your NAS models are not listed, please visit <http://www.qnap.com> for details.

Maximum number of shared folders	NAS models
256	TS-110, TS-210, TS-112, TS-119, TS-119P+, TS-212, TS-219P+, TS-x20, TS-x21, TS-410, TS-239 Pro II+, TS-259 Pro+
512	TS-412, TS-419P+, TS-410U, TS-419U, TS-412U, TS-419U+, SS-439 Pro, SS-839 Pro, TS-439 Pro II+, TS-459U-RP/SP, TS-459U-RP+/SP+, TS-459 Pro+, TS-459 Pro II, TS-559 Pro+, TS-559 Pro II, TS-659 Pro+, TS-659 Pro II, TS-859 Pro+, TS-859U-RP, TS-859U-RP+, TS-809 Pro, TS-809U-RP, TS-x70, TS-879 Pro, TS-1079 Pro, TS-879U-RP, TS-EC879U-RP, TS-



	1279U-RP, TS-EC1279U-RP
--	-------------------------




On the folder list, you can view the current data size, number of sub-folders and files created in the shared folder, and the folder status (hidden or not).

To create a shared folder, follow the steps below:

1. Click "Create" > "Shared Folder".
2. Click "Next".
3. Enter the folder settings.
  - Folder name: Enter the share name. The share name does not support " / \ [ ] : ; | = , + \* ? < > ` ' .
  - Disk Volume: Select which disk volume on which to create the folder.
  - Description: Enter an optional description of the shared folder.
  - Hide Folder: Select to hide the shared folder or not in Microsoft Networking. When a shared folder is hidden, you have to enter the complete directory \ \NAS\_IP\share\_name to access the share.
  - Lock file (oplocks): Opportunistic locking is a Windows mechanism for the client to place an opportunistic lock (oplock) on a file residing on a server in order to cache the data locally for improved performance. Oplocks is enabled by default for everyday usage. For networks that require multiple users concurrently accessing the same file such as a database, oplocks should be disabled.
  - Recycle Bin: Enable the Network Recycle Bin for created shared folders. The option "Restrict the access of Recycle Bin to administrators only for now", once enabled, will ensure that files deleted and moved to the Network Recycle Bin can only be recovered by administrators.
  - Path: Specify the path of the shared folder or select to let the NAS specify the path automatically.
4. Select the way you want to specify the access right to the folder and specify the guest access right.
5. If you select to specify the access right by user or user group, you can select to grant read only, read/write, or deny access to the users or user groups.
6. Confirm the settings and click "Next".
7. Click "Finish" to complete the setup.

To delete a shared folder, select the folder checkbox and click "Remove". You can select the option "Also delete the data. (Mounted ISO image files will not be deleted)" to delete the folder and the files in it. If you select not to delete the folder data, the data will be

retained in the NAS. You can create a shared folder of the same name again to access the data.

Icon	Name	Description
	Folder Property	Edit the folder property. Select to hide or show the network drive, enable or disable oplocks, folder path, comment, restrict the access of Recycle Bin to administrators (files can only be recovered by administrators from the Network Recycle Bin) and enable or disable write-only access on FTP connection.
	Folder Permissions	Edit folder permissions and subfolder permissions.
	Refresh	Refresh the shared folder details.

### Folder Permissions

Configure folder and subfolder permissions on the NAS. To edit basic folder permissions, locate a folder name in "Privilege Settings" > "Shared Folders" and click "Folder Permissions". The folder name will be shown on the left and the users with configured access rights are shown in the panel. You can also specify the guest access right at the bottom of the panel. Click "Add" to select more users and user groups and specify their access rights to the folder. Click "Add" to confirm. Click "Remove" to remove any configured permissions. You can select multiple items by holding the Ctrl key and left clicking the mouse. Click "Apply" to save the settings.

### Subfolder Permissions

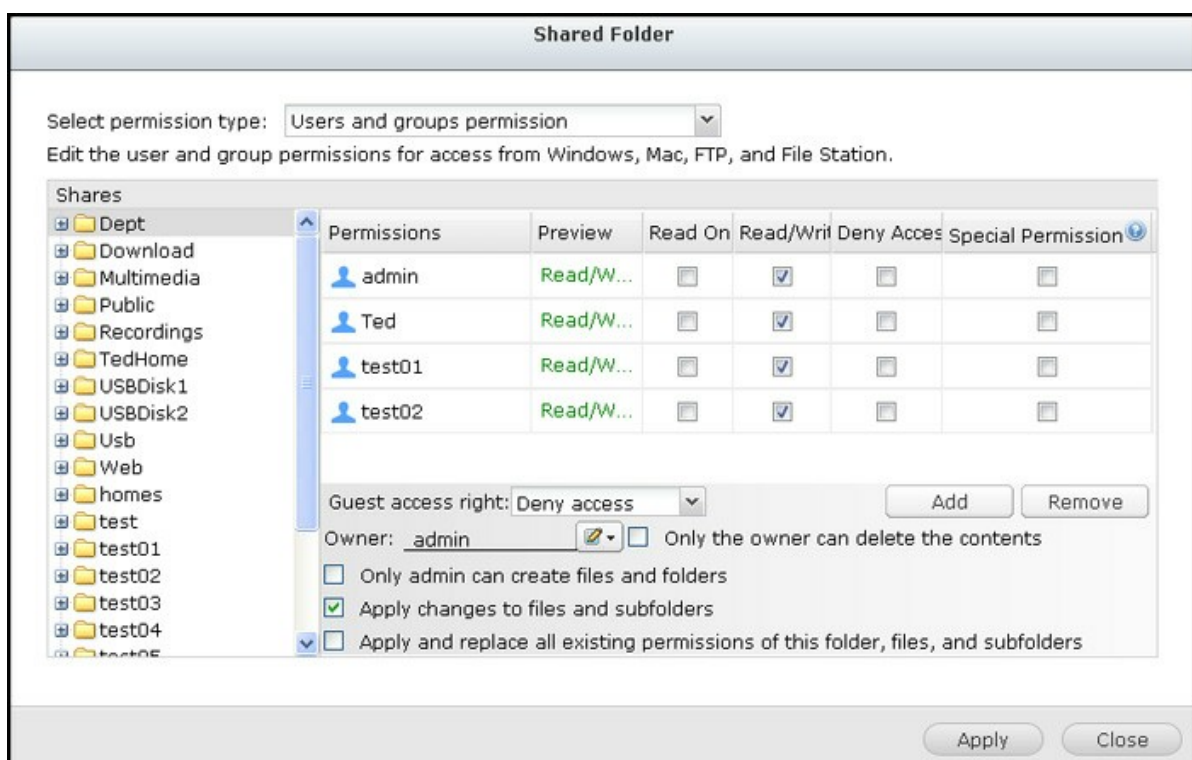
The NAS supports subfolder permissions for secure management of the folders and subfolders. You can specify read, read/write, and deny access of individual user to each folder and subfolder.

To configure subfolder permissions, follow the steps below:

1. Go to "Privilege Settings" > "Shared Folders" > "Advanced Permissions" tab. Select "Enable Advanced Folder Permissions" and click "Apply".
2. Go to "Privilege Settings" > "Shared Folders" > "Shared Folders" tab. Select a root folder, for example Dept, and click "Folder Permissions". The shared folder name and its first-level subfolders are shown on the left. The users with configured access rights are shown in the panel, with special permission below. Double click the first-

level subfolders to view the second-level subfolders. Select the root folder (Dept). Click "+ Add" to specify read only, read/write, or deny access for the users and user groups.

3. Click "Add" when you have finished the settings.
4. Specify other permissions settings below the folder permissions panel.
  - Guest Access Right: Specify to grant full or read only access or deny guest access.
  - Owner: Specify the owner of the folder. By default, the folder owner is the creator.
5. To change the folder owner, click the "Folder Property" button next to the owner field.



6. Select a user from the list or search a username. Then click "Set".
  - Only the owner can delete the contents: When you apply this option to a folder, e.g. Dept, only the folder owner can delete the first-level subfolders and files. Users who are not the owner but possess read/write permission to the folder cannot delete the folders Admin, HR, Production, Sales, and test in this example. This option does not apply to the subfolders of the selected folder even if the options "Apply changes to files and subfolders" and "Apply and replace all existing permissions of this folder, files, and subfolders" are selected.
  - Only admin can create files and folders: This option is only available for root folders. Select this option to allow admin to create first-level subfolders and files

in the selected folder only. For example, in the folder "Dept", only admin can create files and subfolders Admin, HR, Production, and so on. Other users with read/write access to Dept can only create files and folders in the second and lower-level subfolders such as Admin01, Admin02, HR1, and HR2.

- Apply changes to files and subfolders: Apply permissions settings except owner protection and root folder write protection settings to all the files and subfolders within the selected folder. These settings include new users, deleted users, modified permissions, and folder owner. The options "Only the owner can delete the contents" and "Only admin can create files and folders" will not be applied to subfolders.
- Apply and replace all existing permissions of this folder, files, and subfolders: Select this option to override all previously configured permissions of the selected folder and its files and subfolders except owner protection and root folder write protection settings. The options "Only the owner can delete the contents" and "Only admin can create files and folders" will not be applied to subfolders.
- Special Permission: This option is only available for root folders. Select this option and choose between "Read only" or "Read/Write" to allow a user to access to all the contents of a folder irrespective of the pre-configured permissions. A user with special permission will be identified as "admin" when he/she connects to the folder via Microsoft Networking. If you have granted special permission with "Read/Write" access to the user, the user will have full access and is able to configure the folder permissions on Windows. Note that all the files created by this user belong to "admin". Since "admin" does not have quota limit on the NAS, the number and size of the files created by users with special permission will not be limited by their pre-configured quota settings. This option should be used for administrative and backup tasks only.

7. After changing the permissions, click "Apply" and then "YES" to confirm.

**Note:**

- You can create maximum 230 permission entries for each folder when Advanced Folder Permission is enabled.
- If you have specified "deny access" for a user on the root folder, the user will not be allowed to access the folder and subfolders even if you select read/write access to the subfolders.
- If you have specified "read only access" for a user on the root folder, the user will have read only access to all the subfolders even if you select read/write access

to the subfolders.

- To specify read only permission on the root folder and read/write permission on the subfolders, you must set read/write permission on the root folder and use the option "Only admin can create files and folders" (to be explained later).
- If an unidentified account ID (such as 500) is shown for a subfolder on the permission assignment page after you click the "Access Permissions" button next to a shared folder in "Control Panel">"Privilege Settings">"Shared Folders">"Shared Folder", it is likely that the permission of that subfolder has been granted to a user account that no longer exists. In this case, please select this unidentified account ID and click "Remove" to delete this account ID.

### **Microsoft Networking Host Access Control**

The NAS folders can be accessed via Samba connection (Windows) by default. You can specify the IP addresses and hosts which are allowed to access the NAS via Microsoft Networking. Follow the steps below to set up:

1. Click "Folder Permissions".
2. Select "Microsoft Networking host access" from the drop-down menu on top of the page.
3. Specify the allowed IP addresses and host names. The following IP address and host name are used as example here:
  - IP address: 192.168.12.12 or 192.168.\*.\*
  - Host name: dnsname.domain.local or \*.domain.local
4. click "Add" to enter the IP address and host name and then "Apply".

### **Notifications on characters used:**

- Wildcard characters: You can enter wildcard characters in an IP address or host name entry to represent unknown characters.
- Asterisk (\*): Use an asterisk (\*) as a substitute for zero or more characters. For example, if you enter \*.domain.local, the following items are included: a.domain.local, cde.domain.local, or test.domain.local
- Question mark (?): Use a question mark (?) as a substitute for only one character. For example, test?.domain.local includes the following: test1.domain.local, test2.domain.local, or testa.domain.local

When you use wildcard characters in a valid host name, dot (.) is included in wildcard characters. For example, when you enter \*.example.com, "one.example.com" and "one.two.example.com" are included.

## ISO Shared Folders

You can mount the ISO image files on the NAS as ISO shares and access the contents without disc burning. The NAS supports mounting up to 256 ISO shares.

TS-110, TS-119, TS-120, TS-121, TS-210, TS-219, TS-219P, TS-220, TS-221, TS-410, , TS-119P+, TS-219P+, TS-112, TS-212 support maximum 256 network shares only (including 6 default network shares). The maximum number of ISO image files supported by these models is less than 256 (256 minus 6 default shares minus number of network recycle bin folders).

Follow the steps below to mount an ISO file on the NAS by the web interface:

1. Login the NAS as an administrator. Go to "Share Folders" > "Create". Click "Create an ISO Share".
2. Select an ISO image file on the NAS. Click "Next".
3. The image file will be mounted as a shared folder of the NAS. Enter the folder name.
4. Specify the access rights of the NAS users or user groups to the shared folder. You can also select "Deny Access" or "Read only" for the guest access right. Click "Next".
5. Confirm the settings and click "Next".
6. Click "Finish".
7. After mounting the image file, you can specify the access rights of the users over different network protocols such as SMB, AFP, NFS, and WebDAV by clicking the Access Permission icon in the "Action" column.

The NAS supports mounting ISO image files by the File Station. Please refer to the chapter on File Station<sup>[23]</sup> for details.

### Note:

- For ARM based NAS models, Cyrillic characters are not supported for the name of a subfolder in an ISO shared folder (the name will not be correctly displayed if that subfolder is created with a Cyrillic name.) Please name the subfolder with a different language before an ISO file is created.
- For Mac OSX, mounting a folder that contains the # character in the folder name through WebDAV is not supported. Please rename the folder before mounting it if necessary.

## Folder Aggregation

You can aggregate the shared folders on Microsoft network as a portal folder on the NAS and let the NAS users access the folders through your NAS. Up to 10 folders can be linked to a portal folder. To use this function, follow the steps below:

1. Enable folder aggregation.
2. Click "Create A Portal Folder".
3. Enter the portal folder name. Select to hide the folder or not, and enter an optional comment for the portal folder.
4. Click the "Link Configuration" button under "Action" and enter the remote folder settings. Make sure the folders are open for public access.
5. Upon successful connection, you can connect to the remote folders through the NAS.

### Note:

- Folder Aggregation is supported only in Microsoft networking service and recommended for a Windows AD environment.
- If there is permission control on the folders, you need to join the NAS and the remote servers to the same AD domain.

## Advanced Permissions

"Advanced Folder Permissions" and "Windows ACL" provide subfolder and file level permissions control. They can be enabled independently or together.

Protocols	Permission	Options	How to Configure
Advanced Folder Permissions	FTP, AFP, File Station, Samba	3 (Read, Read & Write, Deny)	NAS web UI
Windows ACL	Samba	13 (NTFS permissions)	Windows File Explorer
Both	FTP, AFP, File Station, Samba	Please see the application note ( <a href="http://www.qnap.com/index.php?lang=en&amp;sn=4686">http://www.qnap.com/index.php?lang=en&amp;sn=4686</a> ) for more details.	Windows File Explorer

## **Advanced Folder Permissions**

Use "Advanced Folder Permissions" to configure subfolder permissions directly from the NAS UI. There is no depth limitation for the subfolder permissions. However, it is highly recommended to change the permissions only on the first or second level of the subfolders. When "Advanced Folder Permissions" is enabled, click the "Folder Permissions" button under the "Shared Folders" tab to configure the subfolder permission settings. See "Shared Folders" > "Folder Permission" of this section for details.

## **Windows ACL**

Use "Windows ACL" to configure the subfolder and file level permissions from Windows File Explorer. All Windows Permissions are supported. For detailed Windows ACL behavior, please refer to standard NTFS permissions: [http://www.ntfs.com/#ntfs\\_permissions](http://www.ntfs.com/#ntfs_permissions)

- To assign subfolder and file permissions to a user or a user group, full control share-level permissions must be granted to the user or user group.
- When Windows ACL is enabled while "Advanced Folder Permissions" are disabled, subfolder and file permissions will have effect only when accessing the NAS from Windows File Explorer. Users connecting to the NAS via FTP, AFP, or File Station will only have share-level permissions.
- When Windows ACL and Advanced Folder Permissions are both enabled, users cannot configure Advanced Folder Permissions from the NAS UI. The permissions (Read only, Read/Write, and Deny) of Advanced Folder Permissions for AFP, File Station, and FTP will automatically follow Windows ACL configuration.



## 5.4 Quota

To allocate the disk volume efficiently, you can specify the quota that can be used by each user. When this function is enabled and a user has reached the disk quota, the user cannot upload any data to the server anymore. By default, no limitations are set for the users. You can modify the following options:

- Enable quota for all users
- Quota size on each disk volume

After applying the changes, the quota settings will be shown. Click "Generate" to generate a quota settings file in CSV format. After the file has been generated, click "Download" to save it to your specified location.

## 5.5 Domain Security

The NAS supports user authentication by local access right management, Microsoft Active Directory (Windows Server 2003/2008/2012), and Lightweight Directory Access Protocol (LDAP) directory. By joining the NAS to an Active Directory or a LDAP directory, the AD or LDAP users can access the NAS using their own accounts without extra user account setup on the NAS.

- **No domain security:** Only the local users can access the NAS.
- **Active Directory authentication (domain members):** Join the NAS to an Active Directory. The domain users can be authenticated by the NAS. After joining the NAS to an AD domain, both the local NAS users and AD users can access the NAS via the following protocols/services:
  - Samba (Microsoft Networking)
  - AFP
  - FTP
  - File Station
- **LDAP authentication:** Connect the NAS to an LDAP directory. The LDAP users can be authenticated by the NAS. After connecting the NAS to an LDAP directory, either the local NAS users or the LDAP users can be authenticated to access the NAS via Samba (Microsoft Networking). Both the local NAS users and LDAP users can access the NAS via the following protocols/services:
  - AFP
  - FTP
  - File Station

### **5.5.1 Joining NAS to Active Directory (Windows Server 2003/2008/2012)**

Active Directory is a Microsoft directory used in Windows environments to centrally store, share, and manage the information and resources on the network. It is a hierarchical data centre which centrally holds the information of the users, user groups, and the computers for secure access management. The NAS supports Active Directory (AD). By joining the NAS to the Active Directory, all the user accounts of the AD server will be imported to the NAS automatically. The AD users can use the same set of username and password to login the NAS. If you are using Active Directory with Windows Server 2008 R2, you must update the NAS firmware to V3.2.0 or above to join the NAS to the AD.

#### **Joining the NAS to Active Directory Manually**

Follow the steps below to join the QNAP NAS to the Windows Active Directory.

1. Login the NAS as an administrator. Go to "System Settings" > "General Settings" > "Time". Set the date and time of the NAS, which must be consistent with the time of the AD server. The maximum time difference allowed is 5 minutes.
2. Go to "System Settings" > "Network" > "TCP/IP". Set the IP of the primary DNS server as the IP of the Active Directory server that contains the DNS service. It must be the IP of the DNS server that is used for your Active Directory. If you use an external DNS server, you will not be able to join the domain.
3. Go to "Privilege Settings" > "Domain Security". Enable "Active Directory authentication (domain member)", and enter the AD domain information.

#### **Note:**

- Enter a fully qualified AD domain name, for example, qnap-test.com
- The AD user entered here must have the administrator access right to the AD domain.
- WINS Support: If you are using a WINS server on the network and the workstation is configured to use that WINS server for name resolution, you must set up the WINS server IP on the NAS (use the specified WINS server.)

#### **Joining the NAS to Active Directory (AD) by Quick Configuration Wizard**

To join the NAS to an AD domain by the Quick Configuration Wizard, follow the steps below.

1. Go to "Privilege Settings" > "Domain Security". Select "Active Directory

- authentication (domain member)" and click "Quick Configuration Wizard".
2. Read the introduction of the wizard. Click "Next".
  3. Enter the domain name of the domain name service (DNS). The NetBIOS name will be generated automatically when you type the domain name. Specify the DNS server IP for domain resolution. The IP must be the same as the DNS server of your Active Directory. Click "Next".
  4. Select a domain controller from the drop-down menu. The domain controller is responsible for time synchronization between the NAS and the domain server and user authentication. Enter the domain administrator name and password. Click "Join".
  5. Upon successful login to the domain server, the NAS has joined to the domain. Click "Finish" to exit the wizard.
  6. Go to "Privilege Settings" > "Users" or "User Groups" to load the domain users or user groups to the NAS.

### **Windows 2003**

The AD server name and AD domain name can be checked in "System Properties" in Windows. As an example, for Windows 2003 servers, if you see "node1.qnap-test.com" as the "Full computer name" on the system properties dialog window, the AD server name is "node1" and NOT "node1.qnap-test.com" and the domain name remains the same as qnap-test.com.

### **Windows Server 2008**

Check the AD server name and domain name in "Control Panel" > "System" in Windows. In the system dialog window, the AD server name will appear as the computer name and the domain name can be found in the domain field.

#### **Note:**

- After joining the NAS to the Active Directory, the local NAS users who have access right to the AD server should use "NASname\username" to login; the AD users should use their own usernames to login the AD server.
- For TS-109/209/409/509 series NAS, if the AD domain is based on Windows 2008 Server, the NAS firmware must be updated to version 2.1.2 or above.

### **Windows 7**

If you are using a Windows 7 PC which is not a member of an Active Directory, while your NAS is an AD domain member and its firmware version is earlier than v3.2.0,

change your PC settings as shown below to allow your PC to connect to the NAS:

1. Go to "Control Panel" > "Administrative Tools".
2. Click "Local Security Policy".
3. Go to "Local Policies" > "Security Options". Select "Network security: LAN Manager authentication level".
4. Select the "Local Security Setting" tab, and select "Send LM & NTLMv2 – use NTLMv2 session security if negotiated" from the list. Then click "OK".

### **Verifying the settings**

To verify that the NAS has been joined to the Active Directory successfully, go to "Privilege Settings" > "Users" and "User Groups". A list of users and user groups will be shown on the "Domain Users" and "Domain Groups" lists respectively. If you have created new users or user groups in the domain, you can click the reload button. This will reload the user and user group lists from the Active Directory to the NAS. The user permission settings will be synchronized in real time with the domain controller.

### **5.5.2 Connecting NAS to an LDAP Directory**

LDAP stands for Lightweight Directory Access Protocol. It is a directory that can store the information of all the users and groups in a centralized server. Using LDAP, the administrator can manage the users in the LDAP directory and allow the users to connect to multiple NAS servers with the same username and password. This feature is intended for administrator and users who have some knowledge about Linux servers, LDAP servers, and Samba. An LDAP server which is up and running is required when using the LDAP feature of the QNAP NAS.

#### **Requirements**

Required information/settings:

- The LDAP server connection and authentication information
- The LDAP structure, where the users and groups are stored
- The LDAP server security settings

#### **Connecting QNAP Turbo NAS to LDAP Directory**

Follow the steps below to connect the QNAP NAS to an LDAP directory:

1. Login the web interface of the NAS as an administrator.
2. Go to "Privilege Settings" > "Domain Security". By default, the option "No domain security" is enabled. That means only the local NAS users can connect to the NAS.
3. Select "LDAP authentication" and complete the settings.
  - LDAP Server Host: The host name or IP address of the LDAP server.
  - LDAP Security: Specify how the NAS will communicate with the LDAP server:
    - ldap:// = Use a standard LDAP connection (default port: 389).
    - ldap:// (ldap + SSL) = Use an encrypted connection with SSL (default port: 686). This is usually used by older version of LDAP servers.
    - ldap:// (ldap + TLS) = Use an encrypted connection with TLS (default port: 389). This is usually used by newer version of LDAP servers
  - BASE DN: The LDAP domain. For example: dc=mydomain,dc=local
  - Root DN: The LDAP root user. For example cn=admin, dc=mydomain,dc=local
  - Password: The root user password.
  - Users Base DN: The organization unit (OU) in which users are stored. For example: ou=people,dc=mydomain,dc=local
  - Groups Base DN: The organization unit (OU) in which groups are stored. For example ou=group,dc=mydomain,dc=local

4. Click "Apply" to save the settings. Upon successful configuration, the NAS will be able to connect to the LDAP server.
5. Configure LDAP authentication options.
  - If Microsoft Networking has been enabled (Network Services > Win/Mac/NFS > Microsoft Networking) when applying the LDAP settings, specify the users who can access the NAS via Microsoft Networking (Samba).
    - Local users only: Only the local NAS users can access the NAS via Microsoft Networking.
    - LDAP users only: Only the LDAP users can access the NAS via Microsoft Networking.
  - If Microsoft Networking is enabled after the NAS has already been connected to the LDAP server, select the authentication type for Microsoft Networking.
    - Standalone Server: Only local NAS users can access the NAS via Microsoft Networking.
    - LDAP Domain Authentication: Only LDAP users can access the NAS via Microsoft Networking.
6. When the NAS is connected to an LDAP server, the administrator can:
  - Go to "Privilege Settings" > "Users" and select "Domain Users" from the drop-down menu. The LDAP users list will be shown.
  - Go to "Privilege Settings" > "User Groups" and select "Domain Groups" from the drop-down menu. The LDAP groups will be shown.
  - Specify the folder permissions of the LDAP domain users or groups in "Privilege Settings" > "Shared Folders" > click the "Access Permissions" button next to the folder to be configured.

**Note:** Both the LDAP users and local NAS users can access the NAS via File Station, FTP, and AFP.

## **LDAP Authentication Technical Requirements with Microsoft Networking**

Required items to authenticate the LDAP users on Microsoft Networking (Samba):

1. A third party software to synchronize the password between LDAP and Samba in the LDAP server.
2. Importing the Samba schema to the LDAP directory.

### **A. Third-party software**

Some software applications are available and allow management of the LDAP users, including Samba password. For example:

- LDAP Account Manager (LAM), with a Web-based interface, available at: <http://www.ldap-account-manager.org/>
- smbldap-tools (command line tool)
- webmin-ldap-useradmin - LDAP user administration module for Webmin.

## **B. Samba schema**

To import the samba schema to the LDAP server, please refer to the documentation or FAQ of the LDAP server. The samba.schema file is required and can be found in the directory examples/LDAP in the Samba source distribution. Example for open-ldap in the Linux server where the LDAP server is running (it can be different depending on the Linux distribution):

Copy the samba schema:

```
zcat /usr/share/doc/samba-doc/examples/LDAP/samba.schema.gz > /etc/ldap/  
schema/samba.schema
```

Edit /etc/ldap/slapd.conf (openldap server configuration file) and make sure the following lines are present in the file:

```
include /etc/ldap/schema/samba.schema  
include /etc/ldap/schema/cosine.schema  
include /etc/ldap/schema/inetorgperson.schema  
include /etc/ldap/schema/nis.schema
```

## **Configuration examples**

The following are some configuration examples. They are not mandatory and need to be adapted to match the LDAP server configuration:

### **1. Linux OpenLDAP Server**

- Base DN: dc=qnap,dc=com
- Root DN: cn=admin,dc=qnap,dc=com
- Users Base DN: ou=people,dc=qnap,dc=com
- Groups Base DN: ou=group,dc=qnap,dc=com

### **2. Mac Open Directory Server**

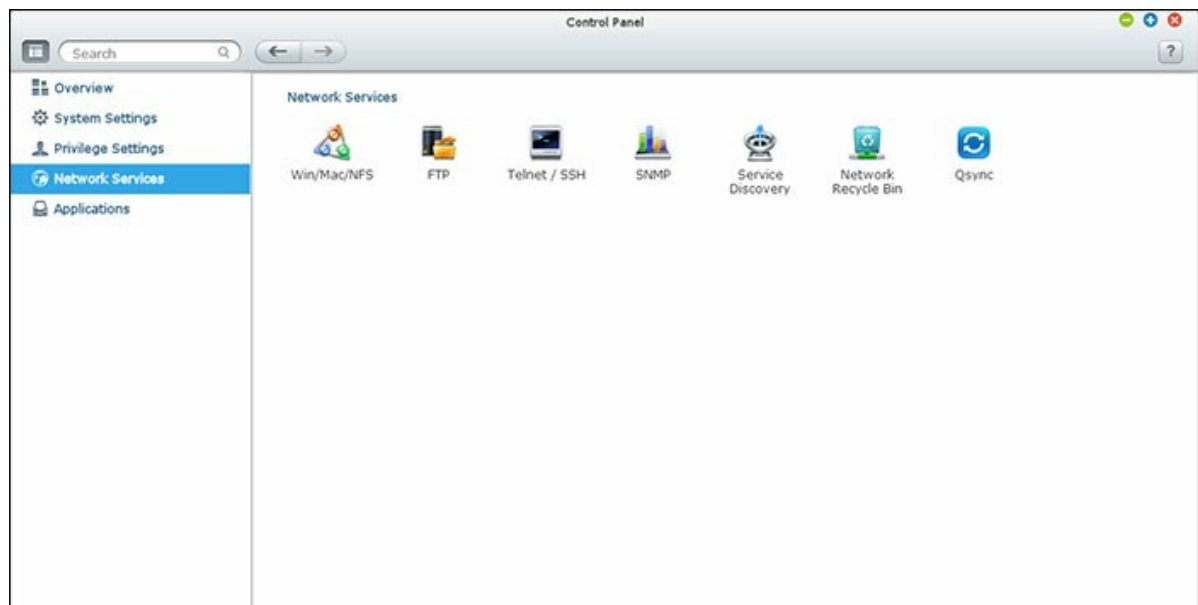
- Base DN: dc=macserver,dc=qnap,dc=com



- Root DN: uid=root,cn=users,dc=macserver,dc=qnap,dc=com
- Users Base DN: cn=users,dc=macserver,dc=qnap,dc=com
- Groups Base DN: cn=groups,dc=macserver,dc=qnap,dc=com

## 6. Network Services

Go to "Control Panel" > "Network Services" to configure network services on the NAS.

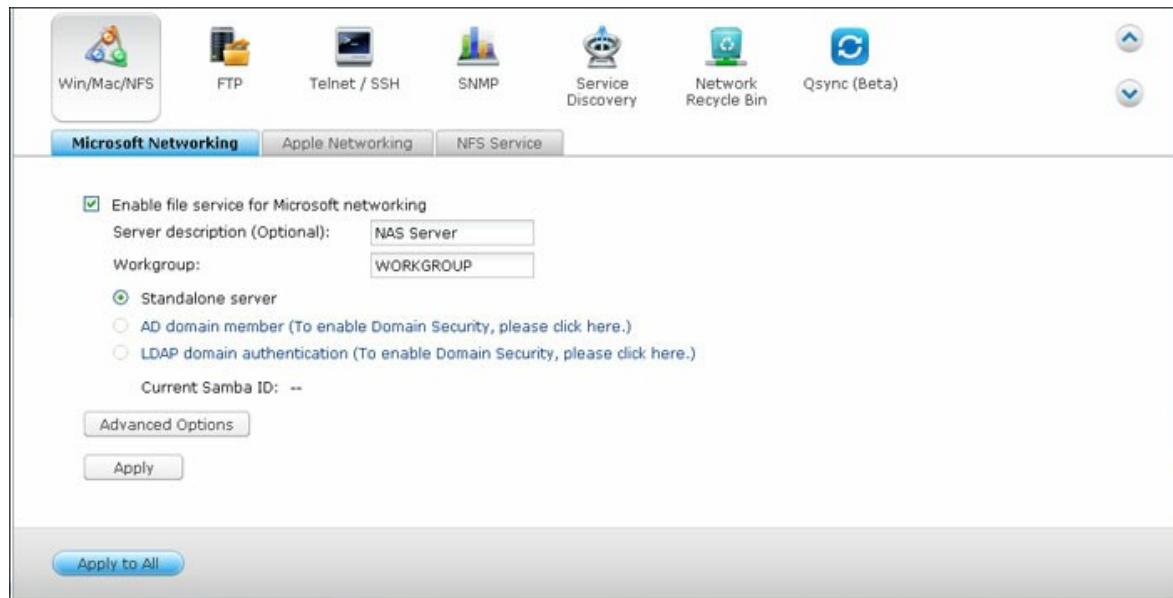


For setup details, refer to the following links:

- [Win/Mac/NFS](#)<sup>[155]</sup>
- [FTP](#)<sup>[159]</sup>
- [Telnet/SSH](#)<sup>[161]</sup>
- [SNMP Settings](#)<sup>[162]</sup>
- [Service Discovery](#)<sup>[164]</sup>
- [Network Recycle Bin](#)<sup>[165]</sup>
- [Qsync](#)<sup>[167]</sup>

## 6.1 Win/Mac/NFS

Go to "Control Panel" > "Network Services" > "Win/Mac/NFS" to configure networking services.



### Microsoft Networking

To allow access to the NAS on Microsoft Windows Network, enable file service for Microsoft networking. Specify also how the users will be authenticated.

#### Standalone Server

Use local users for authentication. The NAS will use the local user accounts information (created in "Privilege Settings" > "Users") to authenticate the users who access the NAS.

- Server Description (optional): Describe the NAS so that the users can easily identify the server on Microsoft Network.
- Workgroup: Specify the workgroup to which the NAS belongs. A workgroup name supports up to 15 characters but cannot contain: " + = / \ : | \* ? < > ; [ ] % , `

#### AD Domain Member

Use Microsoft Active Directory (AD) to authenticate the users. To use this option, enable Active Directory authentication in "Privilege Settings" > "Domain Security" and join the NAS to an Active Directory.

## LDAP Domain Authentication

Use Lightweight Directory Access Protocol (LDAP) directory to authenticate the users. To use this option, enable LDAP authentication and specify the settings in "Privilege Settings" > "Domain Security". When this option is enabled, you need to select either the local NAS users or the LDAP users can access the NAS via Microsoft Networking.

## Advanced Options

- **WINS server:** If the local network has a WINS server installed, specify the IP address. The NAS will automatically register its name and IP address with WINS service. If you have a WINS server on your network and want to use this server, enter the WINS server IP. Do not turn on this option if you are not sure about the settings.
- **Local Domain Master:** A Domain Master Browser is responsible for collecting and recording resources and services available for each PC on the network or a workgroup of Windows. When you find the waiting time for connecting to the Network Neighborhood/My Network Places too long, it may be caused by failure of an existing master browser or a missing master browser on the network. If there is no master browser on your network, select the option "Domain Master" to configure the NAS as the master browser. Do not turn on this option if you are not sure about the settings.
- **Allow only NTLMv2 authentication:** NTLMv2 stands for NT LAN Manager version 2. When this option is turned on, login to the shared folders by Microsoft Networking will be allowed only with NTLMv2 authentication. If the option is turned off, NTLM (NT LAN Manager) will be used by default and NTLMv2 can be negotiated by the client. The default setting is disabled.
- **Name resolution priority:** You can select to use DNS server or WINS server to resolve client host names from IP addresses. When you set up your NAS to use a WINS server or to be a WINS server, you can choose to use DNS or WINS first for name resolution. When WINS is enabled, the default setting is "Try WINS then DNS". Otherwise, DNS will be used for name resolution by default.
- **Login style: DOMAIN\USERNAME instead of DOMAIN+USERNAME for FTP, AFP, and File Station:** In an Active Directory environment, the default login formats for the domain users are:
  - Windows shares: domain\username
  - FTP: domain+username
  - File Station: domain+username
  - AFP: domain+username

When you turn on this option, the users can use the same login name format (domain\username) to connect to the NAS via AFP, FTP, and File Station.

- **Automatically register in DNS:** When this option is turned on and the NAS is joined to an Active Directory, the NAS will register itself automatically in the domain DNS server. This will create a DNS host entry for the NAS in the DNS server. If the NAS IP is changed, the NAS will automatically update the new IP in the DNS server.
- **Enable trusted domains:** Select this option to load the users from trusted Active Directory domains and specify their access permissions to the NAS in "Privilege Settings" > "Shared Folders". (The domain trusts are set up in Active Directory only, not on the NAS.)

## Apple Networking

To connect to the NAS from Mac, enable Apple Filing Protocol. If the AppleTalk network uses extended networks and is assigned with multiple zones, assign a zone name to the NAS. Enter an asterisk (\*) to use the default setting. This setting is disabled by default. To allow access to the NAS from Mac OS X 10.7 Lion, enable "DHX2 authentication support". Click "Apply" to save the settings. You can use the Finder to connect to a shared folder from Mac. Go to "Go" > "Connect to Server", or simply use the default keyboard shortcut "Command+k". Enter the connection information in the "Server Address" field, such as "afp://YOUR\_NAS\_IP\_OR\_HOSTNAME". Here are some examples:

- afp://10.8.12.111
- afp://NAS-559
- smb://192.168.1.159

**Note:** Mac OS X supports both Apple Filing Protocol and Microsoft Networking. To connect to the NAS via Apple Filing Protocol, the server address should start with "afp://". To connect to the NAS via Microsoft Networking, please use "smb://".

## NFS Service

To connect to the NAS from Linux, enable NFS service. To configure the NFS access right to the shared folders on the NAS, go to "Privilege Settings" > "Share Folders". Click the Access Permission button on the "Action" column. Select NFS host access from the drop-down menu on top of the page and specify the access right. If you select "No limit" or "Read only", you can specify the IP address or domains that are allowed to connect to the folder by NFS.

- No limit: Allow users to create, read, write, and delete files or folders in the shared folder and any subdirectories.
- Read only: Allow users to read files in the shared folder and any subdirectories but they are not allowed to write, create, or delete any files.
- Deny access: Deny all access to the shared folder.

### Connecting to the NAS by NFS

On Linux, run the following command:

```
mount -t nfs <NAS IP>:/<Shared Folder Name> <Directory to Mount>
```

For example, if the IP address of your NAS is 192.168.0.1 and you want to link the shared folder "public" under the /mnt/pub directory, use the following command:

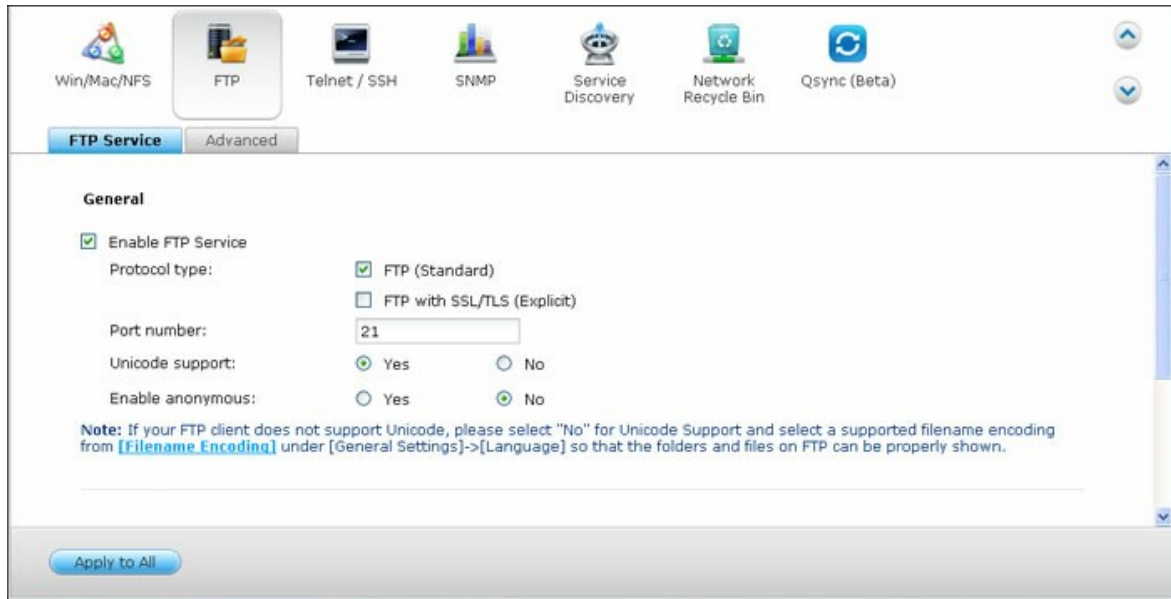
```
mount -t nfs 192.168.0.1:/public /mnt/pub
```

**Note:** You must login as the "root" user to initiate the above command.

Login as the user ID you define, you can use the mounted directory to connect to your shared files.

## 6.2 FTP

Go to "Control Panel" > "Network Services" > "FTP" to Configure the FTP server.



### FTP Service

When you turn on FTP service, you can specify the port number and the maximum number of users that are allowed to connect to the NAS by FTP at the same time. To use the FTP service of the NAS, enable this function. Open an IE browser and enter ftp://NAS IP. Enter the username and the password to login the FTP service.

- **Protocol Type:** Select to use standard FTP connection or SSL/TLS encrypted FTP. Select the correct protocol type in your client FTP software to ensure successful connection.
- **Port number:** Specify the port number of the FTP service.
- **Unicode Support:** Turn on or off the Unicode support. The default setting is No. If your FTP client does not support Unicode, you are recommended to turn off this option and select the language you specify in "General Settings" > "Codepage" so that the file and folder names can be correctly shown. If your FTP client supports Unicode, enable Unicode support for both your client and the NAS.
- **Enable Anonymous:** You can turn on this option to allow anonymous access to the NAS by FTP. The users can connect to the files and folders which are open for public access. If this option is turned off, the users must enter an authorized username and password to connect to the server.
- **Connection:** Enter the maximum number of all FTP connections allowed for the NAS and a single account and check "Enable FTP transfer limitation" to specify the maximum upload and download rate.

**Note:** The number of FTP connections mentioned above varies based on the size of RAM installed on the NAS:

- If the NAS memory  $\leq$  1 GB, the maximum is 256.
- If the NAS memory = 2 GB, the maximum is 512.
- If the NAS memory  $\geq$  3 GB, the maximum is 1024.

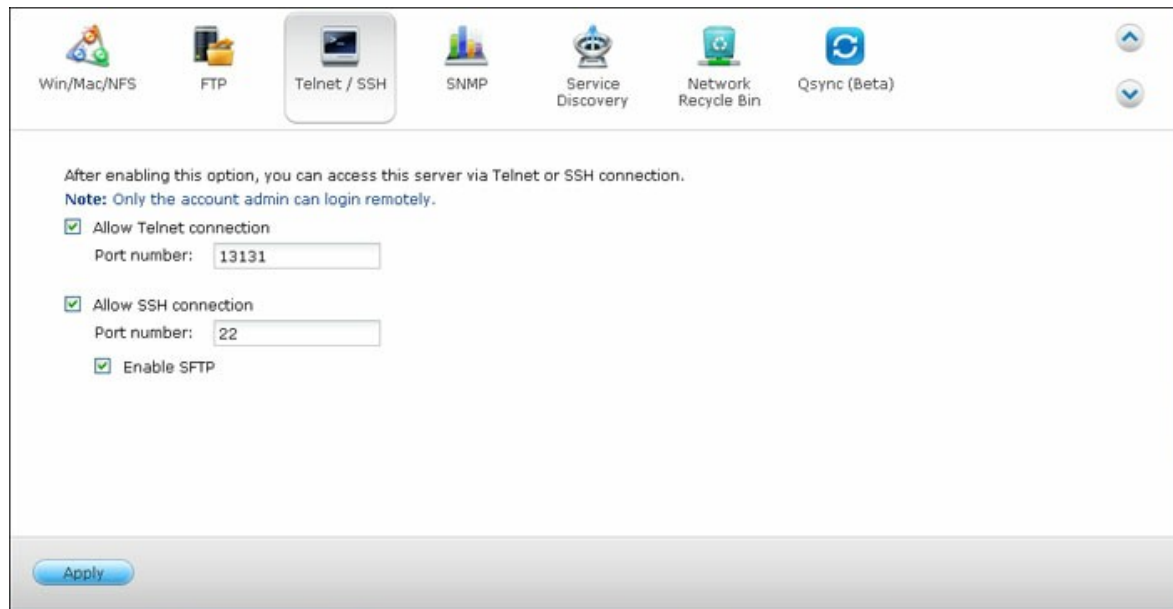
## Advanced

- **Passive FTP Port Range:** You can use the default port range (55536-56559) or specify a port range larger than 1023. When using this function, make sure you have opened the ports on your router or firewall.
- **Respond with external IP address for passive FTP connection request:** When passive FTP connection is in use, the FTP server (NAS) is behind a router, and a remote computer cannot connect to the FTP server over the WAN, enable this function. When this option is turned on, the NAS replies the IP address you specify or automatically detects the external IP address so that the remote computer is able to connect to the FTP server.



### 6.3 Telnet/SSH

Turn on this option to connect to the NAS by Telnet or SSH encrypted connection (only the "admin" account can login remotely). Use Telnet or SSH connection clients, for example, putty for connection. Make sure the specified ports have been opened on the router or firewall.



The screenshot shows a configuration window for 'Telnet / SSH'. At the top, there is a horizontal menu with icons for 'Win/Mac/NFS', 'FTP', 'Telnet / SSH' (which is selected and highlighted), 'SNMP', 'Service Discovery', 'Network Recycle Bin', and 'Qsync (Beta)'. Below the menu, the main area contains the following text and controls:

- Text: "After enabling this option, you can access this server via Telnet or SSH connection."
- Note: "Note: Only the account admin can login remotely."
- Option 1: A checked checkbox labeled "Allow Telnet connection" followed by a text input field for "Port number:" containing the value "13131".
- Option 2: A checked checkbox labeled "Allow SSH connection" followed by a text input field for "Port number:" containing the value "22".
- Option 3: A checked checkbox labeled "Enable SFTP".

At the bottom left of the window is a blue button labeled "Apply".

To use SFTP (known as SSH File Transfer Protocol or Secure File Transfer Protocol), make sure the option "Allow SSH connection" has been turned on.

## 6.4 SNMP Settings

Enable SNMP (Simple Network Management Protocol) service on the NAS and enter the trap address of the SNMP management stations (SNMP manager), for example, PC with SNMP software installed. When an event, warning, or error occurs on the NAS, the NAS (SNMP agent) reports the real-time alert to the SNMP management stations.

**SNMP**

After enabling this service, the NAS will be able to report information via SNMP to the managing systems.

☒ Enable SNMP service

Port number:

SNMP trap Level: ☐ Information ☐ Warning ☐ Error

Trap address 1:

Trap address 2:

Trap address 3:

SNMP version:

Community:

**SNMP MIB**

To install the MIB to your managing systems, click **[Download]**.

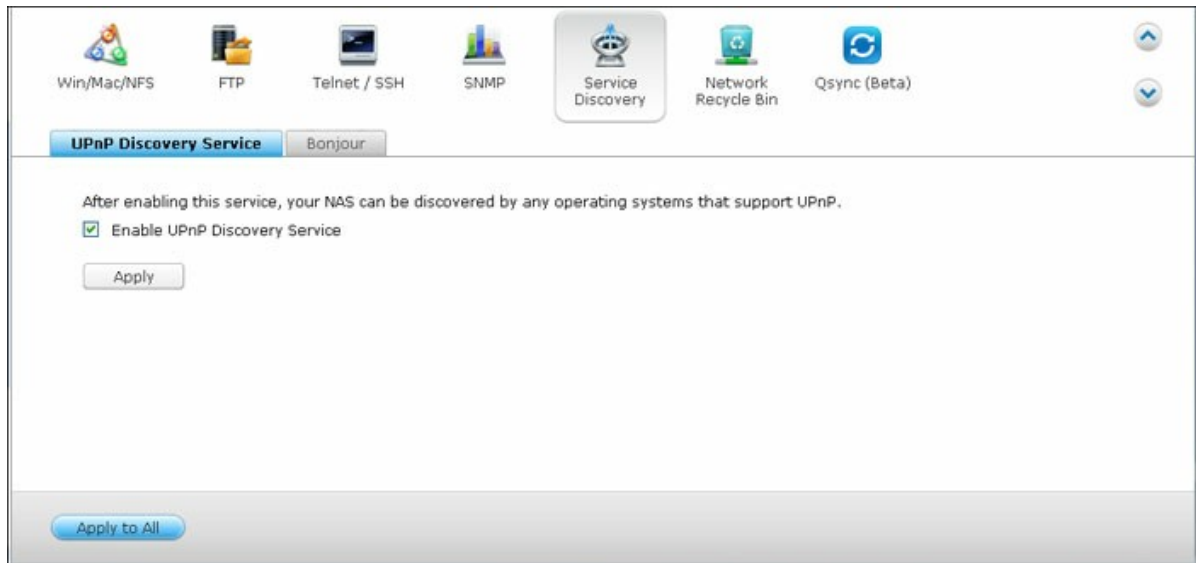
The fields are described as below:

Field	Description
SNMP Trap Level	Select the information to be sent to the SNMP management stations.
Trap Address	The IP address of the SNMP manager. Specify maximum 3 trap addresses.
SNMP MIB (Management Information Base)	The MIB is a type of database in ASCII text format used to manage the NAS in the SNMP network. The SNMP manager uses the MIB to determine the values or understand the messages sent from the agent (NAS) within the network. You can download the MIB and view it with any word processor or text editor.

Community (SNMP V1/V2)	An SNMP community string is a text string that acts as a password. It is used to authenticate messages that are sent between the management station and the NAS. The community string is included in every packet that is transmitted between the SNMP manager and the SNMP agent.
SNMP V3	The NAS supports SNMP version 3. Specify the authentication and privacy settings if available.

## 6.5 Service Discovery

Go to "Control Panel" > "Network Services" > "Service Discovery" to configure the UPnP discovery service and Bonjour.



### UPnP Discovery Service

When an UPnP device is added to the network, the UPnP discovery protocol allows the device to advertise its services to the control points on the network. By enabling UPnP Discovery Service, the NAS can be discovered by any operating systems that support UPnP.

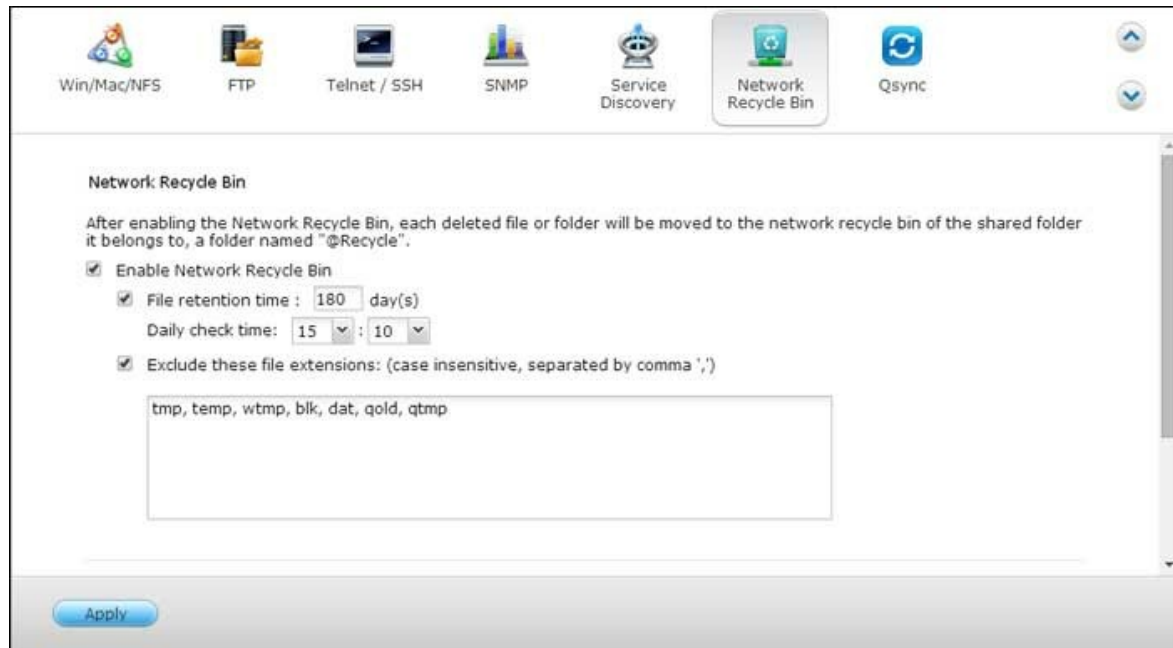
### Bonjour

By broadcasting the network service(s) with Bonjour, your Mac will automatically discover the network services, such as FTP, running on the NAS without the need to enter the IP addresses or configure the DNS servers.

**Note:** You have to activate the services on their setup pages and then turn them on in this section so that the NAS will advertise this service with Bonjour.

## 6.6 Network Recycle Bin

The Network Recycle Bin keeps the deleted files on the NAS. Within each shared folder, a dedicated folder by the name @Recycle is created after the initial QTS installation. Specify the number of days (1-180) and daily check time to keep the deleted files and older files deleted will be deleted first. You may also specify the file extensions to be excluded from the bin. Note that this feature only supports file deletion via Samba, AFP, FTP and QNAP File Station.



### Using Network Recycle Bin

- To delete all the files in the bin, click "Empty All Network Recycle Bin".
- To recover deleted files from the Network Recycle Bin, right click the files in the @Recycle folder and select "RECOVER".
- To permanently delete a file in the recycle bin, right click the file in the @Recycle folder and select "Del (from recycle)".
- To empty the recycle bin for an individual shared folder, right click inside the recycle bin and select "Empty Recycle Bin".

### Restricting Access to Network Recycle Bin

The Network Recycle Bin can be configured for access by administrators only. To do so, please go to "Control Panel" > "Privilege Settings" > "Shared Folders", click the "Property" button under "Action" for the shared folder to be configured and check "Restrict the access of Recycle Bin to administrators only for now".

***Caution:*** All files in the network recycle bins will be permanently deleted when files are deleted in "@ Recycle" on the network share or when you click "Empty All Network Recycle Bins". Moreover, the Network Recycle Bin feature is not supported for USB/eSATA external storage devices and virtual disk.

## 6.7 Qsync

Qsync is a cloud based file synchronization service empowered by QNAP Turbo NAS. Simply add files to your local Qsync folder, and they will be available on your Turbo NAS and all its connected devices.



### Before you Start

Follow the 3 steps below before Qsync deployment.

1. Create user accounts on the NAS,
2. Install Qsync on your computers and Qfile on your mobile devices,
3. Login the NAS (serving as a Qsync server) from your computers or mobile devices (referred to in this document as "Qsync clients".)

#### 1. Creating user accounts on the NAS

Please create user accounts for Qsync users.

For NAS administrator: Please go to "Control Panel" > "Privilege Settings" > "Users" > click "Create".

For NAS users: Please have the system administrator create an account for you.

#### 2. Installing Qsync utility

Qsync will synchronize all chosen files on your computers or mobile devices.

Follow the instructions detailed on the "Overview" page to download the utility (Login the NAS > click the Qsync shortcut on the NAS Desktop > "Overview" page,) or

download the utility from the QNAP website: "Support" > "Download" > "Utilities".

- For computers, please download the Qsync utility (available for Windows operating systems.)
- For mobile devices, please download and install Qfile (available for iOS or Android operating systems.)

### 3. Logging in the NAS

After installing the utility, enter the user ID and password and specify the designated NAS as the Qsync server.

To locate the NAS within a LAN environment, simply click "Search" or key in its IP address or name (e.g. IP address: 10.8.1.20 or 192.168.1.100).

To connect to a remote NAS (over the Internet,) please use your myQNAPcloud address to login (e.g. [andy@myQNAPcloud.com](mailto:andy@myQNAPcloud.com)).

**Note:** If the ports have been changed for NAS connection, please add the port number after the IP address; otherwise, please only enter an IP address. (Default port number: 8080)

### Starting Qsync

Double click the Qsync shortcut on the Windows desktop to open the Qsync local folder. Click the Qsync icon on the taskbar at bottom right side of the screen to bring up the menu. Now, copy or move your files to the local Qsync folder in one of your devices, the files will be copied to all your other devices (devices with Qsync installed and are connected to the NAS.) From now on, there is no need to copy files back and forth between your PC and external devices or worry about the size of the files as you try to attach them to an email.

### Synchronization

There are several methods you can synchronize your files. Qsync will automatically synchronize the files among your computers or mobile devices that have Qsync installed, and they will also be synchronized to the Qsync folder on the NAS:

1. For PCs, drag and drop files directly to the local Qsync folder.
2. For mobile devices (Qfile), copy or move files into the Qsync folder.
3. For the NAS, copy or move files to the Qsync folder via the File Station (web based file explorer).



**Note:**

- If files are "dragged and dropped" to the Qsync folder, they will be moved to the Qsync folder, instead of being copied into the folder, if the files and the Qsync folder are on the same disk drive. The behavior is the same as the Windows File Explore.
- The maximum size of a single file that Qsync can transmit is 50GB in a LAN.
- Qsync does not support SAMBA, FTP or AFP for files access. Please access files using the File Station or Qsync.
- Qfile can only synchronize the file list and does not download the files to a mobile device. Please download the files when you need them.

**Offline editing**

You can browse and edit your files offline, and once your device is online, Qsync will synchronize the files you edited offline for you automatically.

**Sharing****Sharing files by download links**

You can share files by sending file download links to those who haven't installed Qsync.

For Windows:

1. Right click the file that you would like to share in the local Qsync folder and click "Share the link".
2. Select to send the link via email or copy the link to others.
3. Click "Advanced" to check more options for the link, such as creating a SSL link, the expiration date, or password.

For the NAS, right click the file that you would like to share in the Qsync folder within the File Station and click "Share". For mobile devices, launch the Qfile to share the file in the Qsync folder by clicking the icon to the right and click "Share". The file recipients can click the link or copy and paste it to a web browser to download the file.

**Sharing folders with a group**

You can share a folder with a user group. If any member from the group shares the files in the folder, other members can receive the file.

Steps:

1. Create user accounts in the NAS for each group member.
2. Have the Qsync utility installed on each member's device.
3. Right click the folder that you would like to share in the local Qsync folder and click "Share this folder as a team folder".
4. Select users from the list of local or domain users.

All members in the group will receive a file sharing invitation. Once accepted, the group members can start to access this shared folder.

**Note:**

- The team folder will only take effect after users you send the invitation to accept the invitation.
- Users cannot share the team folders which are shared from others again.

## **Remote Access**

### **Accessing the NAS over the Internet**

To connect to a remote NAS (over the Internet), the administrator is required to configure the device name for the NAS in "myQNAPcloud" first (Login the NAS > NAS Desktop > click the myQNAPcloud shortcut.) Next, notify the users about the myQNAPcloud web address for their remote access. You can then use the myQNAPcloud address to login the remote NAS. (e.g. [andy@myQNAPcloud.com](mailto:andy@myQNAPcloud.com))

**Note:**

- The connection with the NAS over the Internet will take longer, when compared to a LAN environment.
- As you switch back to a LAN environment where your NAS is located, please connect to the NAS again through LAN, instead of the myQNAPcloud service for better connection quality.
- For better performance on file transmission, it is recommended to configure port forwarding on the router if possible.

### **Synchronizing photos and videos automatically**

Qsync can synchronize your photos and videos on mobile devices to the Qsync folder across all Qsync clients automatically.

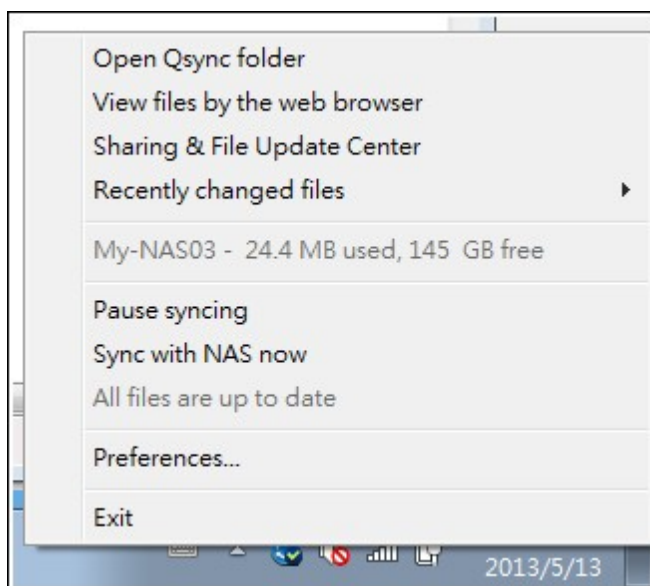
Steps:

1. Install Qfile on your mobile devices by following instructions outlined in the Qsync page on the NAS or find it on the App Store.
2. Launch Qfile.
3. Click "Settings" on the bottom right side of the screen.
4. Scroll down and look for "Auto upload from photo gallery" and click "Set up now".
5. Select a NAS to upload photos and videos to.
6. Select the folder.
7. Select "Use default setting" ( /Qsync/Camera Uploads) or select "Set up manually" to set the path.
8. Select if you want to upload all photos from the photo gallery immediately.
9. You can check the checkbox "Limit to Wi-Fi" to upload files through Wi-Fi and avoid possible expenses associated with the 3G usage.
10. The uploaded files will be synchronized to the Camera Uploads folder under the Qsync folder on Qsync client devices.

**Note:** If files uploaded before are deleted from the Camera Uploads folder, Qfile will not upload those copies in the photo library again.

## Synchronization Management

Click the Qsync icon on the taskbar to see the management functions:



1. Add files and view the synchronization result on the NAS:
  - a. Open the Qsync folder: Open the Qsync folder to add files,
  - b. View files by the web browser: Open the File Station (web based file explorer) and browse files in the Qsync folder on the NAS.
2. Control synchronization progress:
  - a. Pause syncing / Resume syncing: Click to pause or resume file synchronization,
  - b. Sync with NAS now: Force Qsync to scan again and refresh the synchronization list.
3. Information for syncing and sharing:
  - a. Sharing & File Update Center
    - i. File Update Center: List the file or folder update logs.
    - ii. Sharing Center: List the folders or files shared with others. Users can choose to accept or decline the team folders. However, users cannot share team folders that are shared by others.
  - b. Recently changed files: List the recently updated files.
4. Preference:
  - a. General:
    - i. Link Status: Show the current status. Click "Logout" to change users.
    - ii. Network Recycle Bin: Browse or recover files deleted from the Qsync folder.
  - b. Sync:
    - i. Selective Synchronization: Select the folder to synchronize to the computers.
    - ii. Do not remove any files on the NAS when synchronizing: You can remove files within the local Qsync folder, and files deleted from your computer will not be synchronized with the NAS. The NAS still keeps copies of the deleted files.
  - c. Policy:
    - i. Conflict Policies: The policies for handling the name conflicts between the Qsync server (NAS) and clients after it is back online from its disconnection:
      - 1).Rename the local file(s),
      - 2).Rename the remote NAS file(s),
      - 3).Replace local files with remote NAS file(s),
      - 4).or Replace remote NAS files with local file(s).
    - ii. Sharing Policies: The policies of the team folders when other Qsync users share them to this local computer:
      - 1).Always reject sharing,
      - 2).Automatically accept sharing, or
      - 3).Send a notification message once sharing occurs.

- iii. Filter Settings: During file synchronization, Qsync will not synchronize the types of files specified in filter settings.
- d. Email:
  - i. Set up E-mail: Set up an email account for sharing file links. You can use the NAS SMTP server settings (for NAS administrators only) or configure a new SMTP server.
- e. Advanced:
  - i. Import photos and videos: Import photos and videos when an USB external device is connected. This feature only applies to photos and videos located in the DCIM folder in the root directory of the USB external device.

## **Version Control**

The version control will keep one copy of a file as a version whenever you add or modify it, allowing you to retrieve a specific previous version at any time. Or, if you accidentally save a file and override the previous version made by other people while editing the file in team folder, you can still restore the previous version. And you can restore the previous versions even if you have deleted the file from the recycle bin.

### **Viewing the version history**

You can view the version history by using the File Station. Inside the File Station, right click on a file or folder in the Qsync folder and select "Previous Versions". Or you can access it from menu bar, "More Action" > "Previous Versions". Or, just click the "Show Right Panel" > "Version" to show the version list. You can also access it from the Qsync client utility. Right click on a file or folder in the Qsync folder and select "Previous Versions".

### **Restoring the previous versions**

In the version history page, select the version you want to restore and click "Restore" to restore version to the original file path or other location.

- Click "Download" to download the version to the local computer.
- Click "Delete All" to delete all of the listed versions.
- Click "Refresh" to update the status of the version history.

### **Restoring versions of a deleted file**

The version control keeps the version in a separate location, so even you delete the file, you can still restore the previous versions of the file, even the file has been deleted from the recycle bin.

To restore the version of a deleted file, click any folder or file in the Qsync folder, and then click "More Action" > "Show Deleted Files" in the menu bar. To view the version history, right click on a file or folder in Qsync folder and select "Previous Versions". Or you can access it from the menu bar, "More Action" > "Previous Versions". Or just click the "Show Right Panel" > "version" to show the version list.

### **Restoring previous versions**

In the version history page, select the version you want to restore and click "Restore" to restore the version to the original file path or other location.

- Click "Download" to download the version to the local computer.
- Click "Delete All" to delete all of the listed versions.
- Click "Refresh" to update the status of the version history.

**Note:** If you click "Delete All" to delete all the listed versions, then click "Refresh" button, the associated files will be removed from the file list.

To exit the view of the deleted file list, right click any file or folder and select "Hide Deleted Files". Or access it from menu bar, "More Action" > "Hide Deleted Files".

### **Managing and setting version control**

To access the management and settings of version control, click the Qsync button on the desktop of the NAS, then click "Version Control" in the right side menu.

#### **The target folder**

The "Enable version control" is the main switch of the version control. Unchecking this option it will disable the function, so no users can use it including the administrator, but the action will not delete the existing versions that have been created. "Enable version for my Qsync folder" allows each user to apply the function for their own files.

#### **Target folder for version control**

You can apply the version control to the files under specific Qsync folders to save space. To assign specific folders, select "Assign specific subfolder under the Qsync folder", then click "Add" to add folders. You can add 5 folders at most. Click "Delete" to remove all versions under the selected folders and subfolders. This will not take effect until you click "Apply" or "Apply All".

### **Advanced**

**Maximum Number of Versions:** You can choose how many versions you want to keep for your files. This is a control only for administrators. The more versions you keep the more storage space it will take up. To know how much space has been used for version control, click the "Check" button in the section of "Disk Used for Version Control".

**Note:**

- If you reduce the maximum number of versions, it will impact the versions that have been created and if the volume of versions exceeds the new settings, the earlier versions will be dropped. Only the equivalent number of latest versions as of the new settings will be kept.
- The deletion will not take effect immediately until you click "Apply" or "Apply All".
- The maximum number of versions supported for Version Control is 64.

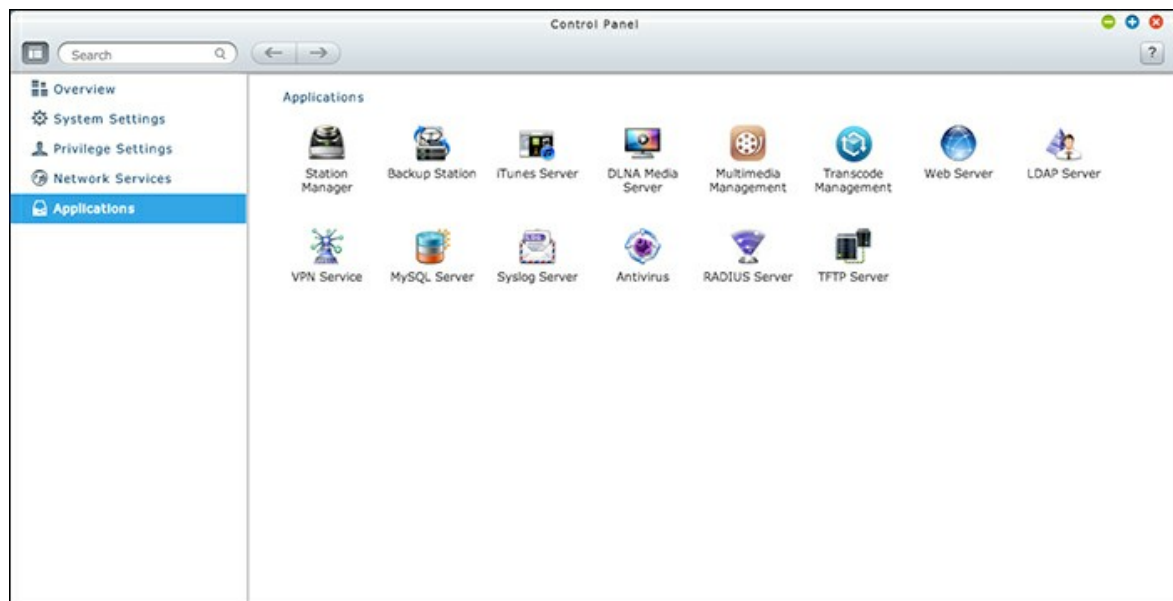
### **Managing or Monitoring Qsync Status via Web Browser**

Login the NAS via a web browser and click the Qsync button.

1. Overview: Provide links to install the utility and to File Station and list the total number of online users and devices. You can also choose to enable or disable the Qsync service (for administrators only.)
2. Users: List information of online users, and you can manage the Qsync service for users (for administrators only.)
3. Devices: List the status of connected devices and you can choose to allow or terminate connection of the devices.
  - a. If users login from their PC, the name of the device will be shown as their computer name.
  - b. If users login from Qfile, the name of the device will be shown as "Qfile-Android" or "Qfile-iPhone".
  - c. If users move or copy files to the Qsync folder in the File Station, the name of the device will be shown as "Qsync-File Station".
4. Event Logs: List the activity details by each user.
5. Team folder: List the status of the team folder, including folders that you shared and are shared by others.
6. Shared File Links: List the status of shared links.

## 7. Applications

Go to "Control Panel" > "Applications" to configure NAS applications.



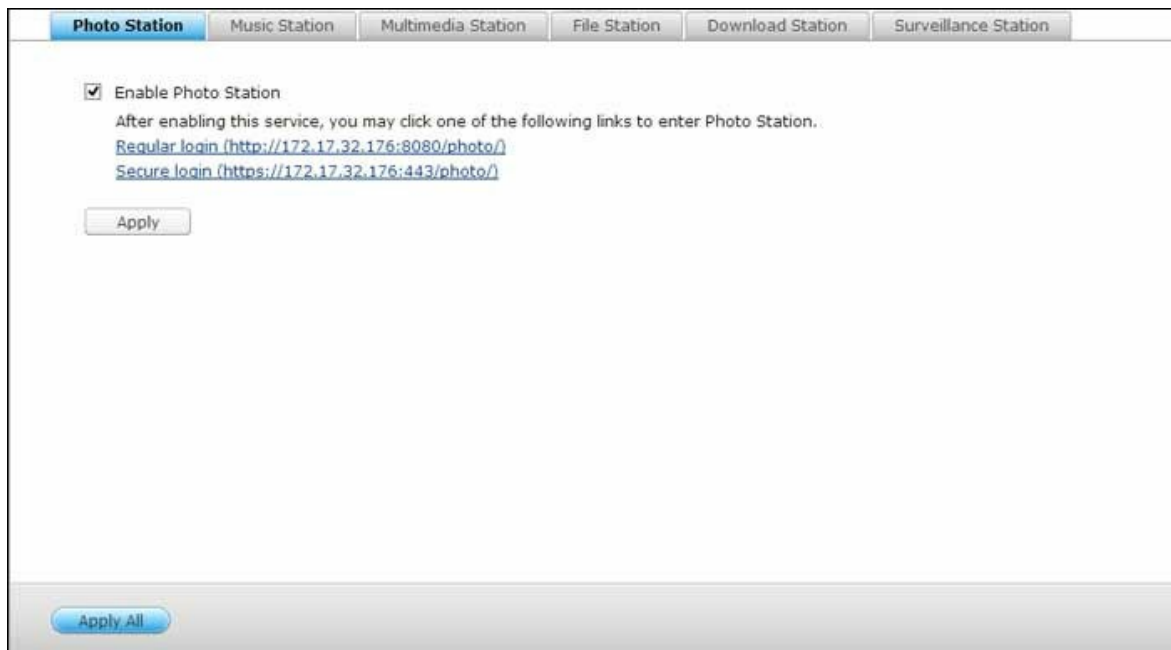
For setup details, refer to the following links:

- [Station Manager<sup>\[177\]</sup>](#)
- [iTunes Server<sup>\[180\]</sup>](#)
- [DLNA Media Server<sup>\[181\]</sup>](#)
- [Multimedia Management<sup>\[183\]</sup>](#)
- [Transcode Management<sup>\[185\]</sup>](#)
- [Web Server<sup>\[188\]</sup>](#)
- [LDAP Server<sup>\[194\]</sup>](#)
- [VPN Service<sup>\[196\]</sup>](#)
- [MySQL Server<sup>\[200\]</sup>](#)
- [Syslog Server<sup>\[202\]</sup>](#)
- [Antivirus<sup>\[205\]</sup>](#)
- [RADIUS Server<sup>\[209\]</sup>](#)
- [TFTP Server<sup>\[211\]</sup>](#)



## 7.1 Station Manager

The Station Manager is an integrated control panel for all QNAP Stations and they can be enabled or disabled here.



### Photo Station

Check "Enable Photo Station" to enable this station and click the links below to directly login to the application. Check "Show the photos of Sharing Management on the login screen" to display photo albums on the login page. This will allow users to directly view the photos of the chosen album as a guest. Please note that the Photo Station can only be launched after it is enabled in the Station Manager. For details on the Photo Station, please refer to the chapter on Photo Station<sup>[255]</sup>.

**Note:** Photo Station 2 will remain installed after the NAS firmware is upgraded to QTS 4.0.

### Music Station

Check "Enable Music Station" to enable this station and click the links below to directly login to the application. Please note that the Music Station can only be launched after it is enabled in the Station Manager.

For details on the Music Station, please refer to the chapter on Music Station<sup>[268]</sup>.

## Multimedia Station

Check "Enable Multimedia Station" to enable this station and click the links below to directly login to the application. To schedule routine scans on the Media Library, check "Rescan Media Library" and specify the start time for the daily scan. Please note that the Music Station can only be launched after it is enabled in the Station Manager.

## File Station

Check "Enable File Station" to enable this station and click the links below to directly login into the application. Please note that the File Station can only be launched after it is enabled in the Station Manager.

For details on the File Station, please refer to the chapter on File Station<sup>[238]</sup>.

## Download Station

Check "Enable Download Station" to enable this station and click the links below to directly login to the application. Please note that the Download Station can only be launched after it is enabled in the Station Manager.

For details on the Download Station, please refer to the chapter on Download Station<sup>[275]</sup>.

## Surveillance Station

Check "Enable Surveillance Station" under "Settings" to enable this station and click the links below to directly login to the application. The Surveillance Station offers one free recording channel. To add extra recording channels, please purchase the license at QNAP License Store (<http://license.qnap.com>) or contact the authorized reseller at your region for details.

### Note:

- The number of recording channels supported varies by the NAS model. Please refer to the QNAP License Store (<http://license.qnap.com/>) for details before purchasing or activating the license on the NAS.
- The maximum number of recording channels supported is for reference only. The actual recording performance may vary depending on the IP cameras, video contents, network bandwidth, recording settings, and other applications running

on the NAS. Please contact an authorized reseller or camera vendors for more information.

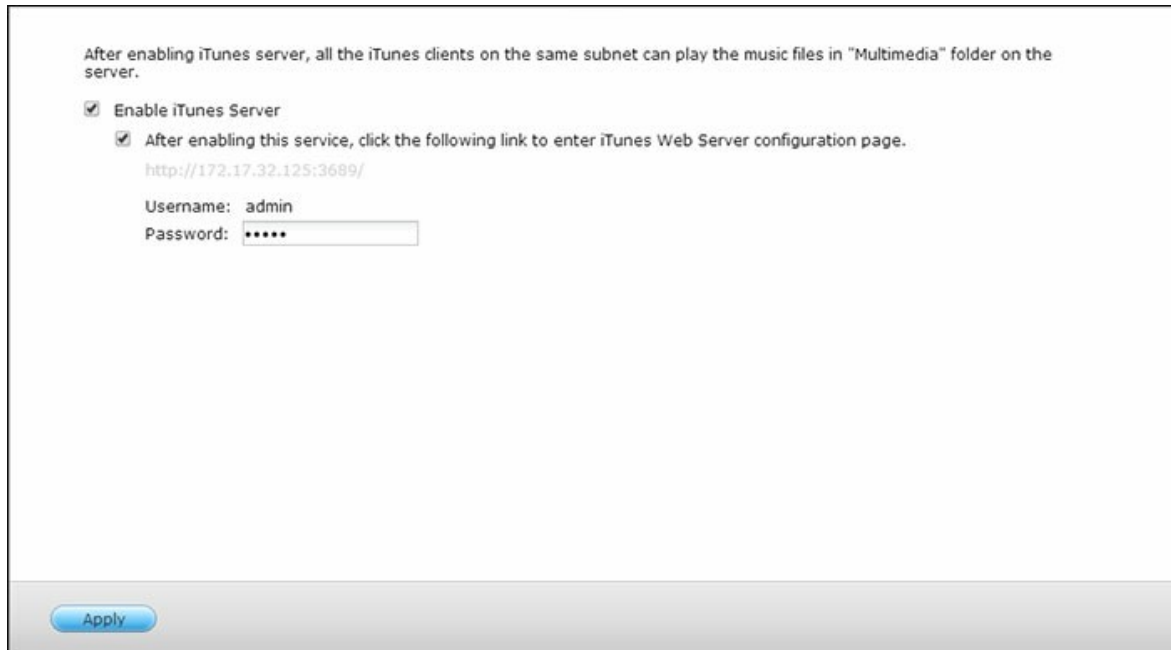
- For step-by-step tutorial on adding extra channels, please refer to the QNAP website (Resource > Tutorials > "How to support additional recording channels on Surveillance Station Pro?").
- Windows users are advised to use IE 10, Chrome or Firefox for live view and playback operations.
- Mac users are recommended to use QNAP Surveillance Client for Mac for live view and playback operations. QNAP Surveillance Client for Mac can be downloaded at <http://www.qnap.com/download>.

To check on license details, switch to the "License Management" page.

## 7.2 iTunes Server

The MP3 files on the Qmultimedia/Multimedia folder of the NAS can be shared to iTunes by this service. All the computers with iTunes installed on LAN are able to find, browse, and play the shared music files on the NAS.

To use iTunes Server, install iTunes ([www.apple.com/itunes/](http://www.apple.com/itunes/)) on your computer. Enable this feature and then upload the music files to the Qmultimedia/Multimedia folder of the NAS.



After enabling iTunes server, all the iTunes clients on the same subnet can play the music files in "Multimedia" folder on the server.

☒ Enable iTunes Server

☒ After enabling this service, click the following link to enter iTunes Web Server configuration page.

<http://172.17.32.125:3689/>

Username:

Password:

**Note:** iTunes Server may be disabled or hidden on the following business models: TS-x70U, TS-x79 Pro and TS-x79U. To enable iTunes server, please refer to "System Administration" in the General Settings<sup>44</sup> section.

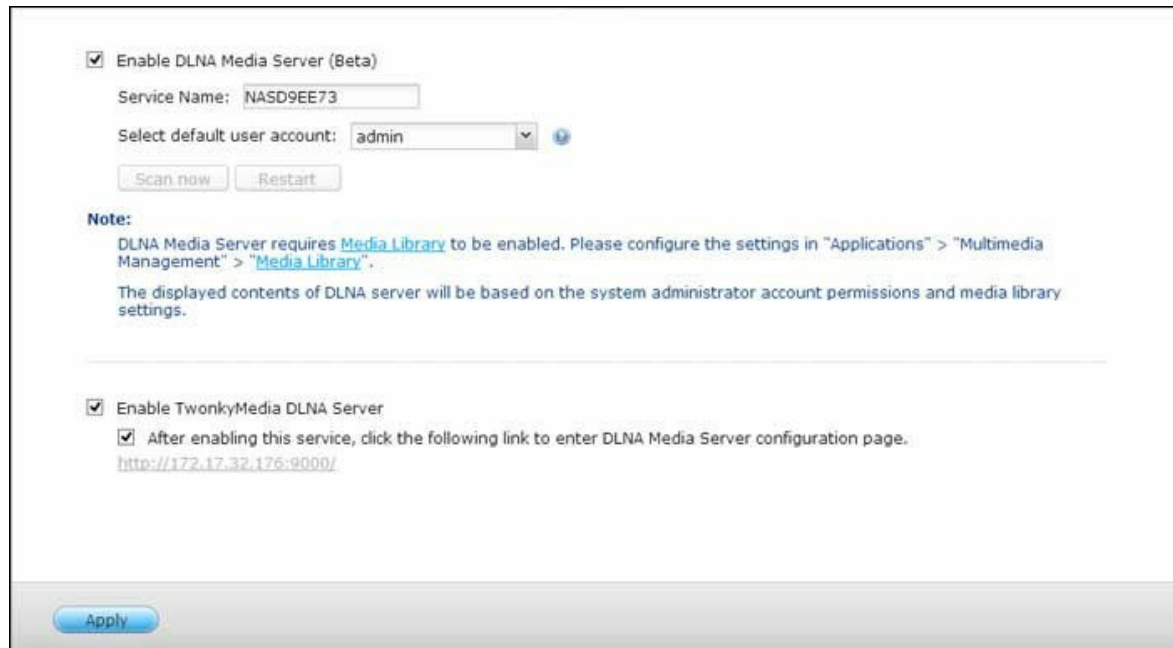
To configure the iTunes server settings and add smart playlists, login the web page of iTunes server: <http://NAS-IP:3689/index.html>. Connect the PC and the NAS to the same LAN and run iTunes on the PC. Find the NAS name under "SHARED" and start to play the music files or playlists.

### Additional Reference:

- Setup iTunes Music Server on QNAP.

### 7.3 DLNA Media Server

QNAP Turbo NAS supports two types of DLNA Media Servers: QNAP DLNA Media Server and Twonky Media DLNA Server.



The screenshot shows the QNAP DLNA Media Server configuration interface. At the top, there is a checkbox labeled "Enable DLNA Media Server (Beta)" which is checked. Below it, the "Service Name" is set to "NASD9EE73". The "Select default user account" dropdown menu is set to "admin". There are "Scan now" and "Restart" buttons. A "Note" section states: "DLNA Media Server requires [Media Library](#) to be enabled. Please configure the settings in "Applications" > "Multimedia Management" > "[Media Library](#)". The displayed contents of DLNA server will be based on the system administrator account permissions and media library settings." Below the note, there is a checkbox labeled "Enable TwonkyMedia DLNA Server" which is checked. Underneath it, another checkbox is checked with the text: "After enabling this service, click the following link to enter DLNA Media Server configuration page." followed by the URL <http://172.17.32.176:9000/>. At the bottom of the page, there is an "Apply" button.

QNAP DLNA Media Server is developed by QNAP, while Twonky Media DLNA Server is a third party media server. To allow DLNA media player to access and play the multimedia contents from the NAS via QNAP DLNA Media Server, enable QNAP DLNA Media Server and configure the Media Library and the default user account.

#### Note:

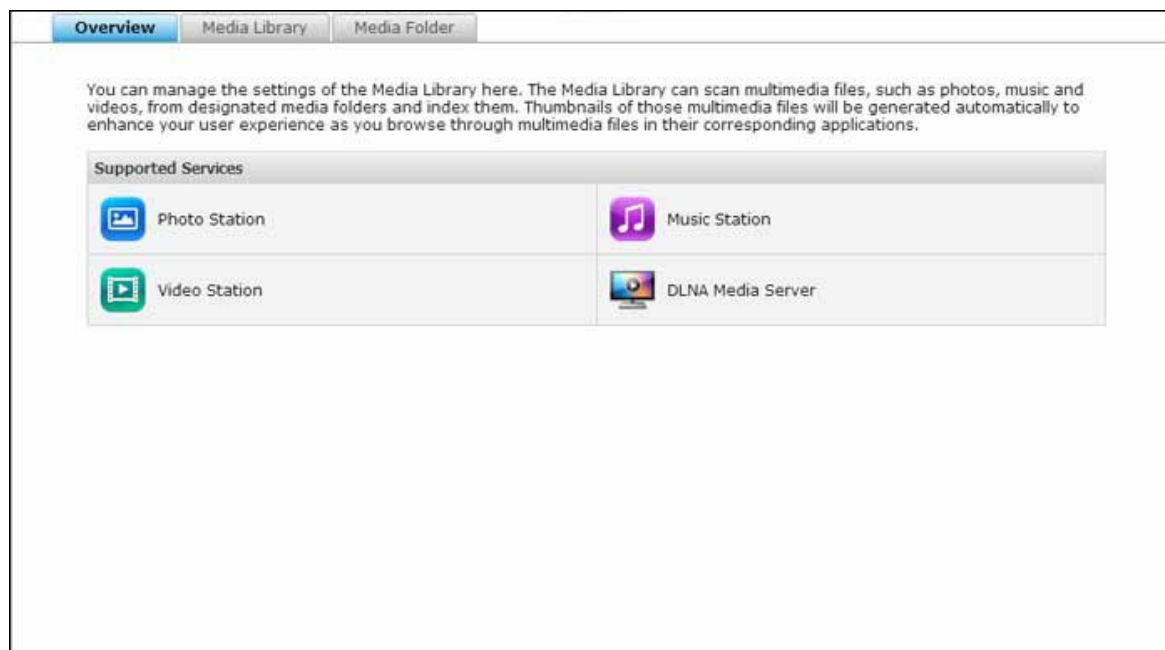
- The contents allowed to be browsed on the device connected to the media server are based on the shared folder permission set for the default user account. In other words, viewers can only watch multimedia contents from the media folders that the default user account is assigned the permission with. For media folder setup, please refer to the chapter on Multimedia Management. For permission assignment, please refer to the chapter on Shared Folder<sup>136</sup>.
- Twonky server is not built-in for certain NAS models. Please refer to the product software specification table for details (<http://www.qnap.com/products>).

To allow DLNA media players to access and play the multimedia contents on the NAS via the Twonky Media DLNA Server, enable it and click the link (<http://NAS IP:9000/>) to enter the configuration page of the TwonkyMedia DLNA Media Server. Click the link <http://NAS IP:9000/>. Go to "TwonkyMedia Settings" > "Basic Setup" to configure the basic server settings. The contents on the Qmultimedia or Multimedia folder of the NAS will be shared to the digital media players by default. You can go to "Basic Setup" > "Sharing" > "Content Locations" to change the folder or add more folders. After configuring the settings, you can upload MP3, photos, or video files to the specified folders on the NAS.

**Note:** If you upload multimedia files to the default folder but the files are not shown on Media Player, click "Rescan content directories" or "Restart server" on the DLNA Media Server configuration page.

## 7.4 Multimedia Management

The Media Library service can scan multimedia files, such as photos, music and videos from designated media folders and index them into the media library for their display in multimedia applications. Thumbnails of photos, music and videos will be automatically generated to enhance your user experience as you browse through multimedia files in their corresponding applications.



### Media Library

- **Scan Setting:** Three options are provided for the media scan:
  - Real-time scan: New files are scanned in real time as soon as they are added to the media folders.
  - Scan by schedule: Here you can specify the start and end time for the scan, and it will be conducted automatically on a daily basis.
  - Manual Scan: The scan only starts when "Scan now" is clicked.
- **Set media scanning priority to high:** The option will allow the media library to process media files immediately in order to quickly generate thumbnails for corresponding applications. When the NAS needs to run scan tasks and transfer files at the same time, it will lower the file transfer speed and execute media scan tasks first.
- **Multimedia code page setting:** Change this setting to the corresponding code for non UTF media files. So, font and characters in the associated applications can be displayed correctly.
- **Rebuild media library indexing:** By rebuilding the media library, the NAS will scan

the specified media folders and replace the existing library with a new one.

By default, the media library is enabled. In some cases, the media library needs to be disabled (ex. multimedia applications are not installed on the NAS.) To disable the media library, please click "Deactivate Media Library". Please note that if the media library is not enabled, services like the Photo Station Video Station, and Music Station, as well as the DLNA Media Server will not function properly. To re-enable the media library, please click "Activate Media Library" (the "Deactivate Media Library" button will turn into "Activate Media Library" after the media library is disabled.)

**Note:**

- iTunes Server may be disabled or hidden on the following business models: x70U, x79 Pro and x79U. To enable iTunes server, please refer to "System Administration" in the General Settings<sup>[44]</sup> section.
- If the media library is not enabled, services like the Photo Station and Music Station, as well as the DLNA Media Server will not function properly.
- Image files with a width or height less than 400 pixels will not be indexed, and so, their thumbnails will not be generated.

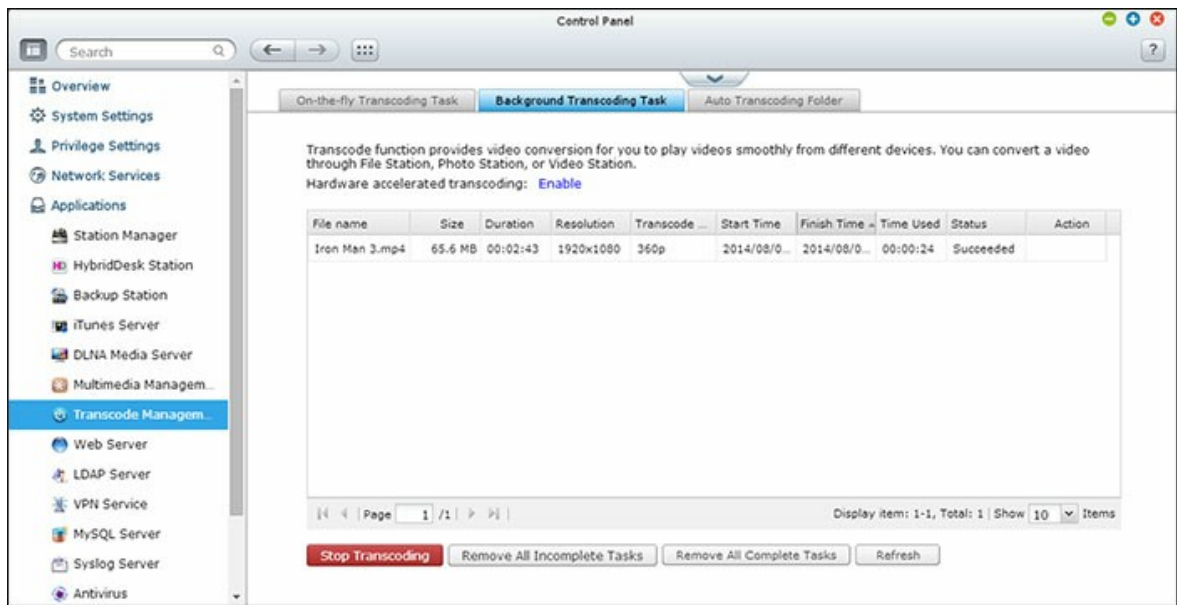
## **Media Folder**

Media folders are shared folders on the NAS that are scanned for multimedia contents, such as photos, videos and music files. The "/Multimedia" and "/Home" are the default media folders on the NAS (for QTS 4.1 or later versions, all default shared folders on the NAS are identified as media folders for the purpose of multimedia application services.) To add media folders, first click "Add", select media types and folders from the list, and click "Add". To change the scanned file types for the media folders, first uncheck the media file types and click "Apply". To remove media folders, first select media folders from the list, and then click "Delete" and "Apply".



### 7.5 Transcode Management


Transcoding is the process of converting video files into an universal format (\*.MP4) compatible with the broadest range of media players such as mobile devices and Smart TVs. Converted files with a range of resolutions can be used across different network environments for a better viewing experience. After transcoding tasks are created, they can be managed here and the transcoding service is enabled by default.




#### On-the-fly Transcoding Task

On-the-fly transcoding will simultaneously convert and stream a video while you watch it. This will consume more CPU resources. If your Turbo NAS has hardware transcoding acceleration, it is recommended to install the CodexPack to increase transcoding speeds and reduce CPU load. You are able to view and manage who is using on-the-fly transcoding services.

Manage all transcoding tasks using the following buttons:

Button	Name	Description
	Refresh	Refresh the list.

Manage each task with the following buttons:

Button	Name	Description
	Priority	Adjust the order each task is executed.

	Remove	Remove the selected task from the list.
---	--------	---

**Note:** This feature is applicable to certain NAS models only. Please check the product page (software specification) on the QNAP website ([www.qnap.com](http://www.qnap.com)) to see if this feature is available for your model.



## Background Transcoding Task

Background transcoding is when a video file is converted in advance, potentially avoiding high CPU usage if the video will be simultaneously accessed by many users. You can manually add videos to be transcoded using the File Station, Photo Station, or Video Station. Video files can be converted to 240p, 360p, 480p, 720p and 1080p and saved in "@Transcode" folder that is in the same directory with the video.

Manage all transcoding tasks using the following buttons:

Button	Name	Description
Stop Transcoding	Stop Transcoding	Suspend all ongoing tasks in the list.
Remove All Incomplete Tasks	Remove All Incomplete Tasks	Remove all tasks that are yet to finish from the list.
Remove All Complete Tasks	Remove All Complete Tasks	Remove all complete tasks from the list.
Refresh	Refresh	Refresh the list.

Manage each task with the following buttons:

Button	Name	Description
	Priority	Adjust the order each task is executed.
	Remove	Remove the selected task from the list.

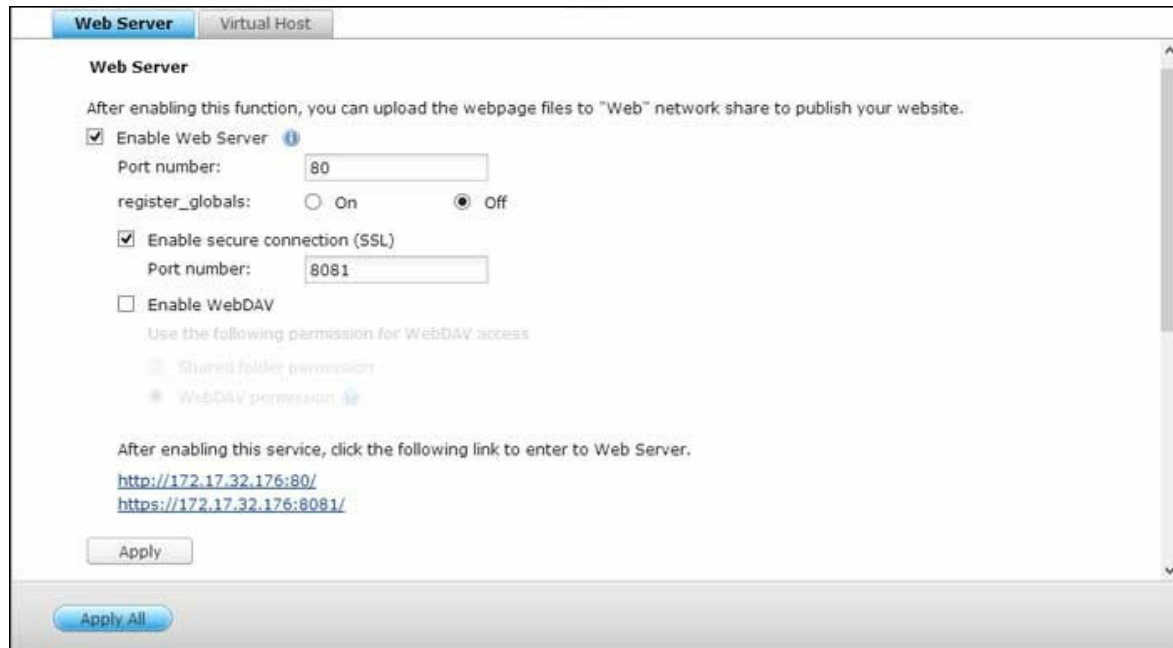
## Auto Transcoding Folder

This feature is designed to convert the entire folder, instead of a file, at a time, and within a folder, the resolution of each subfolder can be specified independently. Click

"Add" to add a new folder and select the video quality (resolution) and the folder to add it to the task list.

## 7.6 Web Server

Go to "Control Panel" > "Applications" > "Web Server" to configure the web server and virtual host.



### Web Server

The NAS supports Web Server for web sites creation and management. It also supports Joomla!, PHP and MySQL/SQLite to establish an interactive website. To use the Web Server, follow the steps below.

1. Enable the service and enter the port number. The default number is 80.
2. Configure other settings:
  - a. Configure register\_globals: Select to enable or disable register\_globals. The setting is disabled by default. When the web program prompts you to enable php register\_globals, enable this option. However, for system security concern, it is recommended to turn this option off.
  - b. Maintenance: Click "Restore" to restore web server configuration to default.
  - c. php.ini Maintenance: Select the option "php.ini Maintenance" and choose to upload, edit or restore php.ini.
3. Secure Connection (SSL): Enter the port number for SSL connection.
4. Upload the HTML files to the shared folder (Qweb/Web) on the NAS. The file index.html, index.htm or index.php will be the home path of your web page.
5. You can access the web page you upload by entering http://NAS IP/ in the web browser. Note that when Web Server is enabled, you have to enter http://NAS IP:8080 in your web browser to access the login page of the NAS.

**Note:**

- Please be reminded that Please note that after the Web Server is disabled, all relevant applications, including the Music Station, Photo Station, Happy Get, or QAirplay will become unavailable.
- To use PHP mail(), go to "System Settings" > "Notification" > "SMTP Server" and configure the SMTP server settings.

**WebDAV**

WebDAV (Web-based Distributed Authoring and Versioning) is a set of extensions to the HTTP(S) protocol that allow the users to edit and manage the files collaboratively on the remote World Wide Web servers. After turning on this function, you can map the shared folders of your NAS as the network drives of a remote PC over the Internet. To edit the access right settings, go to "Privilege Settings" > "Shared Folders" page.

**Note:** Currently, the WebDAV feature supports NAS user accounts and AD domain user accounts. LDAP user accounts are not supported.

To map a shared folder on the NAS as a network drive of your PC, turn on WebDAV and follow the steps below.

1. Go to "Privilege Settings" > "Shared Folders". Click the "Access Permissions" button for the designated folder under the "Action" column.
2. Select "WebDAV access" from the dropdown menu on top of the page and specify the access right. Choose the authentication level or scroll down to search for the account to grant its access rights. Click "Apply" and all settings are complete.
3. Next, mount the shared folders of the NAS as the shared folders on your operating systems by WebDAV.

**Windows XP**

1. Right click "My Computer" and select "Map Network Drive..."
2. Click "Sign up for online storage or connect to a network server".
3. Select "Choose another network location".
4. Enter the URL of your NAS with the folder name. Note that you should put a "#" key at the end of the URL. Click "Next". Format: http://NAS\_IP\_or\_HOST\_NAME/SHARE\_FOLDER\_NAME/#
5. Enter the username and password which has the WebDAV access right to connect

to the folder.

6. Type a name for this network place.
7. The network place has been created and is ready to be used.
8. Now you can connect to this folder anytime through WebDAV. A shortcut has also been created in "My Network Places".

### **Windows Vista**

If you are using Windows Vista, you might need to install the "Software Update for Web Folders (KB907306)". This update is for 32-bit Windows OS only. <http://www.microsoft.com/downloads/details.aspx?FamilyId=17c36612-632e-4c04-9382-987622ed1d64&displaylang=en>

1. Right click "Computer" and select "Map Network Drive..."
2. Click "Connect to a Web site that you can use to store your documents and pictures".
3. Select "Choose a custom network location".
4. Enter the URL of your NAS with the folder name. Format: [http://NAS\\_IP\\_or\\_HOST\\_NAME/SHARE\\_FOLDER\\_NAME](#)
5. Enter the username and password which has the WebDAV access right to connect to this folder.
6. Type a name for this network location.
7. The Web folder has been successfully created.
8. You can locate the web folder in the "Network Location" section in "Computer".
9. You can connect to the folder though this link via HTTP/WebDAV.

### **Mac OS X**

Follow the steps below to connect to your NAS via WebDAV on Mac OS X.

Client Operating System: Mac OS X Snow Leopard (10.6.1)

1. Open "Finder" > "Connect to Server", and enter the URL of the folder. Format: [http://NAS\\_IP\\_or\\_HOST\\_NAME/SHARE\\_FOLDER\\_NAME](#)
2. Enter the username and password which has the WebDAV access right to connect to this folder.
3. You can connect to the folder through this link via HTTP/WebDAV.
4. You can also find the mount point in the "SHARED" category in Finder and make it one of the login items.

Note that the instructions above are based on Mac OS X 10.6, and can be applied to 10.4 or later.

### **Ubuntu**

Follow the steps below to connect to your NAS via WebDAV on Ubuntu.

Client Operating System: Ubuntu 9.10 Desktop

1. Open "Places" > "Connect to Server..."
2. Select "WebDAV (HTTP)" or "Secure WebDAV (HTTPS)" for the Service type according to your NAS settings and enter your host information. Enter the username and password which has the WebDAV access right to connect to this folder. Click "Connect" to initialize the connection.
3. This WebDAV connection has been established successfully, a linked folder will be created on the desktop automatically.

## MySQL Management

Install phpMyAdmin software and save the program files in the Web or Qweb share of the NAS. You can change the folder name and connect to the database by entering the URL in the browser.

**Note:** The default username of MySQL is "root". The password is "admin". Please change your root password immediately after logging in to the phpMyAdmin management interface.

## SQLite Management

Follow the steps below or refer to the INSTALL file in the downloaded SQLiteManager-\*.tar.gz? to install SQLiteManager.

1. Unpack the downloaded file SQLiteManager-\*.tar.gz.
2. Upload the unpacked folder SQLiteManager-\* to \\NAS IP\Web\ or \\NASIP\Qweb.
3. Open a web browser and go to [http://NAS IP/SQLiteManager-\\*/.?:](http://NAS IP/SQLiteManager-*/.?:)
  - The symbol "\*" refers to the version number of SQLiteManager.

### 7.6.1 Virtual Host

Virtual host is a web server technique that provides the capability to host more than one domain (website) on one physical host and offers a cost-effective solution for personal and small business with such need. You can host multiple websites (maximum 32) on the NAS with this feature.

#### Before you Start

In this tutorial we will use the information provided in the table below as the reference guide.

Host name	WAN/LAN IP and port	Document root	Demo web application
site1.mysite.com	WAN IP: 111.222.333.444	/Qweb/ site1_mysite	Joomla!
site2.mysite.com	LAN IP: 10.8.12.45 (NAS) Port: 80 (NAS)	/Qweb/ site2_mysite	WordPress
www.mysite2.com		/Qweb/ www_mysite2	phpBB3

Before you start, make sure you have checked the following items:

- Web Server: Enable Web Server in "Applications" > "Web Server".
- DNS records: The host name must point to the WAN IP of your NAS and you can normally configure this from your DNS service providers.
- Port forwarding: If the web server listens on port 80 you need to configure port forwarding on your router to allow inbound traffic from port 80 to the LAN IP (10.8.12.45) of your NAS.
- SSL certificate import: If you are going to enable SSL connection for the website and intend to use your own trusted SSL certificates you may import the certificate from within the administration backend under "System Settings" > "Security" > "Certificate & Private Key".

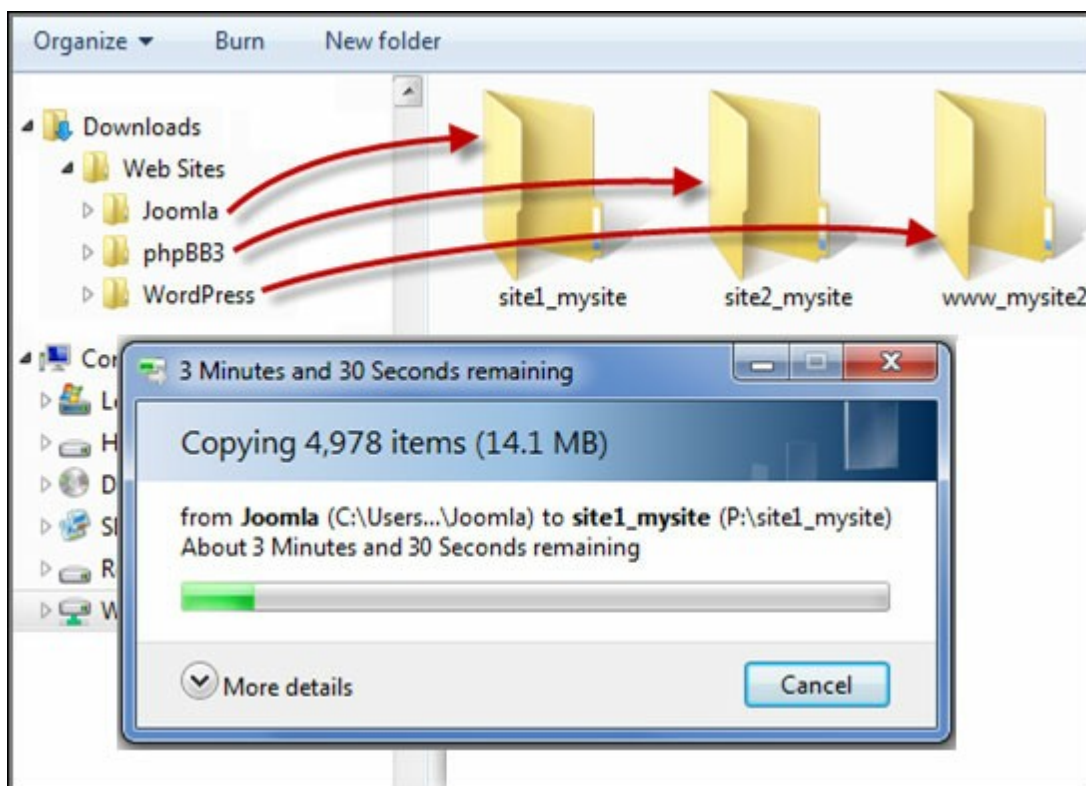
#### Using Virtual Host

Follow the steps below to use virtual host:

1. Select "Enable Virtual Host" and click "Apply".
2. Click "Create a Virtual Host".



3. Enter the host name and specify the folder (under Web or Qweb) where the web files will be uploaded to.
4. Specify the protocol (HTTP or HTTPS) for connection. If you select HTTPS, make sure the option "Enable Secure Connection (SSL)" in Web Server has been turned on.
5. Specify the port number for connection.
6. Click "Apply".
7. Continue to enter the information for the rest of the sites you want to host on the NAS.
8. Create a folder for each website (site1\_mysite, site2\_mysite, and www\_mysite2) and start transferring the website files to the corresponding folders.



Once the files transfers complete point your web browser to the websites by [http://NAS\\_host\\_name](http://NAS_host_name) or [https://NAS\\_host\\_name](https://NAS_host_name) according to your settings. In this example, the URLs are:

<http://site1.mysite.com>

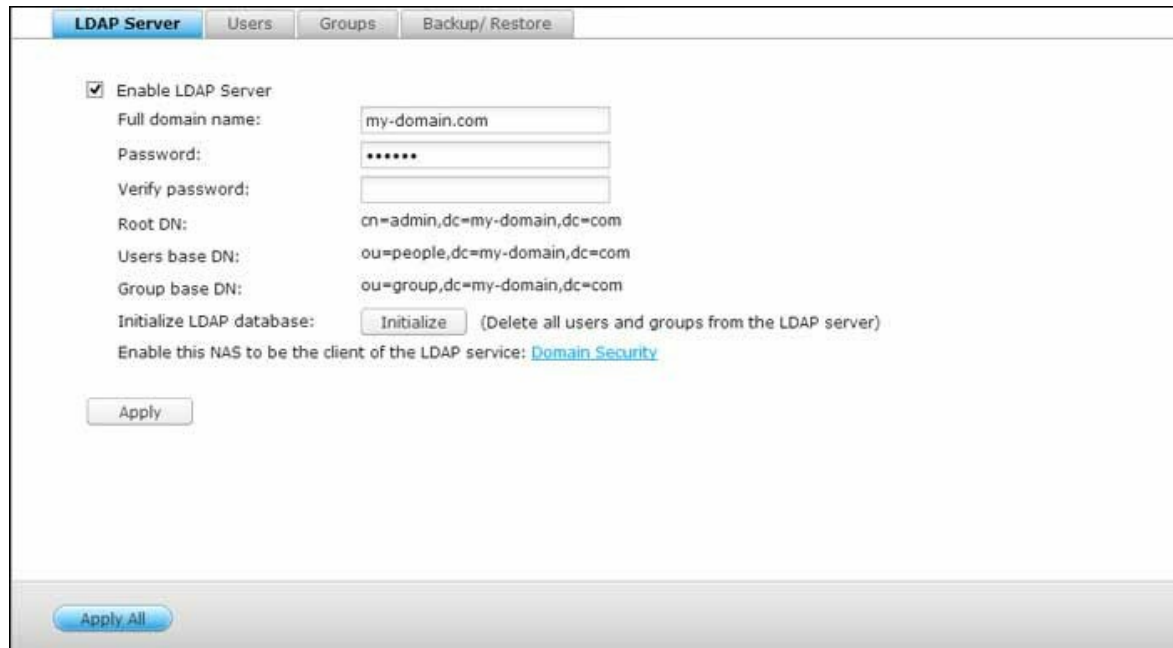
<http://site2.mysite.com>

<http://www.mysite2.com>

You should see the Joomla!, phpBB3, and WordPress web pages, respectively.

## 7.7 LDAP Server

The LDAP server of the NAS allows the administrator to create users to access multiple NAS servers with the same username and password.



The screenshot shows the 'LDAP Server' configuration window. It has tabs for 'LDAP Server', 'Users', 'Groups', and 'Backup/Restore'. The 'LDAP Server' tab is active. The configuration includes:

- ☒ Enable LDAP Server
- Full domain name:
- Password:
- Verify password:
- Root DN:
- Users base DN:
- Group base DN:
- Initialize LDAP database:  (Delete all users and groups from the LDAP server)
- Enable this NAS to be the client of the LDAP service: [Domain Security](#)
- 

At the bottom, there is an  button.

### Configuring LDAP Server

Follow the instructions below to configure the LDAP server.

1. Enable LDAP Server: Login the NAS as "admin". Go to "Applications" > "LDAP Server" and enable LDAP server. Enter the full LDAP domain name and the password for the LDAP server, then click "Apply".
2. Create LDAP Users: Under the "Users" tab, click "Create a User" or "Create Multiple Users" or "Batch Import Users". Follow the instructions of the wizard to create the LDAP users. Once you have created the LDAP users, the NAS can be joined to the domain. You can set the permissions of the LDAP users and allow them to be authenticated by the NAS.
3. Join a NAS to LDAP Domain: To allow the LDAP users to connect to the NAS, join the NAS to the LDAP domain. Go to "Privilege Settings" > "Domain Security". Select "LDAP authentication" and choose "LDAP server of local NAS" as the server type. Then click "Apply". The NAS is now a client of the LDAP server. To view the domain users or groups, go to "Privilege Settings" > "Users" or "User Groups", then select "Domain Users" or "Domain Groups". You can also set the folder permission for the domain users or groups.
4. Join a Second NAS to LDAP Domain: You can join multiple NAS servers to the same LDAP domain and allow the LDAP users to connect to the NAS servers using the

same login credentials. To join another NAS to the LDAP domain, login the NAS and go to "Privilege Settings" > "Domain Security". Select "LDAP authentication" and then "LDAP server of a remote NAS" as the server type. Enter the DNS name or IP address of the remote NAS, the name of the LDAP domain that you created previously, and enter the LDAP server password. Click "Apply".

### **Backing up/Restoring LDAP Database**

To back up the LDAP database on the NAS, select "Back up Database" and specify the backup frequency, destination folder on the NAS and other options. To restore an LDAP database, browse to select the \*.exp file and click "Import". Click "Apply" to apply the settings.

#### **Note:**

- If the name of a user is changed in the LDAP server, it is necessary to assign the folder permission again on the NAS.
- To avoid account conflicts, please do not create NAS local user accounts that already exist in the LDAP directory.

## 7.8 VPN Service

The NAS supports Virtual Private Network (VPN) service for users to access the NAS and resources on a private network from the Internet.

**VPN Server Settings** | VPN Client Management | Connection List

**General Settings**

Select a network interface to connect to the desired network which the NAS belongs to. You can forward the VPN ports on the router by [Auto Router Configuration](#), and also replace the WAN IP by myQNAPcloud name for connection.

Network interface: Ethernet 1

myQNAPcloud name: The myQNAPcloud service is disabled, please enable [myQNAPcloud Service](#) first.

**PPTP Settings**

The PPTP server allows users to access the LAN remotely. Use the default settings or specify the settings manually. To understand more, please check: (<http://www.qnap.com/go/pptp.html>)

☐ Enable PPTP VPN server

VPN client IP pool: 10.0.0.2 - 10.0.0.254

[Advanced Settings](#)

**OpenVPN Settings**

An OpenVPN client software is required on the remote PC. Use the default VPN settings or configure the settings manually. To understand more, please check: (<http://openvpn.net/>)

☐ Enable OpenVPN server

VPN client IP pool: 10.8.0.2 - 10.8.0.254

[Advanced Settings](#)

[Apply All](#)

Follow the instructions below for the first time setup of the VPN service on the NAS.

1. Select a network interface to connect
2. Enable PPTP or OpenVPN service
3. Configure port forwarding by auto router configuration
4. Register myQNAPcloud service
5. Add VPN users
6. Connect to the private network by a VPN client

### VPN Service Setup

1. Select a network interface to connect: Login the NAS as "admin" and go to "Applications" > "VPN Service" > "VPN Server Settings". Under "General Settings", select a network interface to connect to the desired network which the NAS belongs to.
2. Enable PPTP or OpenVPN service: The NAS supports PPTP and OpenVPN for VPN connection. Select either one option and configure the settings.

- PPTP: Point-to-Point Tunneling Protocol (PPTP) is one of the most commonly used methods for VPN connection. It is natively supported by Windows, Mac, Linux, Android, and iPhone.
  - OpenVPN: OpenVPN is an open source VPN solution which utilizes SSL encryption for secure connection. To connect to the OpenVPN server, OpenVPN client must be installed on your PC. Click "Download Configuration File" to download the VPN client settings, certificate/key and installation guide from the NAS and upload the files to the OpenVPN client.
3. Configure port forwarding by auto router configuration: The NAS supports auto port forwarding for UPnP (Universal Plug-and-Play network protocol) routers. Go to "myQNAPcloud" > "Auto Router Configuration" to enable UPnP port forwarding and open the ports of the PPTP or OpenVPN service on the router.
  4. Register myQNAPcloud service: You can connect to the NAS by WAN IP or myQNAPcloud name. To configure myQNAPcloud service, check the chapter on myQNAPcloud Service or visit myQNAPcloud (<https://www.myqnapcloud.com>).
  5. Add VPN users: Go to "Applications" > "VPN Service" > "VPN Client Management", click "Add VPN Users". The local NAS users will be listed. Select the users who are allowed to use the VPN service and their connection method (PPTP, OpenVPN, or both). Click "Add".
    - Connect to the private network by a VPN client: Now you can use your VPN client to connect to the NAS via the VPN service.

**Note:**

- The default NAS IP is 10.0.0.1 under PPTP VPN connection.
- Upload the configuration file to the OpenVPN client every time the OpenVPN settings, myQNAPcloud name, or the secure certificate is changed.
- To connect to the PPTP server on the Internet, the PPTP passthrough options on some routers have to be opened. PPTP uses only port TCP-1723; forward this port manually if your router does not support UPnP.

## **VPN Client Setup**

### **PPTP on Windows 7**

1. Go to "Control Panel" > "Network and Sharing Center". Select "Set up a new connection or network".
2. Select "Connect to a workplace" and click "Next".
3. Select "Use my Internet connection (VPN)".

4. Enter the MyQNAPcloud name or the WAN IP of the NAS and enter a name of the connection. Then click "Next".
5. Enter your username and password which is added from the NAS for VPN access. Click "Connect".

### **PPTP on Mac OS X 10.7**

1. Choose "Apple menu" > "System Preferences", and click "Network".
2. Click "Add (+)" at the bottom of the list, and choose "VPN" as the interface.
3. Choose the VPN type according to the settings of the NAS to connect. Enter the service name.
4. In "Server Address", enter the myQNAPcloud name or the WAN IP of the NAS. In "Account Name", enter your username which is added from the NAS.
5. Click "Authentication Settings", and enter the user authentication information given by the network administrator.
6. After entering the user authentication information, click "OK", and then click "Connect".

### **PPTP on iOS 5**

1. Go to "Settings" > "General" > "Network", select "VPN".
2. Select "Add VPN Configuration".
3. Select "PPTP", and enter the Description, Server, Account, and Password for the connection.
4. Return to "Settings" > "General" > "Network" > "VPN", and enable "VPN".

### **OpenVPN on Windows**

1. Download OpenVPN from <http://openvpn.net/>
2. Install OpenVPN client on Windows. The default installation directory is C:\Program Files\OpenVPN.
3. Run OpenVPN GUI as administrator.
4. Download OpenVPN configuration file and certificate from the NAS ("Applications" > "VPN Service" > "VPN Server Settings" > "OpenVPN Settings")
5. Edit openvpn.ovpn and replace "OPENVPN\_SERVER\_IP" with the OpenVPN server IP.
6. Put "ca.crt" and "openvpn.ovpn" into the configuration folder under OpenVPN configuration subdirectory (C:\Program Files\OpenVPN\config).

**Note:** If the OpenVPN client is running on Windows 7, add the firewall rules in the advanced settings of OpenVPN.

### **OpenVPN on Linux**

1. Download OpenVPN from <http://openvpn.net/index.php/open-source/downloads.htm>
2. Install OpenVPN client on Linux.
3. Download OpenVPN configuration file and certificate from the NAS ("Applications" > "VPN Service" > "VPN Server Settings" > "OpenVPN Settings").
4. Edit `openvpn.ovpn` and replace `OPENVPN_SERVER_IP` with OpenVPN server IP.
5. Put `ca.crt` and `openvpn.ovpn` into the configuration folder under OpenVPN configuration subdirectory.
6. Run OpenVPN.

### **OpenVPN on Mac**

1. Download the disk image of OpenVPN client from <http://code.google.com/p/tunnelblick/>
2. Launch Tunnelblick.
3. Download OpenVPN configuration file and certificate from the NAS ("Applications" > "VPN Service" > "VPN Server Settings" > "OpenVPN Settings").
4. Edit `openvpn.ovpn` and replace `OPENVPN_SERVER_IP` (`alfred.myqnapnas.com`) with OpenVPN server IP.
5. Put `ca.crt` and `openvpn.ovpn` into the configuration folder under OpenVPN configuration subdirectory.
6. Run OpenVPN.

## 7.9 MySQL Server

You can enable MySQL Server as the website database.

**MySQL Server**

You can enable MySQL server as the website database.

☒ Enable MySQL Server  
Enable this option to allow remote connection of MySQL server.

☒ Enable TCP/IP networking  
Port number:

**Note:** You can install the phpMyAdmin package to manage your MySQL server. To install the phpMyAdmin, please click [here](#).

---

**Database Maintenance**

You can reset the database password or re-initialize the database.

- **Enable TCP/IP Networking:** You can enable this option to configure MySQL server of the NAS as a database server of another web server in remote site through Internet connection. When you disable this option, your MySQL server will only be configured as local database server for the web server of the NAS. After enabling remote connection, assign a port for the remote connection service of MySQL server. The default port is 3306. After the first-time installation of the NAS, a folder phpMyAdmin is created in the Qweb/Web network folder. You can enter `http://NAS IP/phpMyAdmin/` in the web browser to enter the phpMyAdmin page and manage the MySQL database.
- **Database Maintenance:**
  - Reset root password: Execute this function to reset the password of MySQL root as "admin".
  - Re-initialize database: Execute this function to delete all the data on MySQL database.

### Note:

- To use this feature on the TS-x39/509/809 series, please update the system firmware with the image file enclosed in the product CD or download the latest system firmware from <http://www.qnap.com>.
- Do not delete the phpMyAdmin folder. You can rename this folder but the link on



the MySQL server page will not be updated. To connect to the renamed folder, you can enter the link `http://NAS IP/renamed folder` in the web browser.

- The phpMyAdmin folder is created after the first-time installation. When you update the firmware, the folder remains unchanged.

## 7.10 Syslog Server

Configure the NAS as a Syslog server, create Syslog filters and view available Syslog messages on this page.

The screenshot shows the 'Server Settings' tab of a Syslog configuration interface. It includes sections for enabling the Syslog server, setting log file parameters, and configuring email notifications. The 'Enable Syslog Server' checkbox is checked. Under 'Log Settings', the maximum log size is 50 MB and the log file is 'Download / messages'. Under 'Email Notification', the severity level is set to 'Emerg'. A note indicates that the SMTP server must be configured first for alert mail delivery. There are 'Apply' and 'Apply All' buttons at the bottom.

### Server Settings

- **Server Settings:** To configure the NAS as a Syslog server and allow it to receive Syslog messages from the clients, enable Syslog Server. Select the protocols (TCP and/or UDP) the NAS uses to receive Syslog messages. Specify the port numbers if necessary or use the default port number 514. Click "Apply" to save the settings. After enabling the NAS as a Syslog server, enter the NAS IP as the Syslog server IP on the Syslog clients to receive the Syslog messages from them.
- **Log Settings:** Specify the maximum log size (1-100 MB) of the Syslog messages, the location (NAS shared folder) to which the logs will be saved, and the file name. Once the logs have reached the maximum size, the log file will be automatically archived and renamed with the archive date as MyLogFile\_yyyy\_mm\_dd, for example MyLogFile\_2011\_12\_31. If multiple log files are archived on the same day, the file will be named as MyLogFile\_yyyy\_mm\_dd.[number]. For example, MyLogFile\_2011\_12\_31.1, MyLogFile\_2011\_12\_31.2, and so on. Click "Apply" to save the settings.

- **Email Notification:** The NAS supports sending email alert to dedicated email addresses (maximum 2, configured in "System Settings" > "Notification" > "Alert Notification") when the severity of the received Syslog messages match the specified level. To use this feature, configure the SMTP server settings in "System Settings" > "Notification" > "SMTP Server". Next, enable email notification and select the severity level in "Applications" > "Syslog Server" > "Server Settings". Click "Apply" to save the settings.

Severity	Level (smallest number the highest)	Description
Emerg	0	Emergency: the system is unusable. Alert emails will be sent when Syslog messages of levels 0-4 are received.
Alert	1	Alert: immediate action required. Alert emails will be sent when Syslog messages of levels 1-4 are received.
Crit	2	Critical: critical conditions. Alert emails will be sent when Syslog messages of levels 2-4 are received.
Err	3	Error: error conditions. Alert emails will be sent when Syslog messages of levels 3-4 are received.
Warning	4	Warning: warning conditions. Alert emails will be sent when Syslog messages of level 4 are received.




## Filter Settings

This feature should only be operated by system administrators who are familiar with Syslog filters. Follow the steps below to create Syslog filters for the NAS to receive Syslog messages that match the criteria:

1. Click "Add a Filter".
2. Define the filter settings and click "Add". To edit the filters or add the filters manually, click "Manual Edit" and modify the contents in the dialog. Click "Apply" to

save the filter.

3. The filters will be shown on the list. The NAS will only receive the Syslog messages that match the filters which are in use.

Button	Name	Description
	Enable	Enable a filter
	Disable	Disable a filter
	Edit	Edit the filter settings
Delete	Delete	Delete one or more filters

## Syslog Viewer

Use the web-based Syslog viewer to view the available Syslog messages on the NAS. Select to view the latest logs or the logs in a particular archived file. The log files can be accessed on the directory configured in "Syslog Server" > "Server Settings" > "Log Settings".

## 7.11 Antivirus

Configure antivirus features on this page.

Overview Scan Jobs Reports Quarantine

**Antivirus**

☒ Enable antivirus Legacy

Virus definitions: 2014/01/21 11:41

Last virus scan: 2014/08/12 13:32:15

Last infected file found: --

Status: Scan complete

**Update**

☐ Check and update automatically. Frequency in days: 1

Online update: Update now

Manual update (\".cvd\"): Browse...

Import

Update file available at: <http://www.clamav.net>

Apply All

### Overview

- **Antivirus:** Use the antivirus feature to scan the NAS manually or on recurring schedule and delete, quarantine, or report files infected by viruses, malware, Trojans, and other malicious threats. To use this feature, select "Enable antivirus" and click "Apply".
- **Update:** Select "Check and update automatically" and specify the interval in days to update the antivirus definitions automatically. Click "Update Now" next to online update to update the antivirus definitions immediately. Users can also download the update files from <http://www.clamav.net> and update the antivirus definitions manually. The NAS must be connected to the Internet to use this feature.
- **Quarantine:** View the quarantine information of the disk volumes on the NAS. For the details, go to "Applications" > "Antivirus" > "Quarantine".

**Note:** The antivirus engine selector next to the "Enable antivirus" checkbox is only available after an antivirus app has been installed in QTS from the App Center<sup>297</sup>.

### Scan Jobs






The NAS supports manual and scheduled scanning of all or specific shared folders. Up

to 64 schedules can be created and maximum 5 scan jobs can run concurrently. To create a scan job, follow the steps below.

1. Go to "Applications" > "Antivirus" > "Scan Jobs". Click "Add a Scan Job".
2. Enter the job name and select the shared folders to scan. To scan a specific shared folder, select the share and click "Add".
3. Multiple shared folders can be selected. To remove a shared folder, click the "Delete (X)" button next to the share name and click "Next". Define the schedule for the scan job and click "Next".
4. Select to scan all the files in the shared folder(s) or quick scan to scan only potentially dangerous files. Select "Exclude files or folders" and specify a file, a folder, or a file extension to be excluded from the virus scan and click "Next". Separate each entry by a space in the same line or enter one entry per line. For example:
  - /Public/testfile.txt
  - /Download
  - \*.log
  - \*.exe \*.com
  - \*.txt; click "Next".
5. Enable other scan options and click "Next":
  - Specify the maximum file size (1-4096 MB) allowed for scanning.
  - To scan compressed files in the shared folder(s), enable "Scan compressed files". Specify the maximum amount of data (1-4096 MB) in an archive file for scanning if applicable.
  - To scan MS Office and Mac Office files, RTF, PDF, and HTML files, select "Deep scan for document files".
6. Specify the actions to take when infected files are found and click "Finish" to create the scan job.
  - Only report the virus: The virus scan reports are recorded under the "Reports" tab. No actions will be done to the infected files.
  - Move infected files to quarantine: The infected files will be quarantined and cannot be accessed from the original shared folders. Users can view the virus scan reports under the "Reports" tab and delete/restore the infected files under the "Quarantine" tab.
  - Delete infected files automatically: **Note that the infected files will be deleted and cannot be recovered.**
  - To receive an alert email when an infected file is found or after scanning has completed, configure the SMTP server settings in "System Settings" >



"Notification" > "SMTP Server".

7. The scan job will run according to the specified schedule.

Button	Name	Description
	Run	Run the scan job now.
	Stop	Stop the scan job.
	Edit	Edit the scan job settings.
	View last run log	Click to open the last virus scan summary.
	Delete	Delete the scan job.

## Reports

View or download the reports of the latest scan jobs on the NAS.

Button	Name	Description
	Download	Download the virus scan report. The file can be opened by a text editor, such as WordPad.
	Delete	Delete an entry on the list.
DOWNLO AD	Download All	Download all the virus scan logs on the list as a zip file.




## Report options

- Specify the number of days (1-999) to keep the logs
- Enable the option "Archive logs after expiration" and specify the shared folder to save the logs once the number of days to keep the logs has been reached. Click "Apply All" to save the changes.

## Quarantine

This page shows the quarantined files on the NAS. Users can manually delete or restore the quarantined files, or restore and add the files to the exclude list.

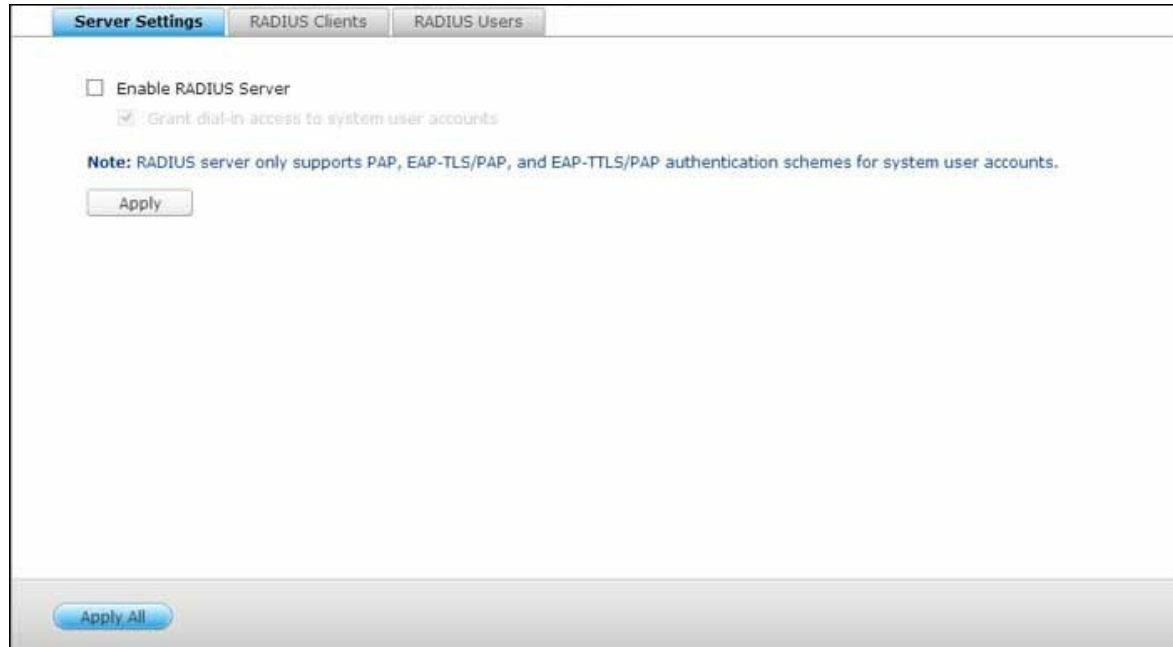
Button	Name	Description
--------	------	-------------

	Delete	Delete an infected file. The file cannot be recovered.
	Restore	Restore an infected file to its original shared folder.
	Exclude List	Restore an infected file and add the file into the exclude list (scan filter).
Restore Selected Files	Restore Selected Files	Restore multiple files on the list.
Delete Selected Files	Delete Selected Files	Delete multiple files on the list. The files cannot be recovered.
Delete All Files	Delete All Files	Delete all the files on the list. The files cannot be recovered.



## 7.12 RADIUS Server

The NAS can be configured as a RADIUS (Remote Authentication Dial In User Service) server to provide centralized authentication, authorization, accounting management for computers to connect and use a network service.



The screenshot shows a web-based configuration interface for a RADIUS server. At the top, there are three tabs: "Server Settings" (selected), "RADIUS Clients", and "RADIUS Users". Below the tabs, there is a checkbox labeled "Enable RADIUS Server" which is currently unchecked. Below this checkbox is a checked checkbox labeled "Grant dial-in access to system user accounts". A note below these checkboxes states: "Note: RADIUS server only supports PAP, EAP-TLS/PAP, and EAP-TTLS/PAP authentication schemes for system user accounts." Below the note is an "Apply" button. At the bottom of the interface, there is a blue "Apply All" button.

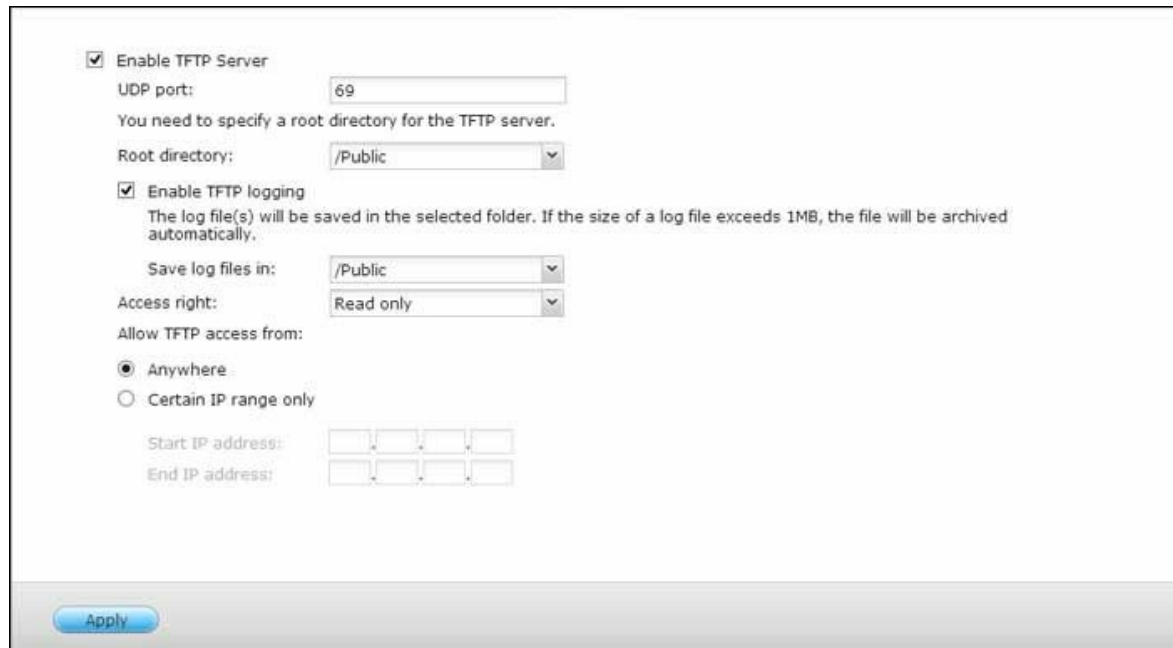
To use this feature, follow the steps below:

1. Enable RADIUS Server on the NAS in "RADIUS Server" > "Server Settings". Click "Apply".
2. Add RADIUS clients, such as Wi-Fi access points and VPN, on the NAS in "RADIUS Server" > "RADIUS Clients". Up to 10 RADIUS clients are supported. Click "Create a Client".
3. Enter the client information and click "Apply".
4. The clients are shown on the list.
5. Create RADIUS users and their password in "RADIUS Server" > "RADIUS Users". The users will be authenticated when trying to access the network through the RADIUS clients. The maximum number of RADIUS users the NAS supports is the same as the maximum number of local NAS users supported. See the chapter on Users<sup>[13]</sup> for details. Click "Create a User".
6. Enter the username and password. The username supports alphabets (a-z and A-Z) and numbers (0-9) only. The password must be 8-32 characters (a-z, A-Z, and 0-9 only). Click "Apply".
7. Specify to grant dial-in access to local NAS users. Enable this option to allow the local NAS users to access the network services through the RADIUS clients using their NAS login name and password. Click "Apply".

**Note:** The RADIUS server only supports PAP, EAP-TLS/PAP, and EAP-TTLS/PAP authentication for local NAS user accounts.

### 7.13 TFTP Server

Configure the NAS as a TFTP (Trivial File Transfer Protocol) server for configuration management of network devices and remote network booting of computers for system imaging or recovery. TFTP is a file transfer protocol with the functionality of a very basic form of FTP. TFTP does not provide user authentication and cannot be connected by a standard FTP client.



The screenshot shows a web-based configuration interface for a TFTP server. It includes the following elements:

- ☒ **Enable TFTP Server**
  - UDP port:
  - You need to specify a root directory for the TFTP server.
  - Root directory:
- ☒ **Enable TFTP logging**
  - The log file(s) will be saved in the selected folder. If the size of a log file exceeds 1MB, the file will be archived automatically.
  - Save log files in:
  - Access right:
  - Allow TFTP access from:
    - ☒ Anywhere
    - ☐ Certain IP range only
      - Start IP address:
      - End IP address:

At the bottom of the form is a blue **Apply** button.

Follow the steps below to use this feature:

1. Select "Enable TFTP Server".
2. The default UDP port for file transfer is 69. Change the port number only when necessary.
3. Specify a folder on the NAS as the root directory of the TFTP server.
4. Enable TFTP Logging: Enable this option and specify the directory to save the TFTP log file (opentftpd.log). It is recommended to view the log file by Microsoft Excel or WordPad on Windows OS or by TextEdit on Mac OS.
5. Assign read only or full access to the clients.
6. Restrict the TFTP client access by specifying the IP address range or select "Anywhere" to allow any TFTP client access.
7. Click "Apply".

**Note:** To set up PXE with your NAS, please be sure to use a static IP for your NAS, enable its DHCP service and specify the TFTP server IP and name of the boot file in "Control Panel" > "Network" > click the "Edit" button next to the LAN port > "DHCP

server". For detail, please refer to the chapter on DHCP Server<sup>[87]</sup>.

## 8. QNAP Applications

Various applications are provided by QNAP to enhance your user experiences. For details on these applications, refer to the following links:

- [Backup Station<sup>\[214\]</sup>](#)
- [myQNAPcloud Service<sup>\[232\]</sup>](#)
- [File Station<sup>\[236\]</sup>](#)
- [Video Station<sup>\[246\]</sup>](#)
- [Photo Station<sup>\[255\]</sup>](#)
- [Music Station<sup>\[268\]</sup>](#)
- [Download Station<sup>\[275\]</sup>](#)
- [HybridDesk Station<sup>\[283\]</sup>](#)
- [Surveillance Station<sup>\[293\]</sup>](#)
- [App Center<sup>\[297\]</sup>](#)

## 8.1 Backup Station

Configure the NAS as a backup server, remote replication, cloud backup and external backup with the Backup Station.



For details on the features, please refer to the following links:

- [Backup Server](#)<sup>[215]</sup>
- [Remote Replication](#)<sup>[218]</sup>
- [Cloud Backup](#)<sup>[225]</sup>
- [External Backup](#)<sup>[227]</sup>

### 8.1.1 Backup Server

#### Rsync Server

Enable Rsync server to configure the NAS as a backup server for data backup from a remote Rsync server or NAS server. The default port number for remote replication via Rsync is 873. Specify the maximum download rate for bandwidth control. 0 means unlimited.

- **Enable backup from a remote server to the local host:** Select this option to allow data backup from a remote server (NAS) to the local server (NAS).
- **Allow remote Rsync server to back up data to the NAS:** Select this option to allow data backup from an Rsync server to the local server (NAS). Enter the username and password to authenticate the Rsync server which attempts to back up data to the NAS.

**Note:** You can only create up to 64 rsync jobs on the NAS.

#### RTRR Server

To allow real-time or schedule data replication from a remote server to the local NAS, select "Enable Real-time Remote Replication Server". You can specify the port number for remote replication. The default port number is 8899. Specify the maximum upload and download rate for bandwidth control. 0 means unlimited. To allow only authenticated access to back up data to the local NAS, specify the access password. The client server will be prompted to enter the password to back up data to the NAS via RTRR.

You can specify the IP addresses or host names which are allowed to access the NAS for remote replication. Up to 10 rules can be configured. To allow all connections, select "Allow all connections". To specify the IP addresses or host names, select "Allow connections from the list only" and click "Add".

Enter an IP address or specify a range of IP addresses by entering the IP and subnet mask. Select the access right "Read Only" or "Read/Write". By selecting "Read/Write", the client server is allowed to delete the files on the local NAS. Click "Finish" to exit. After saving the access rule, click "Apply" and the NAS will restart to apply the

settings.

## **Time Machine**

You can enable Time Machine support to use the NAS as a backup destination of multiple Mac by the Time Machine feature on OS X. To use this function, follow the steps below.

Configure the settings on the NAS:

1. Enable Time Machine support.
2. Enter the Time Machine password. The password is empty by default.
3. Select a volume on the NAS as the backup destination.
4. Enter the storage capacity that Time Machine backup is allowed to use. The maximum value is 4095GB. To specify a larger capacity, please enter 0 (unlimited).
5. Click "Apply" to save the settings.

All the Time Machine users share the same shared folder for this function. Configure the backup settings on Mac:

1. Open Time Machine on your Mac and click "Select Backup Disk".
2. Select the TMBackup on your NAS from the list and click "Use for Backup".
3. Enter the username and password to login the QNAP NAS. Then click "Connect".
  - Registered username: TimeMachine
  - Password: The password you have configured on the NAS. It is empty by default.
4. Upon successful connection, the Time Machine is switched "ON". The available space for backup is shown and the backup will start in 120 seconds.

The first time backup may take more time according to the data size on Mac. To recover the data to the Mac OS, see the tutorial on <http://www.apple.com>.

## **Managing Backup**

You can manage the existing backup on this page.

- Volume (drop down menu on top right side of the screen): Display Time Machine backup tasks stored in the volume.
- Name: The name of the Time Machine backup (the sparse bundle disk image which was created by Time Machine).
- Size: Size of this Time Machine backup.



- Date Modified: Last modified date of this Time Machine backup.
- Delete: Delete the selected Time Machine backup.

### **8.1.2 Remote Replication**







#### **NAS to NAS and Rsync**

The NAS data can be backed up to a remote NAS or Rsync server by Rsync remote replication. If the backup destination is a NAS, go to "Main Menu" > "Backup Station" > "Rsync Server" and enable the remote NAS as an Rsync backup server.

1. To create a replication job, click "Create a Replication Job".
2. Specify the server type, NAS or Rsync server, of the remote server. Enter a job name. Click "Next".
3. Enter the IP address, port number, username and password to login the remote server. The default port number is 873. Note that the login username must have read/write access to the remote server and sufficient quota limit on the server. Click "Test" to verify the connection. Then click "Apply".
4. Specify the local folder by clicking the Source folder box. After expanding and locating the folder, double click the folder to set it as the directory where the data will be replicated from.
5. Specify the destination folder Destination folder box. Locate the folder in the folder tree and double click the folder to set it as the directory where the data will be replicated to. And, click "Add" to add this pair of replication folders.
6. Click "Backup frequency" to configure the backup frequency. Select to replicate the data immediately or specify the backup schedule.
7. Specify other options as follows for the remote replication job by clicking the "Options" button and click "Apply".
  - Enable encryption: Select this option to execute encrypted remote replication. Note that you must turn on "Allow SSH connection" in "Network Services > "Telnet/SSH" and specify the same port number for SSH and encrypted remote replication.
  - Activate file compression: Turn on this option to allow file compression during the data transfer process. This option is recommended for low bandwidth environment or remote replication over WAN.
  - Perform incremental replication: When this option is turned on, after the first-time replication, the NAS will only back up the files that have been changed since the last backup. The files of the same name, size, and modified time will not be copied again. You are recommended to turn on this option for the replication job which will be executed for more than once in order to shorten the backup time.

- Delete extra files on remote destination: Select the option to synchronize the source data with the destination data (one-way synchronization). Extra files on the destination will be deleted. Source data will remain unchanged.
  - Handle sparse files efficiently: A sparse file is a type of computer file that contains large blocks of zero-byte data. Turning on this option may reduce the time required for remote replication.
8. Click "Apply". If you select the "Execute backup immediately" option, the replication task will start at once. Otherwise, it will be performed according to your schedule. Note that the job is recursive. Do not turn off the local NAS and the remote server when remote replication is running.

**Note:** For step 5, the order of selecting the source and destination folders can be changed. The above is just an example.

Icon	Name	Description
	Start	Start a replication job immediately.
	Stop	Stop a running replication job.
	View	View Rsync logs (replication results).
	Edit	Edit a replication job.
	Disable	Disable replication schedule.
	Enable	Enable replication schedule.

To configure the timeout and retry settings of the replications jobs, click "Options".

- Timeout (second): Specify a timeout value for each replication job. This is the maximum number of seconds to wait until a replication job is cancelled if no data has been received.
- Number of retries: Specify the number of times the NAS should try to execute a replication job should it fail.
- Retry intervals (second): Specify the number of seconds to wait in between each retry.

For example, if you entered 600 seconds for timeout, 3 retries, and 60 seconds for retry intervals, a replication job will timeout in 600 seconds if no data is received. The NAS will wait for 60 seconds and try to execute the job a second time. If the job timed out again, the NAS wait for another 60 seconds and retry for a third time.

## RTRR

Real-time Remote Replication (RTRR) provides real-time or scheduled data replication and one-way and two-way data synchronization between two locations (such as local NAS and a remote NAS, local NAS and an FTP server, or local NAS and an external drive, or replication between two local folders.) In real-time mode, the source folder will be monitored and any files that are new, changed, and renamed will be replicated to the target folder immediately. In scheduled mode, the source folder will be replicated to the target folder according to the pre-defined schedule.

One way synchronization refers to data synchronization from the source to the destination, while two-way synchronization means both the source and destination are synchronized after new files are copied in either side or files stored on either side are changed or deleted.

If the backup destination is a NAS, the RTRR server ("Main Menu" > "Backup Station" > "RTRR Server") or FTP service must first be enabled ("Main Menu" > "Control Panel" > "Network Services" > "FTP") on the remote NAS.

NAS models	Firmware	Maximum number of replication jobs supported
Intel-based NAS	Prior to v3.5.0	64*
	v3.5.0 or above	32*
ARM-based (Non Intel-based) NAS	Prior to v3.5.0	RTRR replication not supported.
	v3.5.0 or above	8*

\*Each job supports maximum 5 folder pairs.

If your NAS models are not listed below, please visit <http://www.qnap.com> for details.

Intel-based NAS	TS-x39 series, TS-x59 series, TS-x69 series, TS-509, TS-809, TS-809 Pro, TS-809U-RP, SS-439 Pro, SS-839 Pro, TS-x59 Pro+, TS-879 Pro, TS-1079 Pro, TS-879U-RP, TS-EC879U-RP, TS-1279U-RP, TS-EC1279U-RP
ARM-based (Non Intel-based) NAS	TS-x10, TS-x12, TS-x19 series

Follow the steps below to create a replication job.

1. Click "Create a Replication Job".
2. When the wizard shows up, click "Next".
3. Select the synchronization locations and click "Next". Make sure the destination device has been formatted and folders have been created. Two synchronization options are available: one-way synchronization and two-way synchronization.
  - For one-way synchronization, you can choose to:
    - Synchronize data from a local folder to a remote folder (NAS or FTP server)
    - Synchronize data from a remote folder (NAS or FTP server) to a local folder
    - Synchronize data from a local folder to another local folder or an external drive
  - For two-way synchronization, you can choose to:
    - Synchronize data between the source and destination
4. Enter the IP address or host name. Select the server type (FTP server or NAS server with RTRR service enabled; note for two-way synchronization, only the NAS server is available.)
  - **Remote replication to FTP server:** Specify the port number and if you want to enable FTP with SSL/TLS (Explicit) for encrypted data transfer. If the FTP server is behind a firewall, enable passive mode. Enter the username and password with read/write access to the server. Click "Next".
  - **Remote replication to NAS with RTRR service:** Enter the IP address of the RTRR service-enabled server. Specify the connection port and select whether or not to enable secure connection. The default port number for remote replication via RTRR is 8899. Enter the password for RTRR connection. Click "Next".
5. Select the folder pair for data synchronization.
6. Each sync job supports maximum 5 folder pairs. Select more folder pairs and click "Add". Click "Next".






7. Choose between real-time and scheduled synchronization. Real-time synchronization copies files that are new, changed, and renamed from the source folder to the target folder as soon as the changes are made after the first-time backup. Scheduled synchronization copies files from the source folder to the target folder according to the pre-configured schedule. The options are:
- Replicate Now: Replicate data immediately.
  - Periodically: Enter the time interval in hour and minute that the backup should be executed. The minimum time interval is 5 minutes.
  - Hourly: Specify the minute when an hourly backup should be executed, e.g. enter 01 to execute backup each first minute of every hour, 1:01, 2:01, 3:01...
  - Daily: Specify the time when a daily backup should be executed, e.g. 02:02 every day.
  - Weekly: Select a day of the week and the time when a weekly backup should be executed.
  - Monthly: Select a day of the month and the time when a monthly backup should be executed.
  - Occurs once at: Specify the date and time the scheduled replication job will once be executed and this replication job will be executed only once.


**Note:**

- If a folder or its parent folder or child folder has been selected as the source or destination in a folder pair of a replication job, you cannot select the folder as the source or destination of another folder pair of the same job.
- You can also create a folder as you select the folder pair. To do so, please enter the folder name and click the folder icon from the drop down list.
- Starting QTS 4.1, RTRR can also back up the entire FTP site. To do so, please select the root (/) from the folder drop-down list. Please note that this is only the case when the source is a FTP site.
- For two way synchronization, only scheduled data replication is supported.
- The expiration time setting is not available for "Replicate Now" and "Occurs once at" in Step 7.
- Bandwidth Control in both RTRR and Rsync only works if both NAS servers of a replication job (sender and receiver) are QNAP NAS and use firmware version 3.6 or above.

8. To configure synchronization policy, select "Configure policy and filter" and click "Next". Select whether or not to enable the following options:

- Delete extra files: Delete extra files in the target folder. Deletions made on the source folder will be repeated on the target folder. This option is not available for real-time synchronization.
  - Detect sparse files: Select this option to ignore files of null data.
  - Check file contents: Specify to examine file contents, date, size, and name to determine if two files are identical. This option is not available for real-time synchronization.
  - Compress files during transmissions: Specify whether or not the files should be compressed for synchronization operations. Note that more CPU resources will be consumed.
  - Ignore symbolic links: Select this option to ignore symbolic links in the pair folder.
  - Extended attributes: Select this option to keep the information in extended attributes.
  - Timeout and retry settings: Specify the timeout period and retry settings if a synchronization operation fails.
9. Specify the file size, file types to include/exclude, and file date/time to filter data synchronization. Enter a job name.
- File size: Specify the minimum and maximum size of the files to be replicated.
  - Last modified: Specify the number of days files are last modified for replication.
  - Include file types: Specify the file types to be replicated.
  - Exclude file types: Specify the file types to be excluded for replication.
  - File date/time: Specify the date and time of the files to be replicated.
10. Click "Next".
11. Confirm the settings and click "Next".
12. Click "Finish" to exit the wizard.

Icon	Name	Description
	Enable and Start	Enable connection to a remote server. Start a replication job.
	Stop	Stop connection to a remote server or external drive.
	Stop	Stop a replication job.
	View	View job status and logs; download logs.
	Edit	Edit the connection settings of a remote server. Edit the settings of a replication job.

	Delete	Delete connection settings to a remote server. Delete a replication job. This button is available only after a replication job is stopped or the connection to the remote server is stopped.
---	--------	--

To edit the replication job properties, click "Options".

Under "Event Logs" you can select to enable "Download Detailed Logs" and specify the maximum file size of the log file. You can also select to send an email alert when synchronization fails or completes. Note that the SMTP server settings must be properly set up on the NAS ("System Settings" > "Notification").

Specify the replication policy in "Policy" and filter settings in "Filter". These will become the default settings for all RTRR replication jobs.

### Downloading Replication Job Logs

To view the status and logs of a replication job, click the "View" button under "Action". You can view the details of a replication job. You can view the job logs or download the logs by clicking "Download Logs". The log file can be opened by Microsoft Excel or other text editor software. Note that this button is only available after you have enabled "Download Detailed Logs" in "Options" > "Event Logs" and executed the replication job once.



### **8.1.3 Cloud Backup**

#### **Amazon S3**

Amazon S3 (Simple Storage Service) is an online storage web service offered by AWS (Amazon Web Services). It provides a simple web services interface that can be used to store and retrieve the data from anywhere on the web. With Amazon S3, you can upload the data from your NAS to Amazon S3 or download the data from Amazon S3 to your NAS. Note that you need to register an AWS account from <http://aws.amazon.com> and pay for the service. After signing up for an account, you need to create at least one bucket (root folder) on Amazon S3 by an Amazon S3 application. We recommend the Mozilla Firefox add-on "S3Fox" for beginners.

After setting up the Amazon S3 account, follow the steps below to back up the data to or retrieve the data from Amazon S3 using the NAS.

1. Click "Create a Replication Job".
2. Enter the remote replication job name.
3. Select the usage type: "Upload" or "Download" and enter other settings. A bucket is the root directory on Amazon S3. You can test the connection to the remote host testing by clicking "Test". Other settings are optional.
4. Specify the local directory on the NAS for replication.
5. Enter the replication schedule.
6. Click "Finish". The replication job will be executed according to your schedule.

#### **ElephantDrive**

To use ElephantDrive Service, select "Enable ElephantDrive Service". Enter your email and password for the ElephantDrive service. If you do not have an account, enter the information and click "Create". Click "OK" to confirm. After creating an account, click "Apply". The NAS will help you login the ElephantDrive service. After you have logged in ElephantDrive service on the NAS, you can go to ElephantDrive website (<http://www.elephantdrive.com/qnap>) and manage the backup. Login your ElephantDrive account. You can manage the backup and restore jobs on the website (<https://www.elephantdrive.com/qnap>).

#### **Symform**

To use Symform cloud backup, go to "Backup Station > Cloud Backup > Symform". Click "Get Started Now" to install Symform. The NAS will download, verify, and install the

package automatically. Click "Configure". Enter your email address and click "Sign-In" to activate Symform on the NAS. An activation code will be sent to this address. Check your email to get the activation code and finish the setup. Configure Symform according to the instructions.

When done, the folders chosen during the setup will be backed up to Symform Storage Cloud. After Symform is activated, you will be able to see the device configuration. Click "Cloud Dashboard" to have access to Symform Cloud Dashboard and check the status of all the devices that are running Symform Storage Cloud.

**Note about Symform service:**

- Web administration interface TCP port: 59234
- Contribution TCP port: Defined randomly during Symform setup and can be changed if necessary.
- All TCP outbound ports are mandatory.
- The hard drive standby function of the NAS may not work when contribution is in use, because Symform service always reads and writes data on the hard drives.
- Symform with contribution requires network bandwidth. If contribution is enabled, there will always be communication between the NAS and Symform Cloud. This may cause network utilization and the bandwidth can be limited as needed.

### 8.1.4 External Backup

#### External Drive

The NAS supports real-time and scheduled data backup between the internal disks volumes on the NAS and external USB/eSATA storage devices. To use this feature, follow the steps below.

**Note:** If an external storage device is encrypted by the NAS, make sure it is unlocked in "External Device" > "External Storage" before creating any backup jobs.

1. Connect one or more external storage devices to the USB or eSATA (if available) interfaces of the NAS.
2. Click "Create a new job".
3. When the wizard is shown, read the instructions carefully and click "Next".
4. Select the backup locations.
  - a. Select an external disk volume from the drop-down menu. The NAS supports EXT3, EXT4, FAT, NTFS, and HFS+ file systems. The general information of the storage device will be shown.
  - b. Select "Map this backup job to the volume ID only" to map the backup job to this particular external storage device. The NAS will recognize the device and execute the backup job according to the settings automatically every time it is connected to the NAS via any USB/eSATA interface.
  - c. Select to back up the data from local disk volume to the external storage or vice versa.
  - d. Click "Next".
5. Select the source and destination folders for backup. Then click "Add". Up to 5 folder pairs can be created. Click "Next".

**Note:**






- Multiple partitions on the external storage device will be recognized as individual disk volumes.
- If a folder or its parent folder or child folder has been selected as the source or destination in a folder pair of a backup job, the same folder cannot be selected as the source or destination of another folder pair of the same backup job.

6. Choose between real-time and scheduled backup. Real-time backup copies files that are new, changed, and renamed from the source folder to the target folder as soon

as the changes are made after the first-time backup. Scheduled backup copies files from the source folder to the target folder according to the schedule. The options are:

- Replicate Now: Copy the data immediately.
  - Periodically: Enter the time interval in hour and minute that the backup job should be executed. The minimum time interval is 5 minutes.
  - Hourly: Select the minute when an hourly backup should be executed, e.g. select 01 to execute the backup job every first minute of an hour, 1:01, 2:01, 3:01...
  - Daily: Specify the time when a daily backup should be executed, e.g. 02:02 every day.
  - Weekly: Select a day of the week and the time when a weekly backup should be executed.
  - Monthly: Select a day of the month and the time when a monthly backup should be executed.
  - Auto-Backup: Execute data backup automatically every time the device is connected and detected by the NAS.
7. Choose to automatically eject the external drive after the job is finished.
8. To configure the backup policy and filter settings, select "Configure policy and filter" and click "Next". Select whether or not to enable the following options:
- Delete extra files: Delete extra files in the target folder. Deletions made on the source folder will be repeated on the target folder. This option is not available for real-time data backup.
  - Detect sparse files: Select this option to ignore files of null data.
  - Overwrite the file if the source file is newer or the file size is different .
  - Check file contents: Examine the file contents, date, size, and name to determine if two files are identical. This option is not available for real-time data backup.
  - Ignore symbolic links: Select this option to ignore symbolic links in the pair folder.
9. Create filters for the backup job.
- File size: Specify the minimum and maximum size of the files to be copied.
  - File date/time: Specify the date and time of the files to be copied.
  - Include file types: Specify the file types to be copied.
  - Exclude file types: Specify the file types to be excluded for data copy.
10. Enter a name for the backup job. A job name supports up to 63 characters; it cannot start or end with a space. Click "Next".
11. Confirm the settings and click "Next".
12. Click "Finish" to exit the wizard.

13. The backup job and the status will be shown on the list.

Button	Name	Description
	Start	Start a backup job.
	Stop	Stop a backup job.
	Edit	Edit the settings of a backup job.
	View / Download	View the job status and logs. Download the logs of a backup job.
	Delete	Delete a backup job. This button is available only after a backup job is stopped.

To disable the backup schedule of a backup job, click the "Edit" button and select "Disabled" under "Settings" > "Schedule Type" and click "OK".

### Default Backup Job Settings

1. To edit the default backup job properties, click "Options".
2. Under "Event Logs" you can select to enable "Download Detailed Logs" and specify the maximum file size of the log file. Select to send an email alert when a backup job fails or completes. Note that the SMTP server settings must be properly set up in "System Settings" > "Notification".
3. Specify the backup policy in "Policy" and filter settings in "Filter". These will become the default settings for all the backup jobs.

### Download Backup Logs

1. To download the logs of a backup job, make sure the option "Download Detailed Logs" in "Options" > "Event Logs" has been enabled.
2. Click the "View / Download" button in "Action" column of a backup job.
3. Go to "Job Logs" and click "Download Logs". The log file can be opened by Microsoft Excel or any other text editor software. Note that this button is only available after you have enabled "Download Detailed Logs" in "Options" > "Event Logs" and executed the backup job once.

### USB One Touch Copy

Enable the USB one touch copy button to back up data from the front USB drive to the NAS or vice versa. This feature is not supported by TS-809U-RP, TS-879U-RP, TS-EC879U-RP, TS-1279U-RP, TS-EC1279U-RP.

### **Smart Import (Beta)**

When users connect an external device, such as a camera, to the front USB port, all photos and videos on the device will be imported to the NAS automatically without pressing the "Copy" button. Imported files will be stored in "SmartImport," a newly created folder, under the default backup directory. During each import, only new photos and videos will be imported to a new folder.

### **USB One Touch Copy**

For customized backup configuration, please select "USB One Touch Copy."

- Backup direction: From the front USB drive to the NAS or vice versa.
- Backup method:
  - Create directory: A new directory will be created on the destination and the source data will be copied to this directory. The new directory will be named as the backup date (YYYYMMDD). If there are two or more backups on the same day, the directory will be named with YYYYMMDD-1, YYYYMMDD-2... and so on.
  - Copy: Back up data to the destination share. If the same file exists, the destination file will be overwritten.
  - Synchronize: Back up data to the destination share and clear the redundant files. If the same file exists, the destination file will be overwritten.
- Handle sparse files efficiently: A sparse file is a type of computer file that contains large blocks of zero-byte data. Turn on this option may reduce the time required for backup.
- Source and destination folders: Specify the folder pairs for backup and click "Add". Maximum 9 folder pairs can be added.
- Options: Click "Options" to set up notification of the backup jobs by email, SMS, or instant messaging (IM).
- Unmount the front USB drive manually: When enabled, users can press the Copy button for about 8–10 seconds until the USB LED light turns off and remove the front USB drive from the NAS.
- Enable the alarm buzzer:
  - One short beep: Backup has started.
  - Two short beeps: The front USB drive is being unmounted.

**Note:** If there are multiple partitions on the source storage device, a new folder will be created for each partition on the destination as the backup folder. The backup folder will be named with the backup date and the partition number, YYYYMMDD-1 for partition 1, YYYYMMDD-2 for partition 2... and so on. If the source storage device contains only one partition, the backup folder will be named as YYYYMMDD only.

### **Data copy using front USB port**

The NAS supports instant data copy backup from the external USB device to the NAS or the other way round by the front one touch copy button. To use this function, follow the steps below:

1. Make sure a hard drive is installed and formatted on the NAS. The default shared folder Qusb/Usb has been created.
2. Turn on the NAS.
3. Configure the behavior of the Copy button on "Backup Station" > "USB One Touch Copy" page.
4. Connect the USB device, for example, digital camera or flash, to the front USB port of the NAS.
5. Press the Copy button once. The data will be copied according to your settings on the NAS.

**Note:** Incremental backup is used for this feature. After the first time data backup, the NAS only copies the changed files since the last backup.

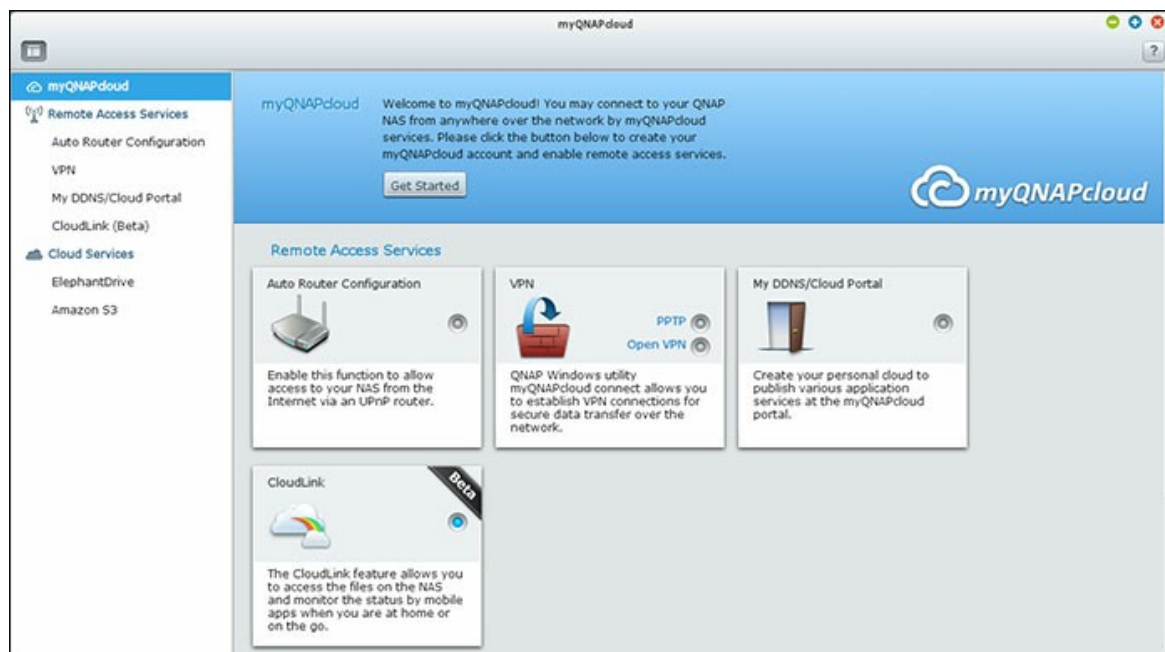
**Caution:** Files are copied from the source to the destination. **Extra files on the destination will be deleted; files of the same names will be overwritten by the source.** Source data will remain unchanged.

### **As an external storage drive**

When an external device is connected to the front USB port, it will be identified as an external storage drive connected to the port.

## 8.2 myQNAPcloud Service

The myQNAPcloud service is a function which provides host name registration, mapping of the dynamic NAS IP to a domain name, and auto port mapping of UPnP router on the local network. Use the myQNAPcloud wizard to register a unique host name for the NAS, configure automatic port forwarding on the UPnP router, and publish NAS services for remote access over the Internet.



To use the myQNAPcloud service, make sure the NAS has been connected to an UPnP router and the Internet and click the myQNAPcloud shortcut from the NAS Desktop or Main Menu.

### myQNAPcloud Wizard

The first time you use the myQNAPcloud service, you are recommended to use the myQNAPcloud wizard to complete the settings. Follow the steps below:

1. Click "Get Started" to use the wizard.
2. Click "Start".
3. Fill out all required fields, agree to the terms and conditions and click "Next" to create a myQNAPcloud account (or, click "Sign in myQNAPcloud account" to login to your myQNAPcloud account if you already have an account.)
4. Enter a name to register your NAS and click "Next".
5. The wizard will configure your router automatically.
6. Review the summary page and click "Finish" to complete the wizard.
7. If any of the settings is unsuccessful, follow the instructions provided to



troubleshoot the issues. After the wizard is finished, a confirmation email will be sent to the email account specified. Click "Confirm Registration" from the email and proceed to complete the registration process.

## Managing and Configuring your myQNAPcloud Account

Click "Manage myQNAPcloud Account" on top of the page after launching myQNAPcloud or log into your account at <http://www.myqnapcloud.com>. Click your login ID next to the "Enter device name" box and select "My Devices" from the drop down menu to review your device details, including the name, DDNS address, LAN and WAN IP. Or, select "My Account" to check your profile, change your password and monitor your account activity.

## Accessing NAS Services via the myQNAPcloud Website

To access the NAS services via the myQNAPcloud website, specify the NAS you registered with in the search box and click "Go!".

The published public NAS services will be listed. Enter the access code to browse private services.

**Note:** For configuration on private NAS services, please refer to the DDNS/Cloud Portal section later in this chapter.

## Auto Router Configuration

In "Remote Access Services" > "Auto Router Configuration", you can enable or disable UPnP port forwarding. When this option is enabled, your NAS is accessible from the Internet via the UPnP router.

**Note:** If there is more than one routers on the network, only the one which is set as the default gateway of the NAS will be detected.

Click "Rescan" to detect the router if no UPnP router is found on the local network and "Diagnostics" to check the diagnostic logs. If the UPnP router is incompatible with the NAS, click the tooltip icon (!) and then click "UPnP Router Compatibility Feedback..." ( [http://www.qnap.com/go/compatibility\\_router.html](http://www.qnap.com/go/compatibility_router.html)) to contact the technical support. Select the NAS services to be allowed for remote access. Click "Apply to Router". The

NAS will configure the port forwarding on the UPnP router automatically. You will then be able to access the NAS services from the Internet.

**Note:**

- If more than two NAS are connected to one UPnP router, please specify a different port for each NAS. If the router does not support UPnP, users are required to configure port forwarding manually on the router. Please refer to the links below:
- Application note: <http://www.qnap.com/go/notes.html>
- FAQ: <http://www.qnap.com/faq>
- UPnP router compatibility list: [http://www.qnap.com/UPnP\\_Router\\_Compatibility\\_List](http://www.qnap.com/UPnP_Router_Compatibility_List)

## **DDNS/Cloud Portal**

With the Cloud Portal, web-based NAS services such as web administration, Web Server, Multimedia Server, and File Station, can be published to <http://www.myqnapcloud.com>. By enabling the NAS services in this step, they are opened for remote access even if they are not published. Enable the My DDNS service in "Remote Access Service" and the NAS will notify the myQNAPcloud server automatically if the WAN IP address of the NAS has changed. To use the myQNAPcloud service, make sure the NAS has been connected to an UPnP router and the Internet.

**Note:**

- The myQNAPcloud name of each QNAP NAS is unique. One myQNAPcloud name can only be used with one NAS.
- A registered myQNAPcloud name will expire in 120 days if your NAS remains offline within the period. Once the name is expired, it will be released for new registration by other users.

Follow the steps below:

1. In "Remote Access Services" > "DDNS/Cloud Portal" > "Cloud Portal", the web-based NAS services are shown. Select "Publish" to publish the NAS services to myQNAPcloud website. Select "Private" to hide the published NAS services from public access. The private services on the myQNAPcloud website are only visible to specified users with the myQNAPcloud access code. Note that if a disabled NAS service is published, the service will not be accessible even the corresponding icon

- is shown on myQNAPcloud website (<http://www.myQNAPcloud.com>).
2. Set myQNAPcloud Access Code: Enter a code of 6-16 characters (a-z, A-Z, 0-9 only). The code is required when NAS users attempt to view the private NAS services on the myQNAPCloud website.
  3. Click "Add Users" and specify maximum 9 local NAS users who are allowed to view the private NAS services published on the myQNAPcloud website.
  4. Select the connection method: the myQNAPcloud Connect (VPN) utility and/or myQNAPcloud website. Click "Apply". Click "Apply" to save the settings.
  5. To send the instructions of the myQNAPcloud service to users via email, select the user(s) and click the "Send Invitation" button.
  6. Enter the email address. Click "Send".

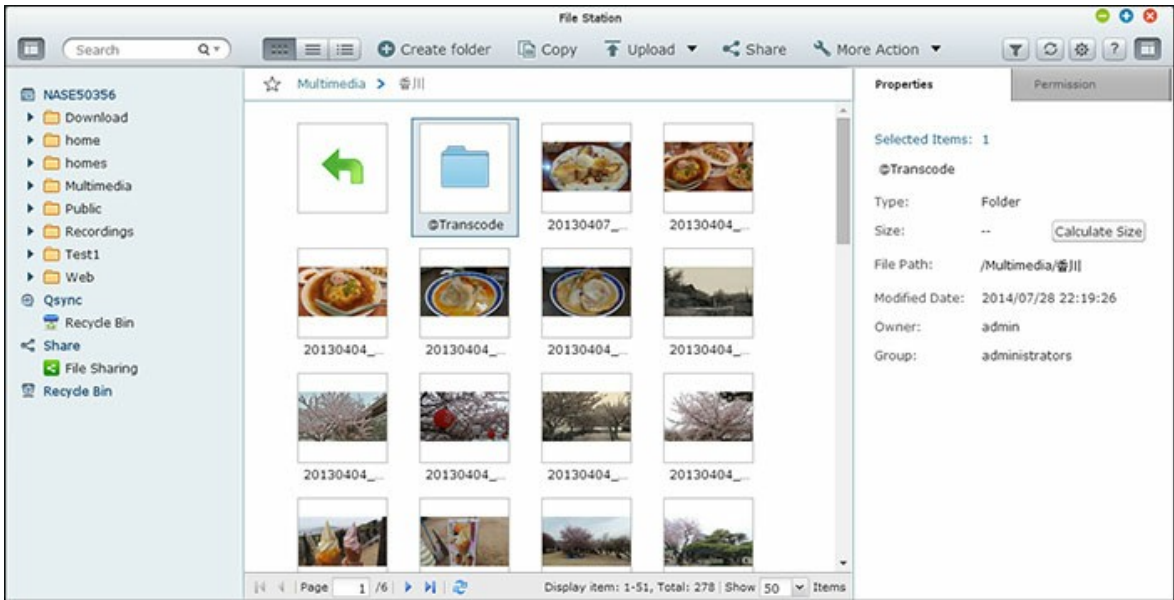
**Note:** To use this function, the mail server settings must be properly configured in "System Settings" > "Notification" > "SMTP Server".

### **CloudLink (Beta)**

The CloudLink is a new service provided by QNAP for remote access to your QNAP NAS over the network without changing the settings of your router, even if UPnP is not supported. Check "Enable CloudLink (Beta) service" to enable this service.

### 8.3 File Station

The File Station is an online file management center. With the File Station, you can access the NAS across the Internet, manage files using a web browser, quickly find your files, play media files online, set file and folder permissions and easily share your files and folders on the NAS.



#### Starting File Station

Launch the File Station from the File Station shortcut on the Main Menu or the Desktop, or log directly into the File Station (type [http://NAS\\_Name\\_or\\_IP/cgi-bin/filemanager.html](http://NAS_Name_or_IP/cgi-bin/filemanager.html) into a web browser.)

#### Familiarizing yourself with File Station

##### Menu Bar



No.	Name	Description
1	Search Bar	Search files by their name, file type (music, video, photo) or with advanced search.

2	Browsing Mode	Switch between different browsing modes (from left to right: thumbnail browsing mode/ list browsing mode/detail browsing mode.)
3	Create Folder	Create a folder on the selected shared folder.
4	Copy / Paste	Copy / paste folders or/and files.
5	Upload	Upload files or folders to the selected shared folder.
6	Share	Share the folder/file via email, publish the folder/file, or share the link of the folder/file.
7	More Action	<ul style="list-style-type: none"> <li>• Bookmark the selected shared folder (and it will appear under "Favorites" on the left panel.)</li> <li>• Check folder properties</li> <li>• Review transcode information and background tasks (i.e. file compressions, file upload and moving files within the NAS.)</li> </ul>
8	Smart File Filter	Filter files based on conditions set by users and the conditions will apply to all folders.
9	Refresh	Refresh the current page.
10	Settings	<ul style="list-style-type: none"> <li>• Set to show/hide files and folders on the local PC</li> <li>• Set to show/hide hidden files</li> </ul>

**Tip:** You can directly drag and drop files from your PC to the NAS to upload them if you are using Chrome.

### Left Panel

- Shared folders: All shared folders on the NAS are listed here. Depending on your NAS model, the default shared folders are "Download", "home", "Multimedia", "Public", "USB" and "Web"
- Local folders: Folders on the local PC are listed here, but Java JRE needs to be enabled first.

- Qsync: Folder or files synchronized from the Qsync service are listed here.
- Favorites: Bookmarked folders are listed here.
- Share: Files and folders that have been shared are listed here.
- Recycle Bin: Deleted files or folders can be found here. Right click the deleted items in the recycle bin to permanently delete or recover them.

## Right Panel

- Properties: Click this tab to review the details of a file and folder and click "Calculate Size" to calculate the size of a folder.
- Permission: Click this tab to configure shared folder permissions. For steps on setting folder permissions, please refer to the "Set file/folder level permission" section below.

## Using File Station

### Creating shared folders

To create a shared folder, click "+" next to the NAS (the first item on the left panel,) specify the folder name, folder description, the disk volume, user access privileges and advanced settings in the shared folder creation dialog window and click "Create".

### Subfolder operations

Right click a subfolder and choose to perform the following actions:

Action	Description
Sort By	Sort all the subfolders and files within the page by name, modified date, type, or size.
Create folder	Create a subfolder.
Copy/Paste	Copy a subfolder and paste it to another shared folder.
Share	<ul style="list-style-type: none"> <li>• Share the selected folder via email;</li> <li>• Publish the selected folder on social networking sites;</li> <li>• Set sharing details</li> </ul>
Open	Enter the chosen subfolder.
Download	Compress and download the chosen subfolder.
Rename	Rename the subfolder.

Move	Move the subfolder to another location on the NAS.
Delete	Delete the subfolder.
Cut/Paste	Cut a subfolder and paste it to another shared folder.
Add to Transcode (Beta)	Create transcode tasks for the files within the subfolder. Note that if you see certain resolution options disabled in the "Add to Transcode(Beta)" window, it means the selected video files have already been transcoded into these resolutions.
Cancel/Delete Transcoding	Cancel / Delete transcode tasks created for the subfolder
Transcode Information	Bring up the Transcode Task window for your review on transcode tasks.
Add to Favorites	Bookmark the subfolder and it will appear under "Favorites" on the left panel.
Compress(Zip)	Compress the subfolder.
Properties	Switch to open the right panel.

**Tip:** For folders and files, the shortcut keys are provided for quick file and folder operations. Available shortcut keys include:

- Ctrl + C: Copy selected files/folders.
- Ctrl + V: Paste selected files/folders.
- Ctrl + X: Cut selected files/folders.
- Ctrl + A: Select all files/folders.
- Del: Delete selected files/folders.
- F2: Rename the selected file/folder.
- F5: Reload the current list.

### File operations

Right click a file and choose to perform the following actions:

Action	Description
Sort By	Sort all the subfolders and files within the page by name, modified date, type, or size.

Copy/Paste	Copy a subfolder and paste it to another shared folder.
Share	<ul style="list-style-type: none"> <li>• Share the selected file via email;</li> <li>• Publish the selected file on social networking sites;</li> <li>• Set sharing details</li> </ul>
Open	Open the file with a corresponding application on your PC. If no such applications available, the file will be downloaded.
Open with VLC	If the chosen file is a video file, it will be opened in the browser (the VLC plug-in needs to be installed first.)
Download	Download the file. If the file chosen is a video that has been transcoded, you can choose its resolution and download the file. If multiple files are selected for the download, they will be compressed before the download.
Rename	Rename the file.
Move	Move the file to another location on the NAS.
Delete	Delete the file.
Cut/Paste	Cut a file and paste it to another shared folder.
Add to Transcode (Beta)	Create a transcode task for the file. Create transcode tasks for the files within the subfolder. Note that if you see certain resolution options disabled in the "Add to Transcode(Beta)" window, it means the selected video files have already been transcoded into these resolutions.
Cancel/Delete Transcoding	Cancel / Delete transcode task.
Transcode Information	Bring up the Transcode Task window for your review on transcode tasks.
Extract	Extract the compressed file.
Compress(Zip)	Compress the file.



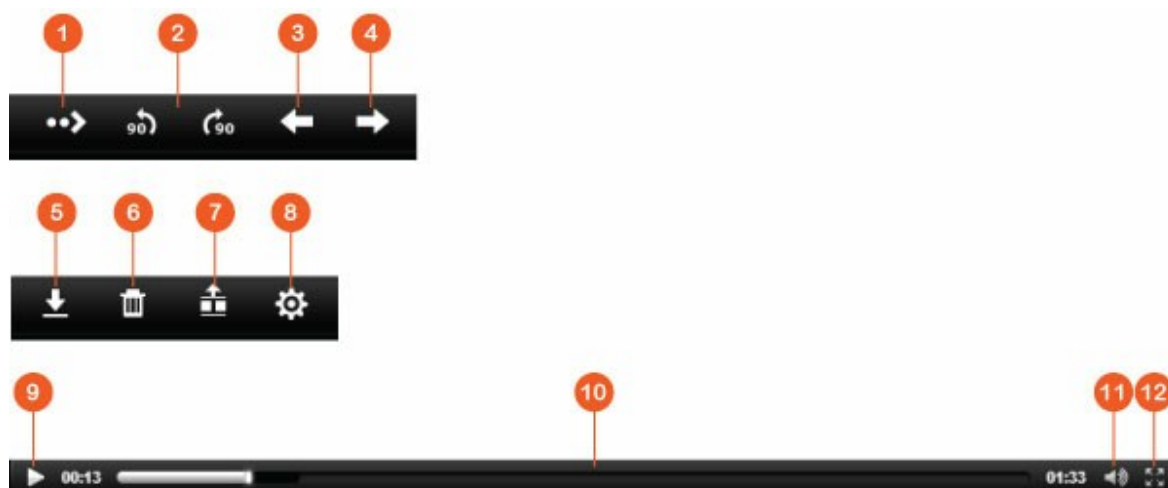
Mount ISO	Mount the iso image as a shared folder on the left panel. After the file is mounted successfully, you can click that shared folder to access the content of that iso image. To unmount an iso file, please right click the iso-mounted shared folder on the left panel and choose "Unmount".
Properties	Switch to open the right panel.

**Note:**

- For IE 8, the maximum size of a file that can be uploaded to the NAS by the File Station is 2GB if the JAVA plug-in is not installed. For file upload, please consider IE 9, Firefox 3.6, Safari 5 and Chrome, as JAVA plug-in is not required.
- For Chrome, multiple files and folders can be dragged once and dropped in the File Station to upload them directly.
- For ARM based NAS models, Cyrillic characters are not supported for the name of a subfolder in an ISO shared folder (the name will not be correctly displayed if that subfolder is created with a Cyrillic name.) Please name the subfolder with a different language before an ISO file is created.
- For Mac OSX, mounting a folder that contains the # character in the folder name through WebDAV is not supported. Please rename the folder before mounting it if necessary.

**Playing media files**

To play media files with the File Station, please double click a multimedia file (photo, music and video files) in the File Station and the Media Viewer (a built-in media player for the NAS) will be opened to play that file. Use the following buttons to control the Media Viewer:



N o	Name	Description
1	Play / Pause	Play / Pause.
2	Rotate	Rotate the photo counter-clockwise/ clockwise by 90 degrees (for photos only.)
3	Previous Item	Play the previous item.
4	Next Item	Play the next item.
5	Download	Download the item.
6	Delete	Delete the item.
7	Preview Bar	Hide/show the preview bar.
8	Play / Pause	Play / Pause the current item.
9	Seek Bar	Control the playback progress.
1 0	Volume	Adjust the volume.
1 1	Full Screen	Switch to the full screen mode.

**Note:** The media viewer feature can be used to play photos and music files on all NAS models. However, the feature to play videos using the media viewer is available on the x69 and x70 series models.

### Finding your files/folders quickly

The File Station supports smart search of files, sub-folders, and folders on the NAS. You can search a file or folder by all or part of the file or folder name, by file types (music, video or photo), or by the file extension (for example, AVI, MP3.) There are two additional approaches you can quickly find your files: 1) advanced search; and 2) smart file filter.

- For the advanced search, first click the magnifier in the search bar and then "Advanced Search". Specify the search conditions (including name, size, date files are modified, location, type and owner/group) and click "Search". The files that match the searched conditions in the current folder will be listed.
- For the smart file filter, first click on the "Smart File Filter" button on the Main Menu. Specify the filtering conditions (including name, size, date files are modified, type and owner/group) and click "OK". The files that match the filtering conditions will be listed for the folder. This is the case even if you switch to a different folder.

**Note:** To search across all folders on the NAS, please click the drop down list in "Location" and select "...".

### Setting file/folder level permission

You can set file or folder level permissions on the NAS by the File Station. Right click a file or folder and select "Properties".

If the "Advanced Folder Permissions" option is disabled in "Privilege Settings" > "Shared Folder" > "Advanced Permissions", the following settings will be shown. Define the Read, Write, and Execute access rights for Owner, Group, and Others.

- Owner: Owner of file or folder.
- Group: Group owner of the file or folder.
- Others: Any other (local or domain member) users who are not the owner or a member of the group owner.

If a folder is selected, you can choose "Apply changes to folder(s), subfolder(s) and file (s)" to apply the settings to all the files and subfolders within the selected folder. Click "OK" to confirm.

If the "Enable Advanced Folder Permissions" option is enabled in "Privilege Settings" > "Shared Folder" > "Advanced Permissions", you will be able to specify the file and folder permissions by users and user groups. Click + to do so.

To select the users and user groups and specify the Read and Write rights, click "Add" to do so.

To remove the permissions on the list, select the user(s) or user group(s) and click "-" to do so.

You can also define the file and folder owner by clicking the edit button next to the owner field. To do this, select a user from the list or search a username, and then, click "Set".

The following options are available for folder permission settings. You are recommended to configure folder permissions and subfolder permissions in "Privilege Settings" > "Shared Folders".

- Only the owner can delete the contents: When you apply this option to a folder, the first-level subfolders and files can be deleted only by their owner.
- Only admin can create files and folders: When you apply this option to a folder, only administrators can create files or folders.
- Apply changes to files and subfolders: Apply changed permissions settings except owner protection to all the files and subfolders within the selected folder. The option "Only the owner can delete the contents" will not be applied to subfolders.
- Apply and replace all existing permissions of this folder, files, and subfolders: Select this option to override all previously configured permissions of the selected folder and its files and subfolders except owner protection. The option "Only the owner can delete the contents" will not be applied to subfolders.

## Sharing files

To share the files on the NAS by the File Station, please follow the steps below:

1. Right click the file(s)/folder(s) and select "Share".
2. Switch to "Settings" and configure the sharing link:
  - Specify the Link Name
  - Select the IP or domain name of the NAS.
  - Check "Allow file upload to this folder", and link recipients can upload files to the folder pointed to by the link (for folder only and please note that this option is available for administrators only.)
  - Select to create the link(s) in SSL (optional) and specify the expiration settings and enter a password (optional).
  - Check "Include the password in the email if the link is sent via email" to include the password in the email sent to the recipients.
3. To share the links by emails, switch to "Send" in the Share dialog window and enter the contents. Click the "Send" button after you are done. Note that you can click the link in the dialog window to preview the link page or provide the link directly to your friends, but this is only the case if the link is a domain name or WAN IP.

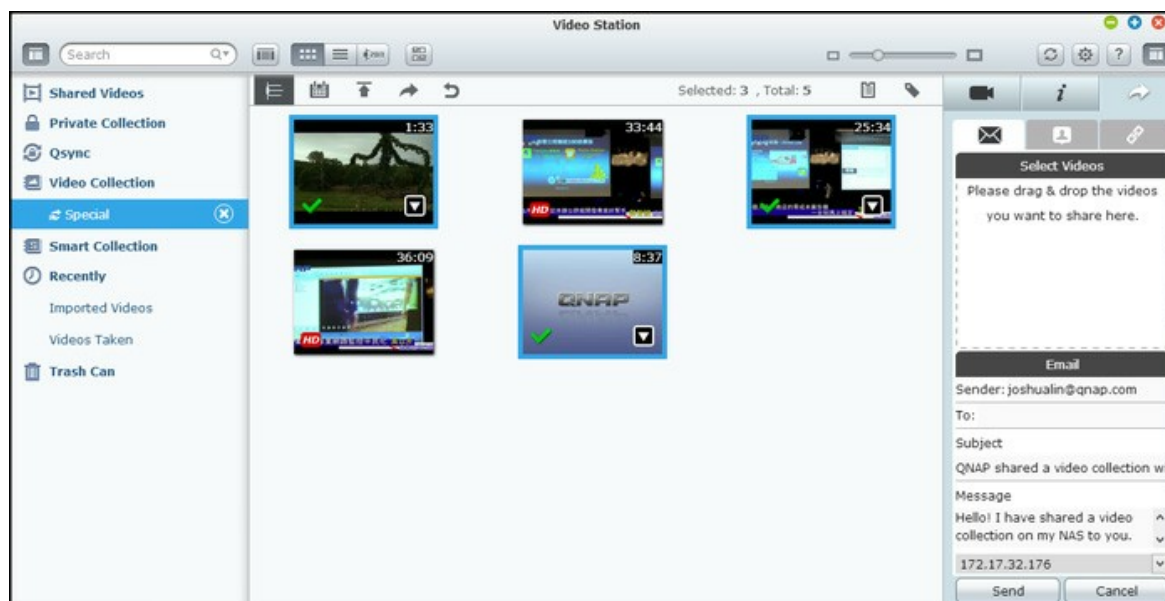
4. To share the links on social networking sites, switch to "Publish" in the Share dialog window and enter the content. Click the social networking site you would like to share the link on after you are done.

**Note:**

- To share links by emails, the mail server settings must be properly configured in "System Settings" > "Notification" > "SMTP Server".
- Up to 1000 sharing links are supported.
- For best performance, please consider using the following browsers: IE 9, Firefox 3.6, Safari 5, or Chrome.
- Please do not close the browser before file transfer process (upload or download) is complete, or the process will fail.

## 8.4 Video Station

The Video Station (2.0) is a video management tool used to organize your videos on the Turbo NAS and to share them with your friends and family across the Internet. With the Video Station, you can classify your videos into home videos, movies, TV shows or music videos for your personal collection. Besides, a smart collection can be set to automatically sort out videos that match search criteria and help you neatly manage your videos.



### Starting Video Station

Please go to the App Center and make sure that the Video Station has been installed and enabled first (for QTS 4.1 or later versions only) and follow the steps below to prepare for the Video Station:

1. Upload videos to a shared folder on the NAS: There are three approaches you can upload videos to the NAS: 1) Install Qfinder on your PC or Mac, set up a network drive and upload files to your preferred shared folders. For details on setting up a network drive, please check the chapter "Connecting to NAS Shared Folders.<sup>[24]</sup>"; 2) Click "Shared Videos" or "Private Collection" on the left panel, and "Import" (up arrow icon) on the main menu to import videos from the local PC. A new shared folder named with the date that files are uploaded will be created on the Turbo NAS to store your uploaded files (for "Shared Videos", this newly created shared folder is located under the "/multimedia" folder; for "Private Collection", this shared folder is located under the "/home" folder.) A corresponding collection will be created under "Video Collection" as well; 3) Switch to the folder view browsing mode and drag and drop videos to a preferred folder. Note that with the first and third approach, you

can choose which folder on the NAS that you would like to upload videos into.

#### Tips on file upload:

- The maximum size of an image file is 2GB.
- The maximum size of multiple files that can be uploaded at a time is 2GB.

2. Launch the Video Station from the Main Menu or the Video Station shortcut on the Desktop or log directly into the Video Station (type [http://NAS\\_Name\\_or\\_IP/video/](http://NAS_Name_or_IP/video/) into a web browser.)

#### Note:

- The admin login credential of the Video Station is the same as that of the NAS administrator.
- Video formats supported by the Video Station include: MP4.

## Familiarizing yourself with Video Station

### Menu Bar



N o	Name	Description
1	Search Bar	Search video files by title, video date, tag, rating, or color label.
2	Browsing Mode	Switch between different browsing modes (from left to right: thumbnail browsing mode/list browsing mode/timeline browsing mode/folder browsing mode) to browse videos.
3	Multi-select	Select multiple items at the same time
4	Resizing Bar	Resize video thumbnails.

5	Refresh	Refresh the current page.
6	Settings	<p>Set video classification, content filters and configure miscellaneous settings.</p> <ul style="list-style-type: none"> <li>• Video Classification: Add, remove and rescan folders to be classified and classify folders into the following categories (Home Videos, Movies, TV Shows, or Music Videos.) The classified videos will be organized into a video library for smart collections.</li> <li>• Content Filter: Set folders as the content source of the Video Station here. Use this feature to filter out (hide) undesired videos and show only intended contents.</li> <li>• Miscellaneous: check "Always ask me to enter my password when accessing Private Collection and Qsync", and each time a user is trying to access those categories, that user will be prompted for password.</li> </ul>
7	Timeline	List videos chronically as timeline.
8	Date Filter	Filter videos by date.
9	Import	Import videos
10	Sharing	Choose to email, publish, or share the link of a collection.
11	Sharing History	Show the history of files that have been shared.
12	Tag Filter	Filter videos by tag.

### Left Panel

- Shared Videos: List all videos contained in all shared folders on the Turbo NAS (except videos in the "/home" and "Qsync" folders) and all videos are only visible to authorized users.
- Private Collection: List all videos located in the "/home" folder, and those multimedia files can be viewed by yourself only.

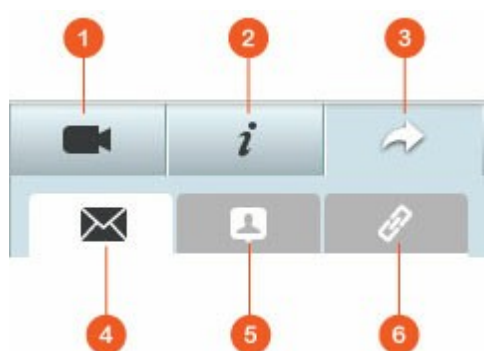


- Qsync: List videos synchronized from the Qsync service.
- Video Collection: List all virtual collections. Note that all entries listed under a collection are only links to the physical files. This can effectively conserve your NAS storage space, as you can keep only one copy of the videos even when you create a collection for a special theme. For collection operations, please refer to the section on Using Video Station below.
- Smart Collection: List all smart collections. Smart collections will only show videos that match specific classifications chosen by users, such as Home Videos, Movies, TV Shows and Music Videos, and can save you a lot of effort on video management. For instructions on smart collection operations, please refer to the section on Using Video Station below.
- Recently: Include videos recently imported (within a month) from a local device or taken with a camera or recording device.
- Trash Can: All videos deleted can be found here and right click the deleted items in the Trash Can to recover or permanently delete them. Note that only deleted physical files (instead of virtual links) will show up in the trash can.

**Note:**

- The "/home" folder can be accessed by its owner and NAS administrators only. For your private videos, please consider storing them in the "/home" folder only.
- For configuration on media folders, please refer to the chapter on Multimedia Management. For user setup and configuration, please refer to the "User" section in the chapter on Privilege Settings.
- If the videos uploaded do not show up in the Video Station, please scan them with the Media Library and wait until the scan is finished. For details on the scan, please refer to the chapter on Multimedia Management.

**Right Panel**



No	Name	Description
1	Video Property	Review and edit video properties.
2	Tag and Description	Edit and browse video tags and descriptions.
3	Sharing	Drag files to this area and share them via a link (including three methods: email, social sharing and link.)
4	Email	Share a link via email. Specify the sender, recipient, subject and message body of the email and click "Send" to send the email. Make sure your email account is properly configured. Go to "Control Panel" > "System Settings" > "Notifications" > "SMTP Server" for email configuration.
5	Social Sharing	Share a link of selected files on social networking sites. Specify the subject and message body and click the social networking site icon to share.
6	Link	Share a link of selected videos by directly pasting it into an email or instant message. Drag and drop videos under "Select Videos" and under "Select Link Format", select the domain name, LAN IP or WAN IP address (note that the myQNAPcloud.com domain name is only available after it is registered in myQNAPcloud. Please refer to the chapter on myQNAPcloud Service for details) and HTML format (click to choose a URL link, HTML code, vB Forum code or Alt Forum code) from the drop down menu. Click "Create", specify the name of the collection displayed on the page seen as recipients open the link. Copy and paste the URL link in the dialog window to your preferred applications.

**Note:** Multiple video files can be classified at the same time. To do so, please first select the video files, click the "Video Property" button on the right panel and choose their classification from the classification drop down list.

## Using Video Station

## **Creating and managing collections**

There are two approaches a collection can be created:

1. Switch to the folder view, right click a shared folder and select "Create New Collection" to turn that shared folder into a collection.
2. Drag and drop videos in "Video Collection" on the left panel.

Right click a collection and choose to play, download, remove, rename, email the link of, publish the link, share the link of that collection, or modify the settings of that collection (The email, publish and share options are only available if "Share with the public" is enabled in "Collection Settings".)

## **Creating and managing smart collections**

To create a smart collection, please click "+" next to "Smart Collection", specify the name of the collection, the classification (Home Videos, Movies, TV Shows and Music Videos) and search criteria (all files and tag). Right click a smart collection and choose to play, download, remove, rename, or reset collection settings. Right click a smart collection and choose to play, download, remove, rename, email the link of, publish the link, share the link of that collection, or modify the settings of that collection (The email, publish and share options are only available if "Share with the public" is enabled in "Collection Settings").

## **Sharing collections**

As you create a collection, you can choose to share it with other NAS users (choose whether all NAS users can edit the collection, or only the collection creator/administrator can edit the collection) or the public, or not to share at all (leave both options unchecked), and set the valid period on the collection creation page. If a collection is set to share with the public, you can right click that collection and select "Email" to email it, "Publish" to publish it on social networking sites, or "Sharing Links" to generate and paste the collection link on your blog, forum, or instant messenger programs. You can still edit the collection content later, and the updated content will be presented when viewers click the same link again.

On the other hand, you can also share a number of videos as you do with collections. To do so, please click the "Sharing" button on the right panel, drag videos from different collections and drop under "Select Videos" on the right panel and use the "Email", "Social Sharing", or "Link" button to share those videos. Then, your friends can log into the Video Station with the link provided to them to watch videos from shared collections. To check the sharing history of a selected collection, please first click that

collection and then the "Sharing History" button on the main menu.

## Video Operations

Right click a video and choose to perform a desired action from the table below.

Operation	Description
Play	Play the video online in the browser.
Open with VLC	Play the video in a browser window with the VLC player (please install the VLC plug-in first.)
Download	Download the video.
Copy to Collection	Copy the video to a collection.
Set as Cover	Set the video thumbnail as the cover of a collection.
Add to Transcode	Convert the video to the following resolutions: 240P, 360P, 480P SD, 720P HD and 1080P Full HD.
Rotate	Rotate the video 90 degrees clockwise or counter-clockwise
Add to Sharing List	Add the selected videos to the sharing list.
Remove/Delete	Delete the video.
Movie Information	Review movie information (such as genre, director, cast, etc) of the selected video.
Add Tag	Tag the video.
Rating	Rate the video.
Color Label	Color-label the video.

### Note:

- The movie information option is only available after the video selected is classified as "Movies". Please click the video property button on the right panel and the classification drop down menu to classify a video.
- The information is retrieved from the Internet based on the English title of this video file. If the movie information is not correct, please modify the English title to retrieve the movie information again.

## Finding your videos quickly

To quickly locate your videos, please be sure to first rate or classify your videos. To do so, please right click the videos and then tag, rate or color label them. To batch mark or classify multiple videos, first click the "Multi-select" button on the main menu or hold the Ctrl key on the keyboard, select your desired videos and right click the videos to rate or classify them. After videos are tagged, rated, or color labeled, they can be searched by their rating, color label or tag in the search bar on the Main Menu.

## Viewing videos

Double click a video to switch to the video viewing mode and use the buttons to view videos:



N o	Name	Description
1	Play / Pause	Play / Pause.
2	Seek Bar	Control the playback progress.
3	Mute / Volume	Mute / Unmute and adjust the volume.
4	Full Screen	Switch to the full screen mode.

**Note:** For HD videos, you can click the HD icon on top of the player window to switch the video quality.

## Media Library and Privacy Settings

Video files in the Video Station are listed and displayed according to shared folder privileges and media folders settings in the Media Library<sup>[183]</sup>. For shared folder privileges, only users with an appropriate permission to a shared folder can view its contents in the Video Station. For example, if a user does not have read/write, or read-only permissions to a certain shared folder, that user cannot see the videos in the shared folder.

**Note:**

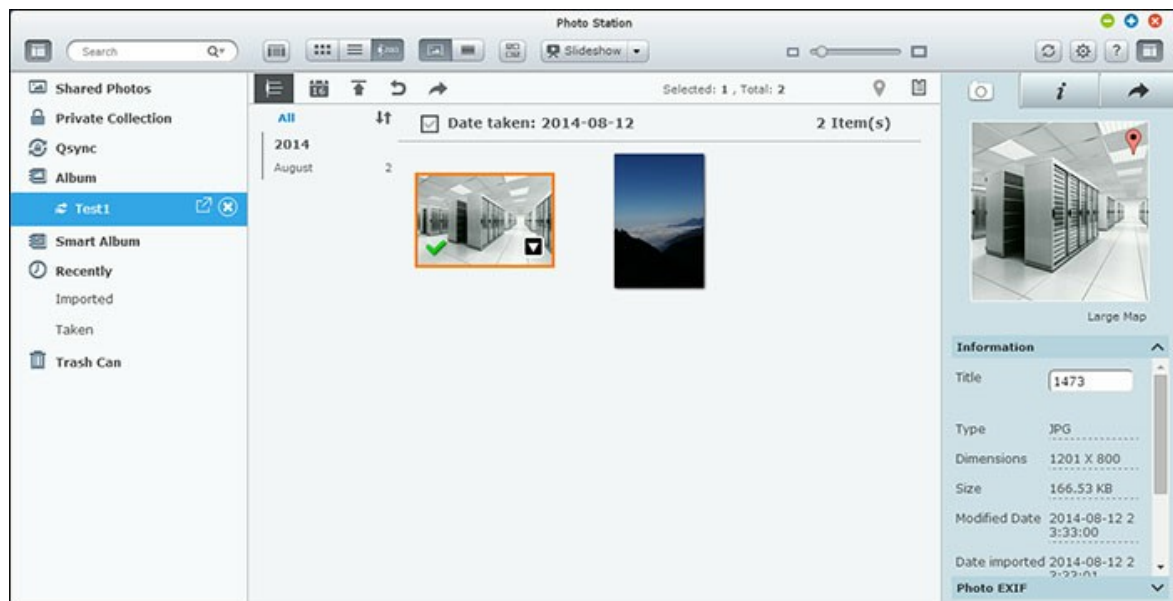
- For x86 based NAS models, all shared folders except the "/recording" and "/web" shared folders are media folders by default; while for ARM based NAS models, only "/multimedia" and "/homes" are media folders by default. However, users can always add media folders manually.
- In addition to shared folder privileges, you can also protect your privacy by storing your private videos in your "/home" shared folder to hide them from other NAS users (except the NAS administrator; and your "/home" folder can be found under "Private Collection". Anyone attempting to access this folder in the Video Station will be prompted for password.)

Videos stored in the media shared folders are only visible after they are detected and scanned by the Media Library. To set the Media Library to scan for videos manually or by schedule, please go to "Control Panel" > "Multimedia Management" > "Media Library". For details on media folder settings, please refer to the chapter on Multimedia Management.

**Note:** As the media folders in the Media Library are shared by the Photo Station, Music Station, Video Station and DLNA Media Server as the source of their contents, the contents will be affected in those applications if new media folders are added or existing media folders are removed from the Media Library.

## 8.5 Photo Station

The Photo Station (4.0) is an online photo album used to organize your multimedia content (photos and videos) on the Turbo NAS and to share them with your friends and family across the Internet. With the Photo Station, users can drag & drop photos in a virtual album, which not only spares users the effort to tediously move and copy physical files around, but also helps users save storage space, as users only need to keep one copy of their photos on the NAS when they try to create an album for a special theme. Besides, a smart album can automatically collect contents that match search criteria and help users neatly manage their photos.



### Starting Photo Station

Depending on your NAS model, the Photo Station should be enabled by default and can be launched from the Desktop or the Main Menu. If not, please go to the App Center and make sure that the Photo Station has been installed and enabled first (for QTS 4.1 or later versions only) and follow the steps below to prepare for the Photo Station:

1. Import photos and videos to a shared folder on the NAS. There are three approaches you can upload photos and videos to the NAS: 1) Install Qfinder on your PC or Mac, set up a network drive and upload files to your preferred shared folders. For details on setting up a network drive, please check the chapter on Connecting to NAS Shared Folders<sup>[24]</sup>; 2) Click "Shared Photos" or "Private Collection" on the left panel and click "Import" on the main menu to import photos or videos from the local PC. A new shared folder named with the date that files are uploaded will be created on the Turbo NAS to store your uploaded files (for "Shared Photos", this newly created shared folder is located under the "Multimedia" folder; for "Private Collection", this shared folder is located under the "/home" folder.) A corresponding album will be created under "Album" as well; and 3) Switch to the folder view browsing mode and drag and drop photos and videos to a preferred folder. Note that with the first and third approach, you can choose which folder on the NAS that you would like to upload photos and videos into.

The Photo Station supports the following file formats:

Image	bmp (Intel-based NAS only), jpg, jpeg, gif, png, tif, tiff, RAW (arw, srf, sr2, dcr, k25, kdc, cr2, crw, nef, mrw, ptx, pef, raf, 3fr, erf, mef, mos, orf, rw2, dng, x3f)
Video	MP4 (H.264). For other formats (avi, m2ts, mpg, mp4, wmv, ts, tp, asf, m2t, mov, mod, m2v, mpeg, 3gp, mkv, mts, tod, trp, m1v, m4v, rmp4, divx, flv, rmvb and rm), they need to be converted into MP4 first

**Tips on file upload:**

- The maximum size of an image file is 2GB.
- The maximum size of multiple files that can be uploaded at a time is 2GB.

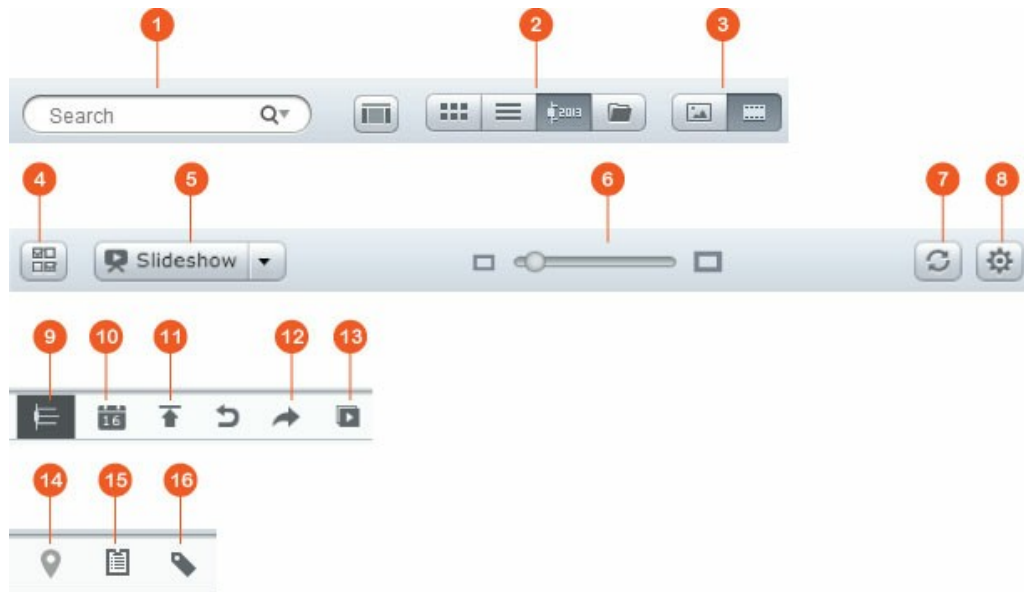
2. Launch the Photo Station from the Main Menu or the Photo Station shortcut on the Desktop or log directly into the Photo Station (type [http://NAS\\_Name\\_or\\_IP/photo/](http://NAS_Name_or_IP/photo/) into a web browser.)

**Note:** The admin login credential of the Photo Station is the same as that of the NAS administrator.

## Familiarizing yourself with Photo Station



## Menu Bar



N o	Name	Description
1	Search Bar	Search photo and video files by title, photo date, tag, rating, or color label.
2	Browsing Mode	Switch between different browsing modes (from left to right: thumbnail browsing mode/list browsing mode/timeline browsing mode/folder browsing mode) to browse photos and videos.
3	Photo / Video Filter	Display photos, videos, or both.
4	Multi-Select	Select multiple items at the same time.
5	Slideshow	Play selected photos as a slideshow and click the down arrow to choose the slideshow speed, effect and background music.
6	Resizing Bar	Resize photos or videos.
7	Refresh	Refresh the current page.
8	Settings	Set content filters, bind with accounts on social networking sites and configure miscellaneous settings.

		<ul style="list-style-type: none"> <li>• Content Filter: Set shared folders as the content source of the Photo Station here. Use this feature to filter out (hide) undesired photos and videos and show only intended contents.</li> <li>• Social Network Binding: Switch to this tab, choose the accessible folders that can be accessed by your friends on the social networking sites and click "Bind with Facebook". After the account is bound successfully, your Facebook friends can log into the Photo Station (<a href="http://NAS_Name_or_IP/photo/">http://NAS_Name_or_IP/photo/</a>) with their account to browse photos from albums opened for them.</li> <li>• Miscellaneous: check "Always ask me to enter my password when accessing Private Collection and Qsync", and each time a user is trying to access those categories, that user will be prompted for password.</li> </ul>
9	Timeline	List photos or videos chronically as timeline.
10	Date Filter	Filter photos or videos by date.
11	Import	Import photos and videos.
12	Sharing	Choose to email, publish, or share the link of an album (this option is only available when the "Share with the public" option is checked in the album settings.)
13	Album Slideshow	Play all photos within an album as a slideshow.
14	Photo Map	Show the photo map. This feature is only available for photos with GPS coordinates; for photos with no GPS coordinates, please follow the steps in the Geotagging photos section to set their GPS coordinates.
15	Sharing History	Show the history of files that have been shared.
16	Tag Filter	Filter photos or videos by tag.

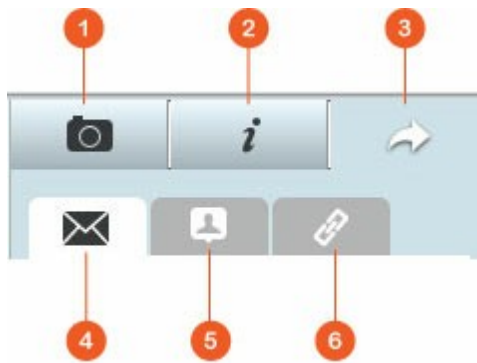
## Left Panel

- **Shared Photos:** List all photos and videos contained in all shared folders on the Turbo NAS (except photos and videos in the "/home" and "Qsync" folders) and all photos and videos are only visible to authorized users.
- **Private Collection:** List all photos and videos located in the "/home" folder, and those multimedia files can be viewed by yourself only.
- **Qsync:** List photos and videos synchronized from the Qsync service.
- **Album:** List all virtual albums. Note that all entries listed under an album are only links to the physical files. This can effectively conserve your NAS storage space, as you can keep only one copy of the photos even when you create an album for a special theme. For album operations, please refer to the section on Using Photo Station below.
- **Smart Album:** List all smart albums. Smart albums will only show photos or videos that match specific conditions chosen by users, such as today in history, random, tag and all files and can save you a lot of effort on photo management. For instructions on smart album operations, please refer to the section on Using Photo Station below.
- **Recently:** Include photos and videos recently imported (within a month) from local device or taken with a camera or recording device.
- **Trash Can:** All photos and videos deleted can be found here and right click the deleted items in the Trash Can to recover or permanently delete them. Note that only deleted physical files (instead of virtual links) will show up in the trash can.

### Note:

- The "/home" folder can only be accessed by its owner and NAS administrators. For your private photos, please consider storing them only in the "/home" folder.
- For configuration on media folders, please refer to the chapter on Multimedia Management<sup>[183]</sup>. For user setup and configuration, please refer to the "User<sup>[137]</sup>" section in the chapter on Privilege Settings.
- If the photos or videos uploaded do not show up in the Photo Station, please scan them with the Media Library and wait until the scan is finished. For details on the scan, please refer to the chapter on Multimedia Management<sup>[183]</sup>.

## Right Panel



N o	Name	Description
1	EXIF	Review photo/video EXIF information and photos can be geotagged here.
2	Information	Edit and browse photo/video details, tags and descriptions.
3	Sharing	Drag files to this area and share them via a link (including three methods: email, social sharing and link.)
4	Email	Share a link via email. Specify the sender, recipient, subject and message body of the email and click "Send" to send the email. Make sure your email account is properly configured. Go to "Control Panel" > "System Settings" > "Notifications" > "SMTP Server" for email configuration.
5	Social Sharing	Share a link with selected files on social networking sites. Specify the subject and message body and click the social networking site icon to share.

6	Link	Share a link by directly pasting it into an email or instant message. Under "Select Link Format", select the DDNS name, LAN IP or WAN IP address (note that the myQNAPcloud.com domain name is only available after it is registered in myQNAPcloud. Please refer to the chapter on myQNAPcloud Service for details) and HTML format (click to choose a URL link, HTML code, vB Forum code or Alt Forum code) from the drop down menu. Click "Create Link", specify the name of the album displayed on the page seen as recipients open the link. Copy and paste the URL link in the dialog window to your preferred applications.
---	------	--

**Note:** Multiple photos can be batch modified for their date taken property at the same time. To do so, please first select the photos, click the EXIF button on the right panel and modify the Date taken field.

## Using Photo Station

### Creating and managing albums

There are two approaches an album can be created:

1. Switch to the folder view, right click a folder and select "Create New Album" to turn that folder into an album.
2. Drag and drop photos or videos in "Album" on the left panel.

Right click an album and choose to download, remove, rename, email the link of, publish the link, share the link of that album, or modify the settings of that album (The email, publish, and share options are only available if "Share with the public" is enabled in "Album Settings".)

### Creating and managing smart albums

To create a smart album, please click + next to "Smart Album", specify the name of the album and specify the file type, content source and condition (today in history, random, tag and all files). Right click a smart album and choose to download, remove, rename, reset album settings, email the link of, publish the album or share the album with a link (The email, publish, and share options are only available if "Share with the public" is enabled in "Album Settings".)

## Sharing albums

As you create an album, you can choose to share it with other NAS users (choose whether all NAS users can edit the album, or only the album creator/administrator can edit the album) or the public (show this album on the QTS login page and please note that this option is only available for administrator,) or not to share at all (leave both options unchecked), and set the valid period on the album creation page.

### Note:

- As an administrator of the Photo Station, you can also share a public album on the NAS login screen (the photo wall style login screen can be set in "Control Panel" > "General Settings" > "Login Screen".)
- If an album is set to share with the public, users can click the photo wall on the login page to check the album.
- An exclamation mark will appear on the album thumbnail if the sharing period of that album has expired.

If an album is set to share with the public, you can right click that album and select "Email" to email it, "Publish" to publish it on social networking sites, or "Sharing Links" to generate and paste the album link on your blog, forum, or instant messenger programs. You can still edit the album content later, and the updated slideshows will be presented when viewers click the same link again.

On the other hand, you can also share photos from different albums as you do with the album. To do so, please click the "Sharing" button on the right panel, drag photos from different albums and drop photos under "Select Photos" on the right panel and use the "Email", "Social Sharing", or "Link" button to share those photos. Note that the difference between sharing an album and photos from different albums is that for an album, it is the entire album that you specifically created under "Album" on the left panel. For photos from different albums, they are photos you choose and pick from different albums.

To share photos with your friends on Facebook, please bind your Facebook account with the Photo Station in "Settings." After the account is bound successfully, your Facebook friends can log into the Photo Station ([http://NAS\\_Name](http://NAS_Name) or IP/photo/) with their account to browse photos from shared albums. To check the sharing history of a selected album, please first click that album and then the sharing history button on the main menu.

## Photo and Video Operations

Right click a photo or video, a drop down menu will show up, and users can choose to perform a desired action from the list.

Operation	Description
Viewing mode (eye icon)	Switch to viewing mode.
Rotation	Rotate the photo 90 degrees clockwise or counter-clockwise (for photos only.)
View / Play	Switch to viewing mode.
Open	Play the video (photo) in a browser window.
Open with VLC	Play the video in a browser window (please install the VLC plug-in first; for videos only.)
Sharing Link	Generate a sharing link (as URL, HTML, or script for vB Forum, or Alt Forum) for public albums only (albums that are set as public in "Album Settings").
Download	Download the photo and video.
Copy to Album	Copy the photo and video to an album.
Set as Cover	Set to display all photos contained in the album on the photo wall.
Add to Transcode	Convert the video to the following resolutions: 240P, 360P, 480P SD, 720P HD and 1080P Full HD (for videos only.)
Add to Sharing List	Add the selected photos or videos to the sharing list.
Edit (Pixlr Editor)	Edit the photo online (for photos only.)
Slideshow	Play the photos/videos in this album as a slideshow.
Remove	Delete photos or videos.
Set Coordinates	Set GPS information of a photo (for photos only.)
Add Tag	Add a tag to photos or videos.
Rating	Rate photos or videos.

Color Label	Color-label photos or videos.
-------------	-------------------------------

### Finding your photos and videos quickly

To quickly locate your photos and videos, please be sure to first rate or classify your photos and videos. To do so, please right click the photos or videos and then tag, rate or color label them. To batch mark or classify multiple photos or videos, first click the "Multi-select" button on the main menu or hold the Ctrl key on the keyboard, select your desired photos or videos and right click the photos or videos to perform desired actions. After photos or videos are tagged, rated, or color labeled, they can be searched by their rating, color label or tag in the search bar.

### Viewing photos and videos

Double click a photo to switch to viewing mode and use the buttons on the menu bar for viewing operations.



N o	Name	Description
1	Set as Cover	Set to display all photos contained in the album on the photo wall.
2	Slideshow	Play the photos/videos in this album as a slideshow.
3	Rotate	Rotate the photo counter-clockwise/clockwise by 90 degrees (for photos only.)
4	Previous Item	Play the last photo or video.
5	Next Item	Play the next photo or video.
6	Download	Download the photo or video.

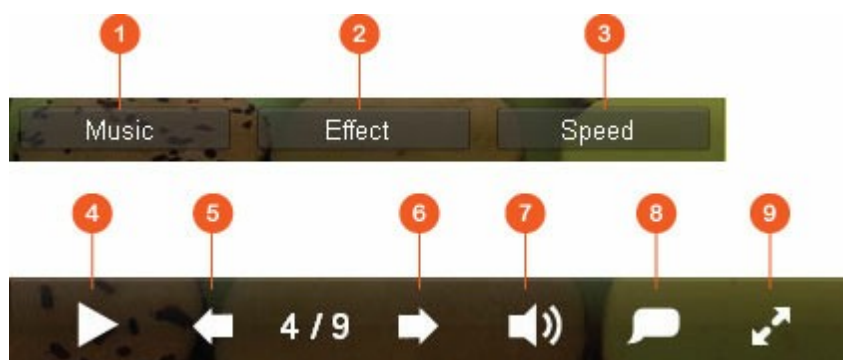


7	Delete	Delete the photo or video. Please note that the photos or videos deleted in the viewing mode will first be marked with an "X" on that photo or video and only deleted as you exit the viewing mode. To unmark a photo or video, first select the marked photo or video and click the trash can button again.
8	Hide/Show Preview Bar	Hide/show the preview bar.
9	Full Screen	View the photo or play the video in the full screen mode.

### Playing photos and videos as slideshow

A slideshow is a collection of photos that are played in a sequential fashion at an interval for your photo enjoyment. To play an album as slideshow, select an album and click "Slideshow" on the Menu Bar to switch to viewing mode.

Use the buttons on the menu bar for slideshow or album operations.



N o	Name	Description
1	Music	Switch between different playlists defined in the Music Station (from the "Playlist", personal playlist and shared playlist on the left panel.) Please refer to the chapter on Music Station for details.
2	Effect	Set a different slide transition effect.
3	Speed	Set the slide speed.
4	Play / Pause	Play / Pause the slideshow.

5	Last Slide	Go to the last slide.
6	Next Slide	Go to the next slide.
7	Background Music	Turn the background music on or off.
8	Title	Show the photo title.
9	Download	Choose to download the played photo or all photos in the slideshow. Note that the photo(s) downloaded will be resized to save network bandwidth.
1 0	Full Screen	Switch between the full screen mode and window mode.

### Geotagging photos and photo map

To geotag a photo, first select a photo, click "Large Map" under the EXIF tab. Enter the name of the location in the search bar on top and hit the Enter key in your keyboard. Right click the map and click "Set Coordinates". To view photos on a photo map, please first click an album and the "photo map" button on the main menu. This feature is only available for photos with GPS coordinates; for photos with no GPS coordinates, please follow the steps above to set their GPS coordinates.

### Media Library and Privacy Settings

Photo and video files in the Photo Station are listed and displayed according to shared folder privileges and media folders settings in the Media Library<sup>[183]</sup>. For shared folder privileges, only users with an appropriate permission to a shared folder can view its contents in the Photo Station. For example, if a user does not have read/write, or read-only permissions to a certain shared folder, that user cannot see the photos and videos in the shared folder.

#### Note:

- For x86 based NAS models, all shared folders except the "/recording" and "/web" shared folders are media folders by default; while for ARM based NAS models, only "/multimedia" and "/homes" are media folders by default. However, users can always add media folders manually.

- Besides shared folder privileges, you can also import your private photos and videos to your "/home" shared folder to hide them from other NAS users (except the NAS administrator; and your "/home" folder can be found under "Private Collection", and anyone attempting to access this folder in the Photo Station will be prompted for password.)
- To create a shared folder, please go to "Control Panel" > "Privilege Settings" > "Shared Folders".

Photos and videos stored in the media shared folders are only visible after they are detected and scanned by the Media Library. To set the Media Library to scan for photos and videos manually or by schedule, please go to "Control Panel" > "Multimedia Management" > "Media Library". For details on media folder settings, please refer to the chapter on Multimedia Management.

**Note:** As the media folders in the Media Library are shared by the Photo Station, Music Station, Video Station and DLNA Media Server as the source of their contents, the contents will be affected in those applications if new media folders are added or existing media folders are removed from the Media Library.

## 8.6 Music Station

The Music Station (4.0) helps you create a personal music center on the cloud. This web-based application is designed for users to play music files on the NAS or a media server, listen to thousands of Internet radio stations using a web browser and share your music collections with your friends and families. Your music collection stored on the Turbo NAS is automatically organized into categories for easy access.



### Starting Music Station

Depending on your NAS model, the Music Station should be enabled by default and can be launched from the Desktop or the Main Menu. If not, please go to the App Center and make sure that the Music Station has been installed and enabled first (QTS 4.1 or later versions only) and follow the steps below to prepare for the Music Station:

1. Upload music files to a shared folder on the NAS. There are three approaches you can upload music files to the NAS: 1) Install Qfinder on your PC or Mac, set up a network drive and upload files to your preferred shared folders. For details on setting up a network drive, please check the chapter on Connecting to NAS Shared Folders<sup>[24]</sup>; 2) Click "Songs" or "Private Collection" on the left panel and click (up arrow icon) or Click (up arrow icon) to import music files from the local PC. A new shared folder named with the date that files are uploaded will be created on the Turbo NAS to store your uploaded files (for "Songs", this newly created shared folder is located under the "Multimedia" folder; for "Private Collection", this shared folder is located under the "/home" folder.) The newly uploaded music files can be found under "Recently Added" on the left panel; 3) Switch to the folder view browsing mode and drag and drop music files to a preferred folder. Note that with

the first and third approach, you can choose which folder on the NAS that you would like to upload music files into.

**Note:**

- The admin login credential of the Music Station is the same as that of the NAS administrator.
- Users are recommended to upload or copy music files to the media folders and scan them using the Multimedia Management if this is the first time the Music Station is launched. For details on media folders, please refer to the chapter on Multimedia Management<sup>[183]</sup>.

2. Launch the Music Station from the Main Menu or the Music Station shortcut on the Desktop or log directly into the Music Station (type [http://NAS\\_Name\\_or\\_IP/musicstation/](http://NAS_Name_or_IP/musicstation/) into a web browser.)

## Familiarizing yourself with Music Station

### Menu Bar



N o	Name	Description
1	Search Bar	Search songs by artist, album, title, or all songs.
2	Browsing Mode	Switch between different browsing modes (from left to right: thumbnail browsing mode/detail browsing mode/album list browsing mode/cover flow browsing mode/folder browsing mode) to browse music files.
3	Multi-Select	Select multiple items at the same time.
4	Resizing Bar	Drag to adjust the size of the thumbnails.
5	Settings	Set user privileges on file access, NAS audio output, Internet radio, or editing song information.
6	Music Alarm	Set the music alarms.

## Player



N o	Name	Description
1	Previous Item	Play the previous item.
2	Play / Pause	Play / Pause.
3	Next Item	Play the next item.
4	Shuffle	Shuffle on/off.
5	Seek Bar	Control the playback progress.
6	Repeat	No repeat, repeat once, or repeat all.
7	Streaming Mode	Stream the music files to the computer or the device and play them using a web browser.
8	Volume	Adjust the volume.

## Left Panel

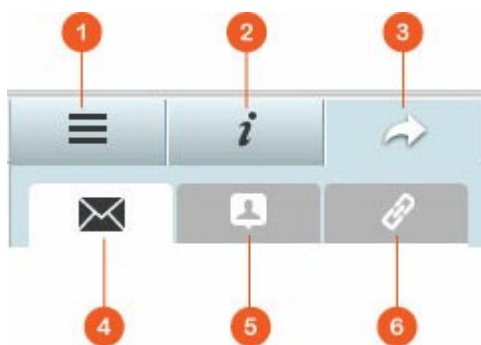
- Songs, Artist, Album, and Genre: All authorized music files are listed here for users by the following categories: all songs, artist, album, genre and folder. Click the upload button next to Songs to upload songs from your PC. All imported contents are saved in the "/Multimedia" shared folder named with date.
- Now Playing: Songs in the "Now Playing" list can be reordered by drag-and-drop, or removing songs from the list.
- Private Collection: Personal music files in the "/home" folder are listed here. The music files belong only to the user that is currently logged in.
- Qsync: List music files synchronized from the Qsync service.
- Playlist: Playlists can be created, managed, and deleted here. Up to 200 playlists can be created, and up to 600 items can be included in each playlist. To create a playlist, click "+" next to "Playlist". To add items to a playlist, simply drag and drop music files to the list. Right click a playlist to rename or delete it, or add it to "Now Playing".

- **My Favorites:** All songs rated at least 1 star are listed here. All un-starred songs will be removed from here. To rate a song, switch to the detail, album list, or cover flow browsing mode and click the star(s) under "Rating".
- **Recently Added:** Songs recently added to the Media Library are listed here.
- **Frequently Played:** Songs most frequently played are listed here.
- **My Favorite Radio:** User's favorite Internet radio stations can be added by entering the radio URL or by searching TuneIn Radio. A maximum of 1024 items are supported. Please note that the type of files the radio station URL points to must be MP3.
- **TuneIn:** Users can browse and play Internet radio stations streamed by TuneIn.
- **Trash Can:** All deleted music files can be found in here and permanently deleted or restored. Trash Can is always enabled.

**Note:**

- Characters not allowed for "Playlist" include: / | \ : ? < > \* " ' and \$.
- Entries under "Recently Added" are listed based on the time they are scanned by the Media Library.
- The Music Station only supports the following file formats: AIFF, APE, FLAC, M4A, M4A Apple Lossless (ALAC), MP3, Ogg Vorbis, WAV (PCM, LPCM), WMA, WMA PRO, WMA VBR.

**Right Panel**



N	Name	Descriptions
1	Lyrics	Add lyrics to a song and browse them here.
2	Information	Edit and browse music details here.
3	Sharing	Drag music files to the area under "Songs" to share them via a

		link (including three methods: email, social sharing and link.)
4	Email	Share the link via email. Specify the subject and message body of the message and click "Send" to send the email. Make sure your email account is properly configured. Go to "Control Panel" > "System Settings" > "Notification" > "SMTP Server" for email configuration.
5	Social Sharing	Share a link with selected songs on social networking sites. Specify the subject and message body and click the social networking site to share.
6	Link	Share a link by directly pasting it into an email or instant message. Under the "Link Code", select the domain name, LAN IP or WAN IP address for the link (Note that the myQNAPcloud.com domain name is only available after it is registered in myQNAPcloud. Please refer to the chapter on myQNAPcloud Service for details) from the drop down menu. Click "Save", and copy and paste the URL link in the dialog window to your preferred applications.

## Using Music Station

### Import music files

Please refer to the section on Starting Music Station.

### Creating and managing playlists

To create a playlist, please drag and drop music files in "Playlist" on the left panel, give that playlist a name and click "OK". Right click a playlist and choose to add it to "Now Playing" on the left panel, email the link of it, publish it, share it with a link, delete it, rename it, or modify the settings of that playlist (the email, publish, and share options are only available if "Share with the public" is enabled in "Playlist Settings".)

### Sharing playlists

As you create a playlist, you can choose to share it with other NAS users (choose whether all NAS users can edit the playlist, or only the album creator/administrator can edit the playlist,) the public, or not to share at all (leave both options unchecked), and set the valid period on the playlist creation page. If a playlist is set to share with the public, you can right click it and select "Email" to email it, "Publish" to publish it on



social networking sites, or "Link Code" to generate and paste the playlist link on your blog, forum, or instant messenger programs. You can still edit the playlist later, and the updated playlist will be presented when viewers click the same link again.

On the other hand, you can also share a list of songs as you do with the playlist. To do so, please click the "Sharing" button on the right panel, drag and drop songs under "Songs" on the right panel from the middle and use the "Email", "Social Sharing", or "Link" button to share this list of songs. Note that the difference between sharing a playlist and a list of songs is that for a playlist, it is the entire playlist that you created under "Playlist" on the left panel. For a list of songs, it is a list of songs you choose and pick from different albums.

### **Finding your music files quickly**

To quickly locate your music files, please be sure to first rate or classify them:

- To rate a music file, please first find it in the detail browsing mode/album list browsing mode/cover flow browsing mode and rate it.
- To classify a music file, please click the music file and "Info" on the right panel to modify its data.
- To batch rate or modify music files, first click the multi-select button on the Main Menu or hold the Ctrl key on the keyboard, select your desired music files and rate and modify all at once.

After music files are rated or classified, they can be searched by their artist, album, or title in the search bar or quickly listed in "My Favorites" on the left panel.

### **Media Library and Privacy Settings**

Music files in the Music Station are listed and displayed according to shared folder privileges (media folders) and settings in the Media Library. For shared folder privileges, only users with an appropriate permission to a shared folder can view its contents in the Music Station. For example, if a user does not have read/write, or read-only permissions to a certain shared folder, that user cannot see the music files in the shared folder.

#### **Note:**

- Besides shared folder privileges, you can also import your private music files to your "/home" shared folder to hide them from other NAS users (except the NAS

administrator; and your "/home" folder can be found under "Private Collection".)

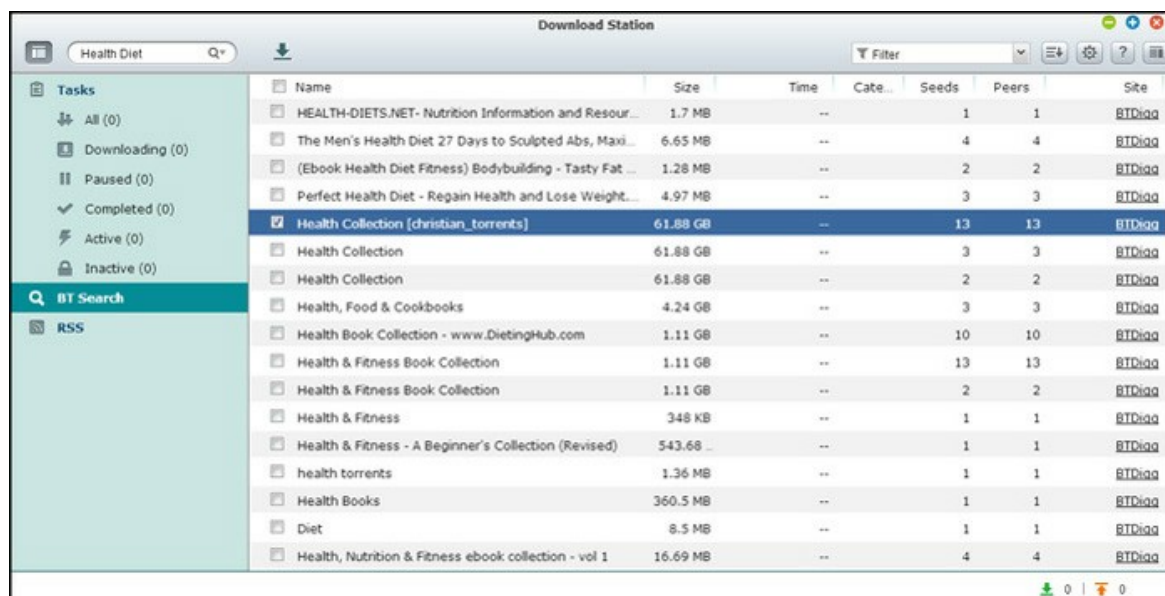
- To create a shared folder, please go to "Control Panel" > "Privilege Settings" > "Shared Folders".

Music files stored in the media shared folders are only visible after they are detected and scanned by the Media Library. To set the Media Library to scan for music files manually or by schedule, please go to "Control Panel" > "Multimedia Management" > "Media Library". For details on media folder settings, please refer to the chapter on Multimedia Management.

**Note:** As the media folders in the Media Library are shared by the Photo Station, Music Station, Video Station and DLNA Media Server as the source of their contents, the contents will be affected in those applications if new media folders are added or existing media folders are removed from the Media Library.

## 8.7 Download Station

The Download Station is a web-based download tool enabling you to download files from the Internet through BT, PT, Magnet Link, HTTP/HTTPS, FTP/FTPS, and subscribe to RSS feeds. With the BT Search function, you can easily find BT seeds to download and make your NAS as 24/7 download center.



**Important:** The Download Station is provided for downloading authorized files only. Downloading or distribution of unauthorized materials is against the law and may result in severe civil and criminal penalties. Users should be aware of the fact that they are subject to copyright restrictions and responsible for the consequences of their actions.

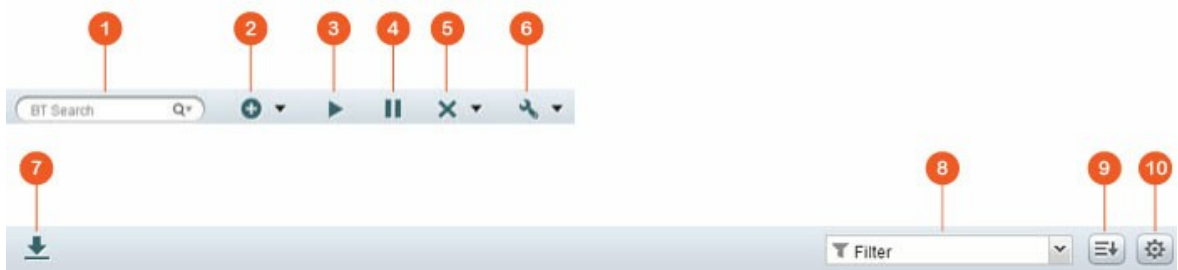
**Note:** For PT download, the supported client applications vary based on the PT sites. If the Download Station (libtorrent) is not in the client application list recommended by your PT sites, please search for an alternative one in the App Center.

### Starting Download Station

Depending on your NAS model, the Download Station should be enabled by default and can be launched from the Desktop or the Main Menu. If not, please Go to the App Center and make sure that the Download Station has been installed and enabled first (QTS 4.1 or later versions only.) Launch the Download Station from the Main Menu or the Download Station shortcut on the Desktop or log directly into the Download Station (type [http://NAS\\_Name\\_or\\_IP/cgi-bin/Qdownload/qdownloadindex.cgi](http://NAS_Name_or_IP/cgi-bin/Qdownload/qdownloadindex.cgi) into a web browser.)

**Familiarizing yourself with Download Station**

**Menu Bar**



N o	Name	Description
1	Search Bar	Enter a keyword in the search bar, click the magnifier button to select the search engines and press enter to search for BT seeds. Please note that the BT search feature is only available after you agree to the terms and conditions in "Settings" button on the main menu > "BT" > "BT Search".
2	Add	Add a BT seed by entering the URL or upload a torrent file from the local PC.
3	Start	Start BT tasks.
4	Pause	Pause BT tasks
5	Remove	Remove BT tasks or remove BT tasks and their data
6	Action	Start all, pause all, or pause all download tasks for a specified time period, remove all completed tasks, remove all completed tasks and delete data.

7	Download	After you select the BT seeds from the search result, click this button to download them.
8	Filter	Enter a keyword in the box or click the drop down list to select the categories and filter the searched BT seeds.
9	Sort	Sort tasks by dates that tasks are created or task types.
1 0	Settings	Configure BT or RSS settings (refer to the Download Station Settings section below for details.)

### Left Panel

- **Tasks:** List all BT tasks based on their download status (All, Downloading, Paused, Completed, Active and Inactive.) Right click a task to start, pause, set priority and remove a BT task (and its data) and edit downloads.
- **BT Search:** List all BT seeds searched using the BT Search Bar. Right click a searched BT seed to download that seed (create a task), open the link URL, or download the torrent file.
- **RSS:** List, add, edit, delete or update RSS feeds.

### Download Station Settings

Click "Settings" to configure the Download Station.

### Global Settings

- **Download Schedule:** Select continuous download or specify the download schedule. When setting the download schedule, select "Full speed" to use the global speed limit (unlimited) for all the download tasks. Select "Limited" to apply the speed limit settings of the downloaded services.
- **Location of Downloaded Files:** Specify the default directory on the NAS for the downloaded files.
- **Notification:** Select to send a notification by email when a download task has completed. Note that the SMTP settings must be configured properly in "System Settings" > "Notification".

### HTTP

- **Connection:** Specify the maximum number of concurrent HTTP downloads.

- **Bandwidth Limit:** Specify the maximum download rate of HTTP download tasks. 0 means no limit (for Intel-based NAS models, the maximum number of concurrent HTTP and FTP downloads is 30, while that number is 10 for ARM-based (Non Intel-based) NAS.)

## **FTP**

- **Connection:** Specify the maximum number of concurrent FTP downloads.
- **Bandwidth Limit:** Specify the maximum download rate of FTP download tasks. 0 means no limit (for Intel-based NAS models, the maximum number of concurrent HTTP and FTP downloads is 30, while that number is 10 for ARM-based (Non Intel-based) NAS.)

## **BT**

- **Connection Setting:**
  - Specify the ports for BT download. The default port numbers are 6881-6889.
  - Enable UPnP port mapping: Enable automatic port mapping on the UPnP supported gateway.
  - Enable DHT network: To allow the NAS to download the files even no trackers of the torrent can be connected, enable DHT (Distributed Hash Table) network and specify the UDP port number for DHT.
  - Protocol encryption: Enable this option for encrypted data transfer.
- **Bandwidth Limit:** Specify the maximum download rate of BT download tasks. 0 means no limit.
  - **Global maximum concurrent downloads:** Specify the maximum number of concurrent BT downloads (for Intel-based NAS models, the maximum number of concurrent downloads is 30, while that number is 10 for ARM-based (Non Intel-based) NAS.)
  - **Global maximum upload rate (KB/s):** Enter the maximum upload rate for BT download. 0 means no limit.
  - **Global maximum download rate (KB/s):** Enter the maximum download rate for BT download. 0 means no limit.
  - **Maximum upload rate per torrent (KB/s):** Enter the maximum upload rate per torrent. 0 means no limit.
  - **Global maximum number of connections:** This refers to the maximum number of allowed connections to the torrent.
  - **Maximum number of connected peers per torrent:** This refers to the maximum number of allowed peers to connect to a torrent.

- **Seeding Preferences:** Specify the share ratio for seeding a torrent and the sharing time. The share ratio is calculated by dividing the amount of uploaded data by the amount of downloaded data.
- **Proxy:** specify the proxy server for BT download. Select the proxy type and fill in the host IP and port, login username and password for the proxy server. For details on the setup of the proxy server, please refer to its user manual.
- **BT Search:** Select the BT engines to enable for BT search on the Download Station.

### **File Hosting Account**

You can save the login information of maximum 64 HTTP and FTP accounts. To add login information, click "Add Account". Enter the host name or IP, username and password. To allow the login information to appear for account selection when configuring HTTP or FTP download, select "Enabled" next to the newly added account. Click "Apply" to confirm or "Cancel" to cancel. To edit the settings of an account, select an entry on the list and click "Edit Account". To delete an account, select an entry on the list and click "Delete Account".

### **RSS**

**Update:** Enable RSS download and specify the time interval to for the NAS to update the RSS feeds and check if any new contents that match the filters are available.

### **Using Download Station**

#### **Adding download task(s)**

There are three approaches you can add download tasks:

1. Drag and drop BT/PT files from the local PC to Download Station or click "+" button to add BT/PT files or multiple URLs (HTTP/FTP/Magnet link).
2. You can search BT files through BT search function to add download tasks.
3. In "RSS" on the left panel, you can add RSS feeds. The Download Station will load all feeds in RSS feeds for you to download.

#### **Note:**

- The maximum number of concurrent downloads for an Intel-based NAS is 60 (30 BT/PT downloads, 30 HTTP+FTP downloads)
- The maximum number of concurrent downloads for an ARM-based NAS is 20 (10 BT/PT downloads, 10 HTTP+FTP downloads)

- Drag and drop BT files from PC to the Download Station is supported on Chrome and Firefox browsers.

### **Adding HTTP, FTP, Magnet download tasks**

To add an HTTP, FTP, or Magnet download task, click "Start" on the Menu Bar. Enter the URL of the download task (one entry per line). Then select the download type: HTTP/FTP, or Magnet Link. If a username and password is required to access the file, select "Use credentials" and select a pre-configured account (Settings > Account List) or enter a username and password. Then click "OK". The NAS will download the files automatically.

**Note:** You can only enter maximum 30 entries at one time.

### **Managing downloads in a BT seed**

You can right click a task and select "Edit Downloads" to select only the files within a BT seed that you would you like to download.

### **Limiting the download/upload speed**

To limit the bandwidth usage of the Download Station, please configure the settings in "Settings" > "HTTP", "FTP", or "BT" > "Bandwidth Limit".

### **Scheduling downloads**

To set download schedules, please go to "Settings" > "Global" > "Download Schedule". After enabling the download schedule, please select "Full speed", "Turn off", or "Limited" and then click the time slots that you prefer.

### **Sending a notification after a download task is complete**

Please go to "Settings" > "Global"> "Notification" and enable "Email".

### **Subscribing to and managing RSS feeds**

You can subscribe to RSS feeds using the Download Station and download the torrent files in the feeds:

1. Click "+" next to "RSS" on the left panel to add an RSS feed.
2. Enter the URL and the label.
3. To download a torrent file from an RSS feed, select the file and click the down arrow button or right click the feed and select "Download".



4. The NAS will start to download the file automatically. You can view the download status in the Downloading list.

To manage the RSS feeds subscription, right click an RSS feed label. You can open the RSS Download Manager, add, update, edit, or delete an RSS feed.

### **Downloading torrent files using RSS Download Manager**

You can use RSS Download Manager to create and manage filters to download particular torrent files for BT Download.

- To add a filter, first launch RSS Download Manager, select a label and click "Add".
- Enter the filter name and specify the keyword to include and exclude.
- Select the RSS feed to apply the filter settings.
- You may also specify the quality of the video torrent files (leave it as "All" if you do not need this function or the torrent file is not a video.)
- Episode number: Select this option to specify particular episodes or a serial of episodes of a drama work. For example, to download episodes 1-26 of season 1 of a TV program, enter 1x1-26. To download only episode 1 of season 1, enter 1x1.
- Select the time interval for automatic update of the RSS feeds. The NAS will update the RSS feeds and check if any new contents that match the filters are available.
- Click "Apply" to save the filter or "Cancel" to cancel or exit.
- To delete a filter, select the filter from the list and click "Delete".

### **Shortening BT seeding time**

Please go to "Settings" > "BT" > "Bandwidth Limit">"Seeding Preferences".

You can change the "Share Ratio "to a smaller percentage or modify "Share Time" to shorten BT seeding time.

**Tip on shortening BT seeding time:** Please go to "Settings" > "BT" > "Bandwidth Limit">"Seeding Preferences". You can change the "Share Ratio "to a smaller percentage or modify "Share Time" to shorten BT seeding time.

**Tip on slow BT download rates or download errors:** The common reasons for slow BT download rate or download error are as below:

1. The torrent file has expired, the peers have stopped sharing this file, or there is error in the file.
2. The NAS has configured to use fixed IP but DNS server is not configured, or DNS server fails.

3. Set the maximum number of simultaneous downloads as 3-5 for the best download rate.
4. The NAS is located behind NAT router. The port settings have led to slow BT download rate or no response. You may try the following means to solve the problem:
  - a. Open the BT port range on NAT router manually. Forward these ports to the LAN IP of the NAS.
  - b. The new NAS firmware supports UPnP NAT port forwarding. If your NAT router supports UPnP, enable this function on the NAT. Then enable UPnP NAT port forwarding of the NAS. The BT download rate should be enhanced.

## 8.8 HybridDesk Station

The HybridDesk Station is a platform where the famous XBMC application or Chrome browser can be installed to let you directly play back your NAS multimedia contents or browse the internet websites on the TV screen thru the HDMI interface.



**Note:** Currently, the HybridDesk Station is supported by the TS-x69L, TS-x69 Pro, TS-x70 and TS-x70 Pro Turbo NAS models.

### Setting up HybridDesk Station

Create your lovely media environment by following the steps below:

#### 1. Setting up the environment of the HybridDesk Station: Connect the NAS to the HDMI TV with a HDMI cable

- Remote controller: There are 4 different ways to control the HybridDesk Station.
  - QNAP remote controller
  - MCE remote controller
  - USB keyboard or mouse
  - Qremote: QNAP remote app, exclusively designed for the HybridDesk Station.

**Note:** If you want to use the Chrome to browse an internet website, you are required to use the mouse function on the Qremote or use the USB mouse directly connected to the NAS.

## 2. Installing the HybridDesk Station

- Go to "Applications" > "HybridDesk Station" and click the "Get Started Now" button. Then, the system will install the HybridDesk Station automatically.

## 3. Choosing the applications to install

- HybridDesk Station: The HybridDesk Station portal, which allows you to use the following applications on the TV screen.
- XBMC: An application for you to operate and enjoy your multimedia data on the TV screen.
- Chrome: With the help of Chrome, the QNAP Turbo NAS brings endless web content to your HDTV. Just sit back, relax, and surf the Internet on your couch.
- YouTube: Simply browse and click to enjoy millions of YouTube videos on your TV.
- My NAS: An application for you to enter the local NAS administration web page to view the NAS functions and settings.
- Surveillance Station (Local Display): An application that allows Turbo NAS devices to output high-resolution video from IP cameras.

### Note:

- Keeping staying at XBMC, Chrome, or other applications could affect the hard drive hibernation of the NAS. Please always exit the application and return to the HybridDesk Station portal.
- Press the power button on the remote control for 6 seconds anytime to exit an application.
- Press the one touch copy button on the NAS for 6 seconds to restart the HybridDesk Station.
- For the best HybridDesk Station experience, QNAP recommends upgrading the memory on your TS-x69 Series Turbo NAS to 2GB or more.
- To use the AirPlay function provided by XBMC, please upgrade the memory on your TS-x69 Series Turbo NAS to 2GB or more.
- The HybridDesk Station will restart when formatting an USB external device.
- The first time XBMC is launched, it will index the "Multimedia" shared folder and it may consume a lot of system resources if the folder contains a lot of multimedia files.

After installation, please choose your preferred language on the TV screen. Then, you will see the HybridDesk Station portal as shown below.



**4. Enjoying the HybridDesk Station: At the HybridDesk Station portal, simply choose the application you want to use to start enjoying the service.**

Enjoy the comfort of your living room and play movies, photos, and music directly on your TV by XBMC or other applications.

**Taking Pictures with Smart Phone and Watching them on TV**

The first part is done by Qfile on your phone:

- a. Use Qfile to browse your NAS.
- b. Choose the multimedia shared folder.
- c. Select the upload function.
- d. Take a picture and upload it to the NAS.

The second part is performed by the HybridDesk Station on your TV:

- e. Turn on your TV and choose XBMC.
- f. Choose "Pictures".
- g. Select the "Multimedia" folder.
- h. Double click the picture you just uploaded.

**Viewing Photos on your USB Device or Camera**

Steps:

1. Connect your USB device or camera to the USB port of your NAS.

2. Choose "Pictures".
3. Choose "USB Disk".
4. Select the photo you want to view.

### **Importing Media Contents to your NAS**

Use one of the several types of network protocols (Samba, AFP, FTP, and NFS) to save the media content files in the "Multimedia" or "Qmultimedia" shared folder, or copy them from an external USB or eSATA device.

To browse the media contents in different folders other than the default "Multimedia" shared folder, perform the following steps:

1. Choose "Files" under "Videos".
2. Choose "Add Videos".
3. Click "Browse".
4. Choose "Root filesystem".
5. Choose "share".
6. If you want to add the "Download" shared folder, for example, choose "Download" like below. Otherwise, just choose the shared folder you would like to add as a video source.
7. Click "OK" to add this source.
8. You will see the "Download" shared folder in the list.

#### **Note:**

- If you encounter any video playback quality issues with some video formats, you may enable the following settings on the XBMC: Go to "Setting" > "Video" > "Playback", and then enable "Adjust display refresh rate to match video" and "Sync playback to display".
- Depending on the data type, some files may not be playable.

### **Chrome**

Select the Chrome application at the main page of the HybridDesk Station. You may surf the web like using a web browser on your PC.

**Note:** In order to use this application, you are required to use the mouse function on the Qremote, or use the USB mouse directly connected to the NAS.

### **Surveillance Station (Local Display)**

Monitor IP cameras and playback recordings stored on the Turbo NAS.

### **YouTube**

Enjoy the YouTube contents via the HybridDesk Station.

### **MyNAS**

Enter the local NAS administration web page to view the NAS functions and settings.

## **Configuring HybridDesk Station**

Configure the HybridDesk Station by choosing "Settings" at the HybridDesk Station portal.

- App: The applications can be enabled or disabled in this feature.
- Display: Here you may change the screen resolution and set up to turn off the screen after an amount of idle time.
- Preferences: Here you may change the language or type of remote control and audio output. The default setting is HDMI. If you have a USB sound card installed, you can choose that option in the NAS Audio Output.

#### **Note:**

- Only the QNAP remote or MCE remote control is supported. NOT all the TS-x69 models support the internal remote control and the TS-x70 models only support the MCE remote control.
- Currently, the HDMI Audio Passthrough is not supported for the TS-x69 series.

## **Remote Control**







	RM- IR001 Remote Control		Action	MCE Remote Control		XBMC Function	HybridDe sk Station
Power	Power	1	N/A	Power	1	Power menu	
	Mute	2	OK	Mute	1 3	Mute	

Numb er	0,1,2,3,4 ,5,6,7,8, 9	3	OK	0,1,2,3,4, 5,6,7,8,9	1 8	0,1,2,3,4, 5,6,7,8,9	
	Vol+, Vol-	4	OK	Vol+, Vol-	1 2	Vol+, Vol-	
	List/Icon	5	N/A			View mode	
	Search	6	N/A				
	TV Out	8	N/A				
	Settings	7	N/A			Settings	
Short cut	Red - (Home)	9	OK	Red - (Home)	3	Home	
	Green (Video)	1 0	OK	Green (Video)	4	Video menu	
	Yellow (Music)	1 1	OK	Yellow (Music)	2 2	Music menu	
	Blue (Picture)	1 2	OK	Blue (Picture)	2 3	Photo menu	
Video Menu	Bookmar k	1 3	N/A			Favorite	
	Repeater	1 4	N/A			Repeater	
	Guide	1 6	N/A			Help	
	Record	1 5	N/A				
	CH-	1 7	Previou s	Previous	3 2	Skip back	
	CH+	1 8	Next	Next	3 3	Skip forward	

	Go to	20	N/A			Video progress bar	
	Info	19	OK	Info	10	File info	
Play Control	Home	21	OK			Home menu	
	Resume	22	N/A			Now playing	
	Return	28	OK	Back	7	Back	
	Options	29	N/A	More		Playback menu	
	OK	25	OK	OK	7	OK	OK
	Up	23	OK	Up	7	Up	Up
	Down	26	OK	Down	7	Down	Down
	Right	27	OK	Right	7	Right	Right
	Left	24	OK	Left	7	Left	Left
Video Play	Move backward	30	OK	Move backward	16	Move backward	
	Move forward	31	OK	Move forward	31	Move forward	
	Play	32	OK	Play	15	Play	

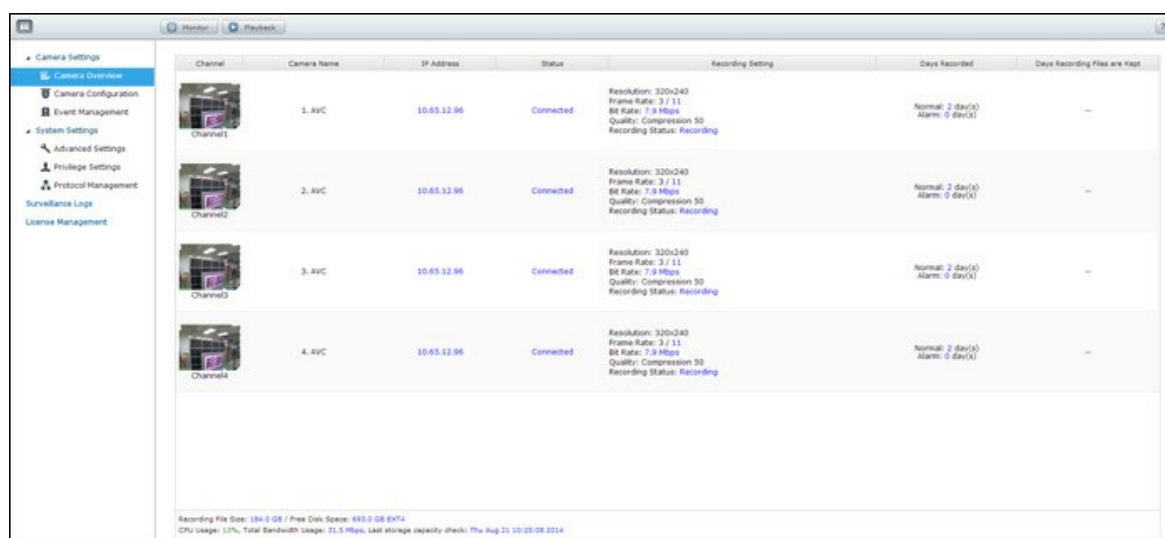
	Slow	3 3	N/A			Slow	
	Pause	3 4	OK	Pause	3 0	Pause	
	Stop	3 5	OK	Stop	3 3	Stop	
Video Setti ng	Audio	3 6	Audio List			Language track	
	Top/ Menu	3 7	Video List			Movie menu	
	Subtitle	3 8	OK	Subtitle	2	Subtitle track	
	Zoom	3 9	N/A			Zoom	
	Pop up	4 0	N/A			Movie menu	
	Angle	4 1	N/A			Angle	
Input				Clear (N/ A)	1 9	Clear	
	OK			Enter	3 4	Confirm	
				Switch 16:9 / 4:3	2 7		

#### Additional Reference:

- How to use Surveillance Station (Local Display) in HD Station.

## 8.9 Surveillance Station

The Surveillance Station enables users to configure and connect many IP cameras at the same time and manage functions including live audio & video monitoring, recording, and playback. Installation and configuration can be easily carried out remotely in a web browser in a few steps. Various recording modes are provided: continuous recording, motion-detection recording, and scheduled recording and users can flexibly define the recording settings according their security plans. The Surveillance Station supports a large number of IP camera brands. For supported cameras, please check <http://www.qnap.com/en/index.php?sn=4056>.



Channel	Camera Name	IP Address	Status	Recording Setting	Days Recorded	Days Recording Files are kept
Channel1	1. xVC	10.65.12.96	Connected	Resolution: 320x240 Frame Rate: 3 / 11 Bit Rate: 7.9 Mbps Quality: Compression 50 Recording Status: Recording	Normal: 2 day(s) Alarm: 0 day(s)	--
Channel2	2. xVC	10.65.12.96	Connected	Resolution: 320x240 Frame Rate: 3 / 11 Bit Rate: 7.9 Mbps Quality: Compression 50 Recording Status: Recording	Normal: 2 day(s) Alarm: 0 day(s)	--
Channel3	3. xVC	10.65.12.96	Connected	Resolution: 320x240 Frame Rate: 3 / 11 Bit Rate: 7.9 Mbps Quality: Compression 50 Recording Status: Recording	Normal: 2 day(s) Alarm: 0 day(s)	--
Channel4	4. xVC	10.65.12.96	Connected	Resolution: 320x240 Frame Rate: 3 / 11 Bit Rate: 7.9 Mbps Quality: Compression 50 Recording Status: Recording	Normal: 2 day(s) Alarm: 0 day(s)	--

Recording File Size: 134.0 GB / Free Disk Space: 693.0 GB EXT4  
CPU usage: 12%, Total Bandwidth usage: 31.6 Mbps, Last storage capacity check: Thu Aug 22 10:28:09 2014

## Setting up Surveillance System

Follow the steps below to set up your surveillance system:

1. Planning Network Topology
2. Setting up IP Cameras
3. Configuring the Surveillance Station on the QNAP NAS

### Planning Network Topology

Plan your home/office network before setting up the surveillance system. Consider the following when doing so:

- The IP address of the NAS
- The IP address of the cameras
- The IP address of your router and the wireless SSID

The computer, the NAS, and the IP cameras should be connected to the same router on the LAN. Assign static IP addresses for the NAS and the IP cameras. For example:

- Router IP: 192.168.1.100
- Camera 1 IP: 192.168.1.10 (fixed IP)
- Camera 2 IP: 192.168.1.20 (fixed IP)
- NAS IP: 192.168.1.60 (fixed IP)

## Setting up IP Cameras

Follow the steps below to set up IP cameras:

1. Download an IP camera finder from the camera vendor's official website.  
Connect the IP camera to the local area network with a network cable and run the IP camera finder. Set the IP address of the cameras (192.168.1.100 in our example) so that they are on the same LAN as the computer.
2. Enter the web configuration page of the IP camera. You will then be able to view the monitoring image.
3. Configure the IP settings of the camera on the web configuration page.
4. Repeat the above steps to set up the second camera.

### Note:

- For details on relevant IP camera setup steps, please refer to the user manual of the IP camera.
- The default IP and administrator login ID/password may differ based on what camera model is used.

## Configuring the Surveillance Station on the QNAP NAS

1. Go to "Control Panel" > "System Settings" > "Network" > "TCP/IP" and press the "Edit" button to specify a fixed IP to the NAS: 192.168.1.60. The default gateway should be the same as the LAN IP of your router, which is 192.168.1.100 in our example.
2. Go to "Control Panel" > "Applications" > "Station Manager" > "Surveillance Station", check "Enable Surveillance Station" and click "Apply" button to save the settings. Then, click on the link below the "Enable Surveillance Station" and go to its page.
3. In the Surveillance Station, please go to "Camera Settings" > "Camera Configuration", select "Add" to add the camera configuration, e.g. name, model, IP address, recording setting and recording schedule and click "Next".

**Note:** Before applying the settings, you may click "Test" on the right to ensure the connection to the IP camera is successful.

Enable or change the recording option of the camera in the next page. Click "next" to move to the next page. On this page, you will see the "Schedule Settings". In the table, 0~23 represents the time period. For example, 0 means 00:00~01:00, 1 means 01:00~02:00. You can set a continuous recording in any period that you want.

Then you will see the "Confirm Settings" on the next page.

After you have added the network cameras to the NAS, go to the "Monitor" page. The first time you access this page by browser, you have to install the ActiveX control (QMon.cab) in order to view the images of Camera 1 and Camera 2.

**Note:**

- You can use the Surveillance Station in Chrome, Firefox or IE. The browser will prompt you to install the "ActiveX control" (QMon.cab) before using Monitor or Playback functions. Please follow the on-screen instructions to complete the installation.
- The default IP and ID of administrator may differ based on what camera model is used.

When you click on the monitoring screen of a camera, the frame will become orange. You can use the floating buttons on the channel to control the camera. For example, you can take a snapshot of the monitored image, enable or disable manual recording, enable or disable the audio function of the camera, use the audio broadcast function, or enter the camera's configuration page.

## **Basic System Configuration and Playback**

### **Configuring Alarm Recording on the QNAP NAS**

The Surveillance Station supports alarm recording by schedule. To use this function, go to "Camera Settings" > "Event Management" in the Surveillance Station. You could select "Traditional Mode" to configure basic settings or "Advanced Mode" to define advanced alarm events.

- Traditional Mode: Define criteria enabling alarm recording then click "Apply" to save the changes.
- Advanced Mode: Select the event on the left side and add an action on the right side by clicking "Add".

Then, choose the action type you need for this event.

The event "Motion Detection" has a corresponding action "Recording".

### **Playing Video Files from the Surveillance Station**

Click the "Play" button or "Playback" to enter the playback page and follow the steps below to play the video files on the remote Surveillance Station.

1. Drag and drop camera(s) from the server/camera tree on the left to the respective playback window(s) to select the channel(s) for playback.
2. Select a playback date. Examine each channel to know the time range when the files were recorded for each IP camera. The blue cells indicate regular recording files and the red cells indicate alarm recording files. If it is blank, it means no files are recorded at that time.
3. Click the "Play" button to start the playback. You can control the speed and playback direction by dragging the button to right or left on the shuttle bar.
4. Specify the time to play back the recording files at that moment. You can view the preview image on the timeline bar to search the moment you want to play.
5. Click the "Play" button to control all the playback windows to play back the recording files. When this function is enabled, the playback options (play, pause, stop, previous/next frame, previous/next file, speed adjustment) will be applied to all the playback windows.



8.10 App Center

The App Center is a digital platform for distribution of NAS apps. Users can search for, install, remove and update apps developed by QNAP or third party apps through the App Center to expand the services and add new features on the NAS.



Starting App Center

The App Center can be launched from the App Center shortcut on the Main Menu or the NAS Desktop.

Familiarizing yourself with App Center

Menu Bar



N o	Name	Description
1	Search Bar	Search apps that are available to install on the NAS.
2	Update All	Update all apps that are currently installed on the NAS
3	Refresh	Refresh the current page

4	Install Manually	Browse to upload and install a QPKG add-on manually.
5	Sort	Sort apps by category, name or release date.

### Left Panel

- **Public Apps:** List apps that are set to be accessible by the public. To set an app as a public app, please go to "My Apps", check "Show on login screen" at bottom of the app icon box and that app will show up in the login screen. Please note that to show public apps on the login page, please first enable the photo wall style login page. For details on login screen setup, please refer to [here](#)<sup>46</sup>.
- **My Apps:** List apps that are currently installed on the NAS.
- **Update:** List available updates of the apps currently installed on the NAS.
- **My Licenses:** List licenses for all apps to be installed on the NAS and you can also add and activate your licenses.
- **All Apps:** List all apps that can be installed on the NAS.
- **QNAP Essentials:** List apps developed by QNAP.
- **Recommended:** List apps recommended by QNAP (they could be either developed by QNAP or third party developers.)
- **Beta Lab:** List beta apps for your first-hand experiences.
- **Partners:** List apps developed by QNAP partners.
- **Apps by types:** From "Backup/Sync" to "Education", those are app categories listed to facilitate your app searches.

## Using App Center

### Searching apps

To search for an app, enter the keyword in the search bar.

### Installing, updating and removing apps

To install an app, click the "Add to QTS+" button and the installation process will begin. After the installation process is complete, the "Add to QTS+" button will turn to the "Open" button and you can directly click this button to launch this newly installed app. This newly installed app will then show up in "My Apps".

#### Note:

- Make sure the NAS is connected to the Internet.

- QNAP is not responsible for troubleshooting any issues caused by the open source software/add-ons. Users are recommended to participate in the discussion in the QNAP community forum or contact the original creators of the open source software for the solutions.
- When installing an add-on which requires a prerequisite app, the prerequisite add-on will be added to the installation queue automatically prior to the dependent add-on.
- If the app update process is canceled before it is finished, please install the app from the App Center again.

To update an app, click "Update" and click "OK" to confirm. Alternatively, you may click "Update All" on the menu bar to install all updates and "Refresh" to check for the latest updates. The button will turn to "Open" to signify that the update is complete for an app. To remove an app, first click an installed app to open its introduction page. Click "Remove" on the page to uninstall it from the NAS and click "OK" to confirm.

**Note:**

- Click the on/off button in an app icon to enable or disable an app.
- For more apps, please visit the QNAP official site (<http://www.qnap.com/go/qpkg.html>).

### **Offline Installation**

To install apps when the NAS is offline or beta apps that are not officially available on the QNAP App server, users can download the app application (\*.qpkg) from the QNAP website (<http://www.qnap.com/go/qpkg.html>) or forum (<http://forum.qnap.com/>), unzip the files, and click "Install Manually" on the menu bar to install the apps manually.

## 9. Use the LCD Panel

This feature is only provided by the NAS models with LCD panels. Please visit <http://www.qnap.com> for details.

You can use the LCD panel to perform disk configuration and view the system information.

When the NAS has started up, you will be able to view the NAS name and IP address:

N	A	S	5	F	4	D	E	3						
1	6	9	.	2	5	4	.	1	0	0	.	1	0	0

For the first time installation, the LCD panel shows the number of hard drives detected and the IP address. You may select to configure the hard drives.

Number of hard drives detected	Default disk configuration	Available disk configuration options*
1	Single	Single
2	RAID 1	Single -> JBOD -> RAID 0 -> RAID 1
3	RAID 5	Single -> JBOD -> RAID 0 -> RAID 5
4 or above	RAID 5	Single -> JBOD -> RAID 0 -> RAID 5 -> RAID 6

\*Press the "Select" button to choose the option, and press the "Enter" button to confirm.

For example, when you turn on the NAS with 5 hard drives installed, the LCD panel shows:

C	o	n	f	i	g	.		D	i	s	k	s	?		
→	R	A	I	D	5										

You can press the "Select" button to browse more options, for example, RAID 6. Press the "Enter" button and the following message shows. Press the "Select" button to

select "Yes" to confirm.

C	h	o	o	s	e		R	A	I	D	5	?				
→	Y	e	s			N	o									

When you execute RAID 1, RAID 5, or RAID 6 configuration, the system will initialize the hard drives, create the RAID device, format the RAID device, and mount it as a volume on the NAS. The progress will be shown on the LCD panel. When it reaches 100%, you can connect to the RAID volume, for example, create folders and upload files to the folders on the NAS. In the meantime, to make sure the stripes and blocks in all the RAID component devices are ready, the NAS will execute RAID synchronization and the progress will be shown on "Storage Manager" > "Volume Management" page. The synchronization rate is around 30-60 MB/s (varies depending on the hard drive models, system resource usage, etc.)

**Note:** If a member drive of the RAID configuration was lost during the synchronization, the RAID device will enter degraded mode. The volume data is still accessible. If you add a member drive to the device, it will start to rebuild. You can check the status on the "Volume Management" page.

To encrypt the disk volume\*, select "Yes" when the LCD panel shows <Encrypt Volume? >. The default encryption password is "admin". To change the password, login the NAS with an administrator account and change the settings in "Storage Manager" > "Encrypted File System".

E	n	c	r	y	p	t		V	o	l	u	m	e	?		
→	Y	e	s			N	o									

When the configuration is finished, the NAS name and IP address will be shown. If the NAS fails to create the disk volume, the following message will be shown.

C	r	e	a	t	i	n	g	.	.	.						
R	A	I	D	5		F	a	i	l	e	d					

\*This feature is not supported by TS-110, TS-119, TS-210, TS-219, TS-219P, TS-410, TS-419P, TS-410U, TS-419U, TS-119P+, TS-219P+, TS-419P+, TS-112, TS-212, TS-412, TS-419U+, TS-412U.

The data encryption functions may not be available in accordance to the legislative

restrictions of some countries.

## Viewing System Information on LCD Panel

When the LCD panel shows the NAS name and IP address, you may press the "Enter" button to enter the Main Menu. The Main Menu consists of the following items:

1. TCP/IP
2. Physical disk
3. Volume
4. System
5. Shut down
6. Reboot
7. Password
8. Back

### TCP/IP

In TCP/IP, you can view the following options:

1. LAN IP Address
2. LAN Subnet Mask
3. LAN Gateway
4. LAN PRI. DNS
5. LAN SEC. DNS
6. Enter Network Settings
  - Network Settings – DHCP
  - Network Settings – Static IP\*
  - Network Settings – BACK
7. Back to Main Menu

**\* In Network Settings – Static IP, you can configure the IP address, subnet mask, gateway, and DNS of LAN 1 and LAN 2.**

### Physical disk

In Physical disk, you can view the following options:

1. Disk Info
2. Back to Main Menu

The disk info shows the temperature and the capacity of the hard drives.

D	i	s	k	:	1		T	e	m	p	:	5	0	°	C
---	---	---	---	---	---	--	---	---	---	---	---	---	---	---	---

S i z e : 2 3 2 G B

## Volume

This section shows the hard drive configuration of the NAS. The first line shows the RAID configuration and storage capacity; the second line shows the member drive number of the configuration.

R A I D 5 7 5 0 G B  
D r i v e 1 2 3 4

If there is more than one volume, press the "Select" button to view the information. The following table shows the description of the LCD messages for RAID 5 configuration.

LCD Display	Drive configuration
RAID5+S	RAID5+spare
RAID5 (D)	RAID 5 degraded mode
RAID 5 (B)	RAID 5 rebuilding
RAID 5 (S)	RAID 5 re-synchronizing
RAID 5 (U)	RAID 5 is unmounted
RAID 5 (X)	RAID 5 non-activated

## System

This section shows the system temperature and the rotation speed of the system fan.

C P U T e m p : 5 0 ° C  
S y s T e m p : 5 5 ° C

S y s F a n : 8 6 5 R P M

## Shut down

Use this option to turn off the NAS. Press the "Select" button to select "Yes". Then press the "Enter" button to confirm.

## Reboot

Use this option to restart the NAS. Press the "Select" button to select "Yes". Then press

the "Enter" button to confirm.

### Password

The default password of the LCD panel is blank. Enter this option to change the password of the LCD panel. Select "Yes" to continue.

C	h	a	n	g	e		P	a	s	s	w	o	r	d	
					Y	e	s	→	N	o					

You may enter a password of maximum 8 numeric characters (0-9). When the cursor moves to "OK", press the "Enter" button. Verify the password to confirm the changes.

N	e	w		P	a	s	s	w	o	r	d	:			
														O	K

### Back

Select this option to return to the main menu.

### System Messages

When the NAS encounters system error, an error message will be shown on the LCD panel. Press the "Enter" button to view the message. Press the "Enter" button again to view the next message.

S	y	s	t	e	m		E	r	r	o	r	!			
P	l	s	.		C	h	e	c	k		L	o	g	s	

System Message	Description
Sys. Fan Failed	The system fan fails.
Sys. Overheat	The system overheats.
HDD Overheat	A hard drive overheats.
CPU Overheat	The CPU overheats.
Network Lost	Both LAN 1 and LAN 2 are disconnected in failover or load balancing mode.
LAN1 Lost	LAN 1 is disconnected.
LAN2 Lost	LAN 2 is disconnected.



HDD Failure	A hard drive fails.
Vol1 Full	The disk volume (1) is full.
HDD Ejected	A hard drive is ejected.
Vol1 Degraded	The disk volume (1) is in degraded mode.
Vol1 Unmounted	The disk volume (1) is unmounted.
Vol1 Nonactivate	The disk volume (1) is inactive.

## 10. GNU GENERAL PUBLIC LICENSE

Version 3, 29 June 2007

Copyright © 2007 Free Software Foundation, Inc. <<http://fsf.org/>>

Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

### **Preamble**

The GNU General Public License is a free, copyleft license for software and other kinds of works.

The licenses for most software and other practical works are designed to take away your freedom to share and change the works. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change all versions of a program- to make sure it remains free software for all its users. We, the Free Software Foundation, use the GNU General Public License for most of our software; it applies also to any other work released this way by its authors. You can apply it to your programs, too.

When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for them if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs, and that you know you can do these things.

To protect your rights, we need to prevent others from denying you these rights or asking you to surrender the rights. Therefore, you have certain responsibilities if you distribute copies of the software, or if you modify it: responsibilities to respect the freedom of others.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must pass on to the recipients the same freedoms that you received. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights.

Developers that use the GNU GPL protect your rights with two steps: (1) assert copyright on the software, and (2) offer you this License giving you legal permission to copy, distribute and/or modify it.

For the developers' and authors' protection, the GPL clearly explains that there is no warranty for this free software. For both users' and authors' sake, the GPL requires that modified versions be marked as changed, so that their problems will not be attributed erroneously to authors of previous versions.

Some devices are designed to deny users access to install or run modified versions of the software inside them, although the manufacturer can do so. This is fundamentally incompatible with the aim of protecting users' freedom to change the software. The systematic pattern of such abuse occurs in the area of products for individuals to use, which is precisely where it is most unacceptable. Therefore, we have designed this version of the GPL to prohibit the practice for those products. If such problems arise substantially in other domains, we stand ready to extend this provision to those domains in future versions of the GPL, as needed to protect the freedom of users.

Finally, every program is threatened constantly by software patents. States should not allow patents to restrict development and use of software on general-purpose computers, but in those that do, we wish to avoid the special danger that patents applied to a free program could make it effectively proprietary. To prevent this, the GPL assures that patents cannot be used to render the program non-free.

The precise terms and conditions for copying, distribution and modification follow.

## **TERMS AND CONDITIONS**

### **0. Definitions.**

'This License' refers to version 3 of the GNU General Public License.

'Copyright' also means copyright-like laws that apply to other kinds of works, such as semiconductor masks.

'The Program' refers to any copyrightable work licensed under this License. Each licensee is addressed as 'you'. 'Licensees' and 'recipients' may be individuals or organizations.

To 'modify' a work means to copy from or adapt all or part of the work in a fashion requiring copyright permission, other than the making of an exact copy. The resulting work is called a 'modified version' of the earlier work or a work 'based on' the earlier work.

A 'covered work' means either the unmodified Program or a work based on the Program.

To 'propagate' a work means to do anything with it that, without permission, would make you directly or secondarily liable for infringement under applicable copyright law, except executing it on a computer or modifying a private copy. Propagation includes copying, distribution (with or without modification), making available to the public, and in some countries other activities as well.

To 'convey' a work means any kind of propagation that enables other parties to make or receive copies. Mere interaction with a user through a computer network, with no transfer of a copy, is not conveying.

An interactive user interface displays 'Appropriate Legal Notices' to the extent that it includes a convenient and prominently visible feature that (1) displays an appropriate copyright notice, and (2) tells the user that there is no warranty for the work (except to the extent that warranties are provided), that licensees may convey the work under this License, and how to view a copy of this License. If the interface presents a list of user commands or options, such as a menu, a prominent item in the list meets this criterion.

#### 1. Source Code.

The 'source code' for a work means the preferred form of the work for making modifications to it. 'Object code' means any non-source form of a work.

'Standard Interface' means an interface that either is an official standard defined by a recognized standards body, or, in the case of interfaces specified for a particular programming language, one that is widely used among developers working in that language.

The 'System Libraries' of an executable work include anything, other than the work as a whole, that:

- a) is included in the normal form of packaging a Major Component, but which is not part of that Major Component, and

- b) serves only to enable use of the work with that Major Component, or to implement a Standard Interface for which an implementation is available to the public in source code form. A 'Major Component', in this context, means a major essential component (kernel, window system, and so on) of the specific operating system (if any) on which the executable work runs, or a compiler used to produce the work, or an object code interpreter used to run it.

The 'Corresponding Source' for a work in object code form means all the source code needed to generate, install, and (for an executable work) run the object code and to modify the work, including scripts to control those activities. However, it does not include the work's System Libraries, or general-purpose tools or generally available free programs which are used unmodified in performing those activities but which are not part of the work. For example, Corresponding Source includes interface definition files associated with source files for the work, and the source code for shared libraries and dynamically linked subprograms that the work is specifically designed to require, such as by intimate data communication or control flow between those subprograms and other parts of the work.

The Corresponding Source need not include anything that users can regenerate automatically from other parts of the Corresponding Source.

The Corresponding Source for a work in source code form is that same work.

## 2. Basic Permissions.

All rights granted under this License are granted for the term of copyright on the Program, and are irrevocable provided the stated conditions are met. This License explicitly affirms your unlimited permission to run the unmodified Program. The output from running a covered work is covered by this License only if the output, given its content, constitutes a covered work. This License acknowledges your rights of fair use or other equivalent, as provided by copyright law.

You may make, run and propagate covered works that you do not convey, without conditions so long as your license otherwise remains in force. You may convey covered works to others for the sole purpose of having them make modifications exclusively for you, or provide you with facilities for running those works, provided that you comply with the terms of this License in conveying all material for which you do not control copyright. Those thus making or running the covered works for you must do so exclusively on your behalf, under your direction and control, on terms that prohibit

them from making any copies of your copyrighted material outside their relationship with you.

Conveying under any other circumstances is permitted solely under the conditions stated below. Sublicensing is not allowed; section 10 makes it unnecessary.

### 3. Protecting Users' Legal Rights From Anti-Circumvention Law.

No covered work shall be deemed part of an effective technological measure under any applicable law fulfilling obligations under article 11 of the WIPO copyright treaty adopted on 20 December 1996, or similar laws prohibiting or restricting circumvention of such measures.

When you convey a covered work, you waive any legal power to forbid circumvention of technological measures to the extent such circumvention is effected by exercising rights under this License with respect to the covered work, and you disclaim any intention to limit operation or modification of the work as a means of enforcing, against the work's users, your or third parties' legal rights to forbid circumvention of technological measures.

### 4. Conveying Verbatim Copies.

You may convey verbatim copies of the Program's source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice; keep intact all notices stating that this License and any non-permissive terms added in accord with section 7 apply to the code; keep intact all notices of the absence of any warranty; and give all recipients a copy of this License along with the Program.

You may charge any price or no price for each copy that you convey, and you may offer support or warranty protection for a fee.

### 5. Conveying Modified Source Versions.

You may convey a work based on the Program, or the modifications to produce it from the Program, in the form of source code under the terms of section 4, provided that you also meet all of these conditions:

- a) The work must carry prominent notices stating that you modified it, and giving a relevant date.
- b) The work must carry prominent notices stating that it is released under this License and any conditions added under section 7. This requirement modifies the

requirement in section 4 to 'keep intact all notices'.

- c) You must license the entire work, as a whole, under this License to anyone who comes into possession of a copy. This License will therefore apply, along with any applicable section 7 additional terms, to the whole of the work, and all its parts, regardless of how they are packaged. This License gives no permission to license the work in any other way, but it does not invalidate such permission if you have separately received it.
- d) If the work has interactive user interfaces, each must display Appropriate Legal Notices; however, if the Program has interactive interfaces that do not display Appropriate Legal Notices, your work need not make them do so.

A compilation of a covered work with other separate and independent works, which are not by their nature extensions of the covered work, and which are not combined with it such as to form a larger program, in or on a volume of a storage or distribution medium, is called an 'aggregate' if the compilation and its resulting copyright are not used to limit the access or legal rights of the compilation's users beyond what the individual works permit. Inclusion of a covered work in an aggregate does not cause this License to apply to the other parts of the aggregate.

#### 6. Conveying Non-Source Forms.

You may convey a covered work in object code form under the terms of sections 4 and 5, provided that you also convey the machine-readable Corresponding Source under the terms of this License, in one of these ways:

- a) Convey the object code in, or embodied in, a physical product (including a physical distribution medium), accompanied by the Corresponding Source fixed on a durable physical medium customarily used for software interchange.
- b) Convey the object code in, or embodied in, a physical product (including a physical distribution medium), accompanied by a written offer, valid for at least three years and valid for as long as you offer spare parts or customer support for that product model, to give anyone who possesses the object code either (1) a copy of the Corresponding Source for all the software in the product that is covered by this License, on a durable physical medium customarily used for software interchange, for a price no more than your reasonable cost of physically performing this conveying of source, or (2) access to copy the Corresponding Source from a network server at no charge.
- c) Convey individual copies of the object code with a copy of the written offer to provide the Corresponding Source. This alternative is allowed only occasionally and noncommercially, and only if you received the object code with such an

offer, in accord with subsection 6b.

- d) Convey the object code by offering access from a designated place (gratis or for a charge), and offer equivalent access to the Corresponding Source in the same way through the same place at no further charge. You need not require recipients to copy the Corresponding Source along with the object code. If the place to copy the object code is a network server, the Corresponding Source may be on a different server (operated by you or a third party) that supports equivalent copying facilities, provided you maintain clear directions next to the object code saying where to find the Corresponding Source. Regardless of what server hosts the Corresponding Source, you remain obligated to ensure that it is available for as long as needed to satisfy these requirements.
- e) Convey the object code using peer-to-peer transmission, provided you inform other peers where the object code and Corresponding Source of the work are being offered to the general public at no charge under subsection 6d.

A separable portion of the object code, whose source code is excluded from the Corresponding Source as a System Library, need not be included in conveying the object code work.

A 'User Product' is either (1) a 'consumer product', which means any tangible personal property which is normally used for personal, family, or household purposes, or (2) anything designed or sold for incorporation into a dwelling. In determining whether a product is a consumer product, doubtful cases shall be resolved in favor of coverage. For a particular product received by a particular user, 'normally used' refers to a typical or common use of that class of product, regardless of the status of the particular user or of the way in which the particular user actually uses, or expects or is expected to use, the product. A product is a consumer product regardless of whether the product has substantial commercial, industrial or non-consumer uses, unless such uses represent the only significant mode of use of the product.

'Installation Information' for a User Product means any methods, procedures, authorization keys, or other information required to install and execute modified versions of a covered work in that User Product from a modified version of its Corresponding Source. The information must suffice to ensure that the continued functioning of the modified object code is in no case prevented or interfered with solely because modification has been made.

If you convey an object code work under this section in, or with, or specifically for use



in, a User Product, and the conveying occurs as part of a transaction in which the right of possession and use of the User Product is transferred to the recipient in perpetuity or for a fixed term (regardless of how the transaction is characterized), the Corresponding Source conveyed under this section must be accompanied by the Installation Information. But this requirement does not apply if neither you nor any third party retains the ability to install modified object code on the User Product (for example, the work has been installed in ROM).

The requirement to provide Installation Information does not include a requirement to continue to provide support service, warranty, or updates for a work that has been modified or installed by the recipient, or for the User Product in which it has been modified or installed. Access to a network may be denied when the modification itself materially and adversely affects the operation of the network or violates the rules and protocols for communication across the network.

Corresponding Source conveyed, and Installation Information provided, in accord with this section must be in a format that is publicly documented (and with an implementation available to the public in source code form), and must require no special password or key for unpacking, reading or copying.

## 7. Additional Terms.

'Additional permissions' are terms that supplement the terms of this License by making exceptions from one or more of its conditions. Additional permissions that are applicable to the entire Program shall be treated as though they were included in this License, to the extent that they are valid under applicable law. If additional permissions apply only to part of the Program, that part may be used separately under those permissions, but the entire Program remains governed by this License without regard to the additional permissions.

When you convey a copy of a covered work, you may at your option remove any additional permissions from that copy, or from any part of it. (Additional permissions may be written to require their own removal in certain cases when you modify the work.) You may place additional permissions on material, added by you to a covered work, for which you have or can give appropriate copyright permission.

Notwithstanding any other provision of this License, for material you add to a covered work, you may (if authorized by the copyright holders of that material) supplement the terms of this License with terms:

- a) Disclaiming warranty or limiting liability differently from the terms of sections 15 and 16 of this License; or
- b) Requiring preservation of specified reasonable legal notices or author attributions in that material or in the Appropriate Legal Notices displayed by works containing it; or
- c) Prohibiting misrepresentation of the origin of that material, or requiring that modified versions of such material be marked in reasonable ways as different from the original version; or
- d) Limiting the use for publicity purposes of names of licensors or authors of the material; or
- e) Declining to grant rights under trademark law for use of some trade names, trademarks, or service marks; or
- f) Requiring indemnification of licensors and authors of that material by anyone who conveys the material (or modified versions of it) with contractual assumptions of liability to the recipient, for any liability that these contractual assumptions directly impose on those licensors and authors.

All other non-permissive additional terms are considered 'further restrictions' within the meaning of section 10. If the Program as you received it, or any part of it, contains a notice stating that it is governed by this License along with a term that is a further restriction, you may remove that term. If a license document contains a further restriction but permits relicensing or conveying under this License, you may add to a covered work material governed by the terms of that license document, provided that the further restriction does not survive such relicensing or conveying.

If you add terms to a covered work in accord with this section, you must place, in the relevant source files, a statement of the additional terms that apply to those files, or a notice indicating where to find the applicable terms.

Additional terms, permissive or non-permissive, may be stated in the form of a separately written license, or stated as exceptions; the above requirements apply either way.

## 8. Termination.

You may not propagate or modify a covered work except as expressly provided under this License. Any attempt otherwise to propagate or modify it is void, and will automatically terminate your rights under this License (including any patent licenses granted under the third paragraph of section 11).

However, if you cease all violation of this License, then your license from a particular copyright holder is reinstated (a) provisionally, unless and until the copyright holder explicitly and finally terminates your license, and (b) permanently, if the copyright holder fails to notify you of the violation by some reasonable means prior to 60 days after the cessation.

Moreover, your license from a particular copyright holder is reinstated permanently if the copyright holder notifies you of the violation by some reasonable means, this is the first time you have received notice of violation of this License (for any work) from that copyright holder, and you cure the violation prior to 30 days after your receipt of the notice.

Termination of your rights under this section does not terminate the licenses of parties who have received copies or rights from you under this License. If your rights have been terminated and not permanently reinstated, you do not qualify to receive new licenses for the same material under section 10.

#### 9. Acceptance Not Required for Having Copies.

You are not required to accept this License in order to receive or run a copy of the Program. Ancillary propagation of a covered work occurring solely as a consequence of using peer-to-peer transmission to receive a copy likewise does not require acceptance. However, nothing other than this License grants you permission to propagate or modify any covered work. These actions infringe copyright if you do not accept this License. Therefore, by modifying or propagating a covered work, you indicate your acceptance of this License to do so.

#### 10. Automatic Licensing of Downstream Recipients.

Each time you convey a covered work, the recipient automatically receives a license from the original licensors, to run, modify and propagate that work, subject to this License. You are not responsible for enforcing compliance by third parties with this License.

An 'entity transaction' is a transaction transferring control of an organization, or substantially all assets of one, or subdividing an organization, or merging organizations. If propagation of a covered work results from an entity transaction, each party to that transaction who receives a copy of the work also receives whatever licenses to the work the party's predecessor in interest had or could give under the previous

paragraph, plus a right to possession of the Corresponding Source of the work from the predecessor in interest, if the predecessor has it or can get it with reasonable efforts.

You may not impose any further restrictions on the exercise of the rights granted or affirmed under this License. For example, you may not impose a license fee, royalty, or other charge for exercise of rights granted under this License, and you may not initiate litigation (including a cross-claim or counterclaim in a lawsuit) alleging that any patent claim is infringed by making, using, selling, offering for sale, or importing the Program or any portion of it.

#### 11. Patents.

A 'contributor' is a copyright holder who authorizes use under this License of the Program or a work on which the Program is based. The work thus licensed is called the contributor's 'contributor version'.

A contributor's 'essential patent claims' are all patent claims owned or controlled by the contributor, whether already acquired or hereafter acquired, that would be infringed by some manner, permitted by this License, of making, using, or selling its contributor version, but do not include claims that would be infringed only as a consequence of further modification of the contributor version. For purposes of this definition, 'control' includes the right to grant patent sublicenses in a manner consistent with the requirements of this License.

Each contributor grants you a non-exclusive, worldwide, royalty-free patent license under the contributor's essential patent claims, to make, use, sell, offer for sale, import and otherwise run, modify and propagate the contents of its contributor version.

In the following three paragraphs, a 'patent license' is any express agreement or commitment, however denominated, not to enforce a patent (such as an express permission to practice a patent or covenant not to sue for patent infringement). To 'grant' such a patent license to a party means to make such an agreement or commitment not to enforce a patent against the party.

If you convey a covered work, knowingly relying on a patent license, and the Corresponding Source of the work is not available for anyone to copy, free of charge and under the terms of this License, through a publicly available network server or other readily accessible means, then you must either (1) cause the Corresponding Source to be so available, or (2) arrange to deprive yourself of the benefit of the

patent license for this particular work, or (3) arrange, in a manner consistent with the requirements of this License, to extend the patent license to downstream recipients. 'Knowingly relying' means you have actual knowledge that, but for the patent license, your conveying the covered work in a country, or your recipient's use of the covered work in a country, would infringe one or more identifiable patents in that country that you have reason to believe are valid.

If, pursuant to or in connection with a single transaction or arrangement, you convey, or propagate by procuring conveyance of, a covered work, and grant a patent license to some of the parties receiving the covered work authorizing them to use, propagate, modify or convey a specific copy of the covered work, then the patent license you grant is automatically extended to all recipients of the covered work and works based on it.

A patent license is 'discriminatory' if it does not include within the scope of its coverage, prohibits the exercise of, or is conditioned on the non-exercise of one or more of the rights that are specifically granted under this License. You may not convey a covered work if you are a party to an arrangement with a third party that is in the business of distributing software, under which you make payment to the third party based on the extent of your activity of conveying the work, and under which the third party grants, to any of the parties who would receive the covered work from you, a discriminatory patent license (a) in connection with copies of the covered work conveyed by you (or copies made from those copies), or (b) primarily for and in connection with specific products or compilations that contain the covered work, unless you entered into that arrangement, or that patent license was granted, prior to 28 March 2007.

Nothing in this License shall be construed as excluding or limiting any implied license or other defenses to infringement that may otherwise be available to you under applicable patent law.

#### 12. No Surrender of Others' Freedom.

If conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot convey a covered work so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not convey it at all. For example, if you agree to terms that obligate you to collect a royalty for further conveying from those to whom

you convey the Program, the only way you could satisfy both those terms and this License would be to refrain entirely from conveying the Program.

#### 13. Use with the GNU Affero General Public License.

Notwithstanding any other provision of this License, you have permission to link or combine any covered work with a work licensed under version 3 of the GNU Affero General Public License into a single combined work, and to convey the resulting work. The terms of this License will continue to apply to the part which is the covered work, but the special requirements of the GNU Affero General Public License, section 13, concerning interaction through a network will apply to the combination as such.

#### 14. Revised Versions of this License.

The Free Software Foundation may publish revised and/or new versions of the GNU General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Program specifies that a certain numbered version of the GNU General Public License 'or any later version' applies to it, you have the option of following the terms and conditions either of that numbered version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of the GNU General Public License, you may choose any version ever published by the Free Software Foundation.

If the Program specifies that a proxy can decide which future versions of the GNU General Public License can be used, that proxy's public statement of acceptance of a version permanently authorizes you to choose that version for the Program.

Later license versions may give you additional or different permissions. However, no additional obligations are imposed on any author or copyright holder as a result of your choosing to follow a later version.

#### 15. Disclaimer of Warranty.

THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM 'AS IS' WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM

IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

16. Limitation of Liability.

IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MODIFIES AND/OR CONVEYS THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

17. Interpretation of Sections 15 and 16.

If the disclaimer of warranty and limitation of liability provided above cannot be given local legal effect according to their terms, reviewing courts shall apply local law that most closely approximates an absolute waiver of all civil liability in connection with the Program, unless a warranty or assumption of liability accompanies a copy of the Program in return for a fee.

END OF TERMS AND CONDITIONS

